



השתלמות מקצועית בנושא תכנות בסיסי בשפת R



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בעלים של שווי פנימי – מעריכי שווי בלתי תלויים
מנכ"ל לשכת מעריכי השווי והאקטוארים הפיננסיים בישראל (IAVFA)

תל אביב, 26 בדצמבר 2019



1. משתנים

1. משתנים



ערכים ותקנון התחרות!

R (שפת תכנות)

ערך זה זקוק לעריכה: הסיבה לכך היא: יש צורך בהגהה ועריכה.



אתם מוזמנים לסייע ולתקן את הבעיות, אך אנא אל תורידו את ההודעה כל עוד לא תוקן הדף. אם אתם סבורים כי אין בדף בעיה, ניתן לציין זאת בדף השיחה.

עריכה

R



פרדיגמות תכנות מונחה-עצמים, תכנות פונקציונלי

1993

מתכנ Ross Ihaka and Robert Gentleman

R Core Team

גרסה 3.3.1 (June 21, 2016)

אחרונה

הושפעה על S

ידי

רישיון GPL-2.0

<http://www.r-project.org>

R היא שפת תכנות וסביבת עבודה (בקוד פתוח) למחשוב ולגרפיקה סטטיסטיים. שפת R נמצאת בשימוש נרחב בקרב סטטיסטיקאים וכורי מידע ומשמשת לפיתוח תוכנה סטטיסטית וניתוח נתונים. סקרים ומחקרים שנערכו הראו כי הפופולריות של R גדלה באופן משמעותי, ונכון לעשור השני של המאה ה-21 היא כבר נחשבת לסטנדרט ביצירה של תוכנות סטטיסטיות. [דרוש מקור]

R היא יישום של **שפת התכנות S** בשילוב עם **סמנטיקה לקסיקלית** בהשראת שפת התכנות Scheme. היא נוצרה על ידי **רוס איהקה ורוברט ג'נטלמן** באוניברסיטת אוקלנד בניו זילנד. השפה קיבלה את שמה מהאות הראשונה של שמם של יוצריה וכמחווה לשפת S. R מופצת כתוכנה חופשית, כחלק מפרויקט גנו, ומופצת לפי תנאי הרישיון הציבורי הכללי של גנו (גרסה 2). קוד המקור שלה כתוב בבסיסו בשפת C ופורטן וכן בשפת R עצמה. ל-R יש ממשק שורת פקודה, אולם יש גם מספר ממשקי משתמש גרפיים לשימוש עם R.

תוכן עניינים [הסתרה]

- 1 היסטוריה
- 2 מאפייני שפה
- 3 מאפיינים סטטיסטיים
- 4 גרפיקה
- 5 מאפיינים תכנותיים
- 6 דוגמאות קוד
 - 6.1 דוגמה 1 - תחביר בסיסי
 - 6.2 דוגמה 2
 - 6.3 דוגמה 3 - שימוש בספריות חיצוניות

עמוד ראשי

ברוכים הבאים

שינויים אחרונים

ערכים מומלצים

דיווח על טעות

פורטלים

ערך אקראי

תרומה לוויקיפדיה

טיפ

גם אתם יכולים לערוך ערכים בוויקיפדיה! למידע נוסף ראו כאן.

קהילה

שער הקהילה

עזרה

ייעוץ

מזנון

כיצד העיר

חדשות

לוח מודעות

יצירת קשר

ספר אורחים

כלים

דפים המקושרים לכאן

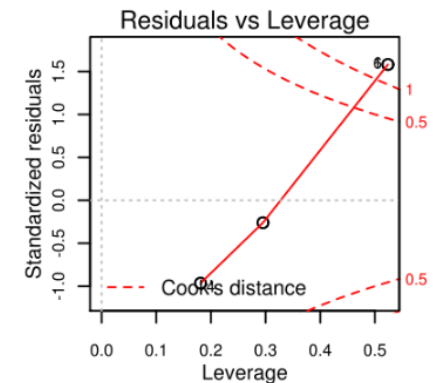
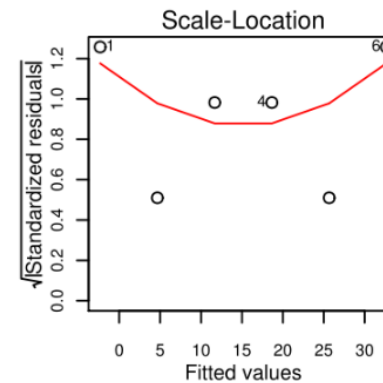
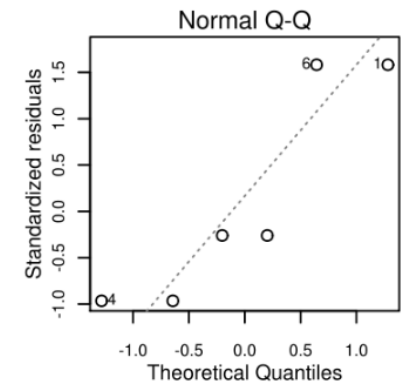
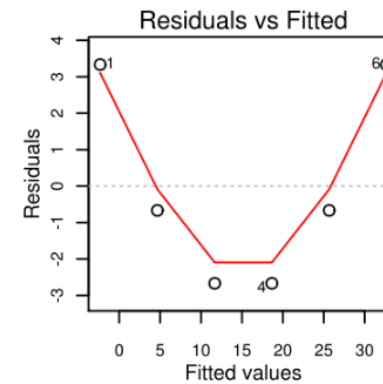
שינויים בדפים המקושרים

דפים מיוחדים

קישור קבוע

1. משתנים

```
> par(mfrow=c(2, 2)) # בקשה לגרף בממדים 2x2  
> plot(lm_1) # גרף דיאגנוסטי של מודל הרגרסיה
```



1. משתנים

The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Tools, and Help. Below the menu is a toolbar with icons for file operations and a 'Go to file/function' search bar. The main workspace is divided into two panes. The left pane, titled 'Console', shows the R startup message and several lines of text: 'R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"', 'Copyright (C) 2016 The R Foundation for Statistical Computing', 'Platform: x86_64-w64-mingw32/x64 (64-bit)', 'R is free software and comes with ABSOLUTELY NO WARRANTY. You are welcome to redistribute it under certain conditions. Type \'license()\' or \'licence()\' for distribution details.', 'R is a collaborative project with many contributors. Type \'contributors()\' for more information and \'citation()\' on how to cite R or R packages in publications.', 'Type \'demo()\' for some demos, \'help()\' for on-line help, or \'help.start()\' for an HTML browser interface to help.', 'Type \'q()\' to quit R.', and a prompt '> |'. The right pane, titled 'Environment', shows 'Global Environment' and 'Environment is empty'. Below the Environment pane is a file explorer showing the 'Home' directory. The file explorer has tabs for Files, Plots, Packages, Help, and Viewer. It includes buttons for 'New Folder', 'Delete', 'Rename', and 'More'. The file list shows various folders and files, including '.Rhistory', 'Apowersoft', 'delete', 'IISExpress', 'My Web Sites', 'nadav.java', 'nadavba', 'nadavBaC++', 'R', 'temp', and 'tempp'. A yellow circle highlights the 'IISExpress' folder. The status bar at the bottom shows 'Project: (None)'.

R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"
Copyright (C) 2016 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |

Environment History

Global Environment

Environment is empty

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size	Modified
.Rhistory	590 B	Sep 28, 2016, 4:27 PM
Apowersoft		
delete		
IISExpress		
My Web Sites		
nadav.java	116 B	Sep 5, 2016, 4:13 PM
nadavba		
nadavBaC++		
R		
temp		
tempp		

1. משתנים

The screenshot displays the RStudio application window. The 'File' menu is open, showing options like 'New File', 'Open File...', 'Save', and 'Quit Session...'. The 'New File' submenu is also open, highlighting 'R Script' (Ctrl+Shift+N). The main editor area shows the R license text, including the phrase 'with ABSOLUTELY NO WARRANTY.' and instructions to type 'license()' or 'licence()' for distribution details. The right-hand side of the interface shows the 'Environment' pane, which is currently empty, and the 'Plots', 'Packages', and 'Help' panes.

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

New File ▶ R Script Ctrl+Shift+N

New Project...

Open File... Ctrl+O

Reopen with Encoding...

Recent Files ▶

Open Project...

Open Project in New Session...

Recent Projects ▶

Import Dataset ▶

Save Ctrl+S

Save As...

Save with Encoding...

Save All Ctrl+Alt+S

Knit Document Ctrl+Shift+K

Compile Report...

Publish...

Print...

Close Ctrl+W

Close All Ctrl+Shift+W

Close All Except Current Ctrl+Alt+Shift+W

Close Project

Quit Session... Ctrl+Q

Run Source

Project: (None)

Environment History Connections

Global Environment

Environment is empty

Files Plots Packages Help Viewer

Zoom Export

```
-- "Action of the Toes"
Foundation for Statistical Computing
/x64 (64-bit)

with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
```

1. משתנים

The screenshot displays the RStudio application window. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a 'Go to file/function' search bar. The main editor pane shows a script titled 'Untitled1*' with the following R code:

```
1 | mge1,p,e,g'45[3]'
```

The status bar at the bottom of the editor indicates '1:18 (Top Level)' and 'R Script'. To the right of the editor is the 'Environment' pane, which is currently empty, displaying the message 'Environment is empty'. Below the editor is the 'Console' pane, which shows the R startup output:

```
R version 3.6.1 (2019-07-05) -- "Action of the Toes"  
Copyright (C) 2019 The R Foundation for Statistical Computing  
Platform: x86_64-w64-mingw32/x64 (64-bit)  
  
R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.
```

The bottom right of the interface features a toolbar with tabs for Files, Plots, Packages, Help, and Viewer, along with icons for navigation and zooming.

1. משתנים

The screenshot displays the RStudio environment. At the top, the menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar. The main editor window shows a script titled 'Untitled1*' with the following code:

```
1 lmge1,p,e,g'45[3]'
```

The 'Run' button (a green arrow) in the toolbar is circled in red. Below the editor is the Console pane, which contains the following output:

```
R version 3.6.1 (2019-07-05) -- "Action of the Toes"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
```

The first two paragraphs of the console output are circled in red. On the right side of the RStudio window, there are three panes: Environment, History, and Connections. The Environment pane shows 'Global Environment' and 'Environment is empty'. At the bottom right, there are tabs for Files, Plots, Packages, Help, and Viewer.

1. משתנים

The screenshot displays the RStudio integrated development environment (IDE) interface. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar labeled "Go to file/function". The main editor window, titled "Untitled1*", contains a script with two lines of code: `1 2+2` and `2 |`. The status bar at the bottom of the editor indicates the cursor is at line 2:1, (Top Level), in an R Script file. To the right of the editor is the Environment pane, which shows the "Global Environment" and states "Environment is empty". Below the editor is the Console pane, which shows the output of the first line of code: `> 2+2` resulting in `[1] 4`. The bottom right corner features a dock with tabs for Files, Plots, Packages, Help, and Viewer.

1. משתנים

The screenshot displays the RStudio integrated development environment (IDE) with a dark blue header. The main window is divided into several panes:

- Source Editor:** Contains a script named "Untitled1*" with four lines of R code:

```
1 2+2  
2  
3 3+9  
4
```
- Console:** Shows the execution of the code from the source editor:

```
> 2+2  
[1] 4  
> 3+9  
[1] 12  
> |
```
- Environment Pane:** Located on the right, it shows the "Global Environment" and states "Environment is empty".
- Files Pane:** Located at the bottom right, it shows the file explorer.

The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. The bottom status bar shows the current line (4:1) and the file type (R Script).

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

Source on Save Run Source

```
1 2+2
2
3 3+9
4
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> 2+2
[1] 4
> 3+9
[1] 12
> 2+2
[1] 4
>
> 3+9
[1] 12
>
```

Environment History Connections

Import Dataset List

Global Environment

Environment is empty

Files Plots Packages Help Viewer

Zoom Export

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

Run the current line or selection (Ctrl+Enter)

```
1 3*2
2 5-8
3 8/3
4
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> 3*2
[1] 6
> 5-8
[1] -3
> 8/3
[1] 2.666667
>
```

Environment History Connections

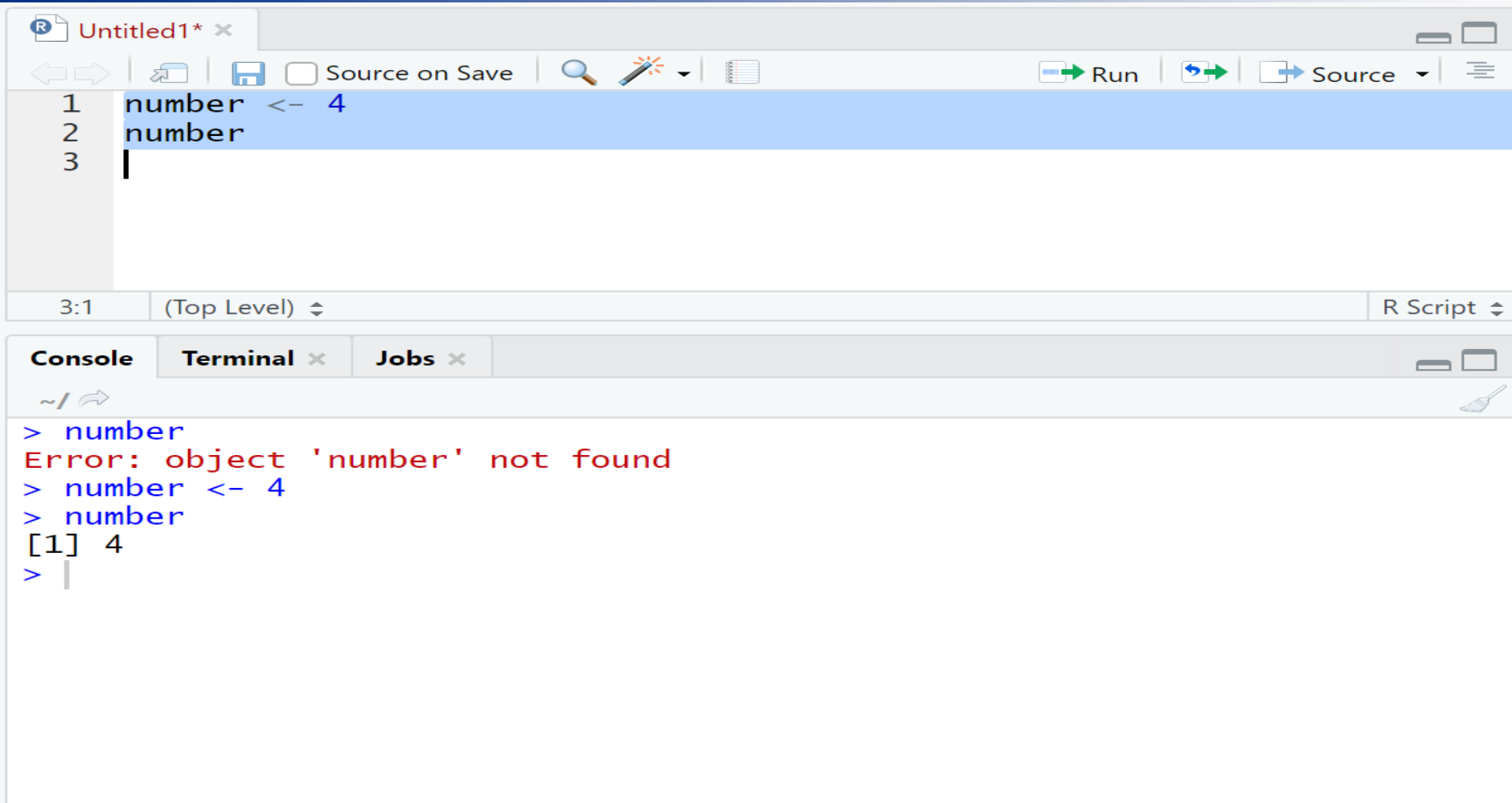
Global Environment

Environment is empty

Files Plots Packages Help Viewer

Zoom Export

1. משתנים



```
1 number <- 4
2 number
3
```

3:1 (Top Level) R Script

Console Terminal Jobs

```
> number
Error: object 'number' not found
> number <- 4
> number
[1] 4
>
```

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 number <- 4
2 number
3
```

Run Source

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

number	4
--------	---

Functions

Polanitze... function (Stock, Strike...

Console Terminal Jobs

>

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 number <- 4
2 number
3
4 number+2
5
```

4:1 (Top Level) R Script

Console Terminal Jobs

```
> number+2
[1] 6
>
```

Environment History Connections

Global Environment

Data

- polanitizer 10 obs. of 4 variables
- x 10 obs. of 4 variables

Values

number	4
--------	---

Functions

- Polanitze... function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1* x

```
1 number <- 4
2 number
3
4 number+2
5 number
6
```

5:1 (Top Level) R Script

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

number	4
--------	---

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Console Terminal Jobs

```
> number+2
[1] 6
> number
[1] 4
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 number <- 4
2 number
3
4 number+2
5 number*4
6
```

Run Source

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

number	4
--------	---

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Console

```
[1] 6
> number
[1] 4
> number*4
[1] 16
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

- polanitizer 10 obs. of 4 variables
- x 10 obs. of 4 variables

Values

myname	"roi"
number	4

Functions

- Polanitze... function (Stock, Strike...

Console

```
> myname <- "roi"
>
> myname
[1] "roi"
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 myname <- "roi"
2 number <- 5
```

Run Source

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Console Terminal x Jobs x

```
> number <- 5
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 myname <- "roi"
2 number <- number2 <- 5
3 number2
4
5
```

Source on Save Run Source

1:1 (Top Level) R Script

Environment History Connections

Global Environment

Data

- polanitizer 10 obs. of 4 variables
- x 10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5

Functions

- Polanitze... function (Stock, Strike...

Console Terminal Jobs

```
> myname <- "roi"
> number <- number2 <- 5
> number2
[1] 5
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

Untitled1*

```
1 orange <- 3
2 orange
```

2:7 (Top Level) R Script

Console Terminal Jobs

```
> orange <- 3
> orange
[1] 3
>
```

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 orange <- 3
2 orange
3
4 class(orange)
```

4:1 (Top Level) R Script

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (stock, strike...
--------------	----------------------------

Console Terminal x Jobs x

```
> orange <- 3
> orange
[1] 3
> class(orange)
[1] "numeric"
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 orange <- 3
2 orange
3
4 class(myname)
```

Run Source

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Console

```
[1] 3
> class(orange)
[1] "numeric"
> class(myname)
[1] "character"
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 is.character(myname)
```

1:21 (Top Level) R Script

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Console Terminal x Jobs x

```
> is.character(myname)
[1] TRUE
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1:21 (Top Level) R Script

```
1 is.character(orange)
```

Console Terminal Jobs

```
> is.character(myname)
[1] TRUE
> is.character(orange)
[1] FALSE
>
```

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

Untitled1* x

Source on Save

Run

Source

```
1 is.numeric(orange)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> is.numeric(orange)
[1] TRUE
>
```

1. משתנים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Polanitzer.R*

```
1 is.numeric(orange)
2
3 is.numeric(myname)
4
```

4:1 (Top Level) R Script

Console Terminal Jobs

```
> is.numeric(orange)
[1] TRUE
>
> is.numeric(myname)
[1] FALSE
>
```

Environment History Connections

Global Environment

Data

polanitzer 10 obs. of 4 variables

Values

myname	"roi frm"
number	5

Files Plots Packages Help Viewer

Install Update

Install R packages

	Description	Versi...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2
☐ askpass	Safe Password Entry for R, Git, and SSH	1.1
☐ assertthat	Easy Pre and Post Assertions	0.2.1



2. תאריכים ואופרטורים לוגיים

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3

Functions

Polanitze...	function (Stock, Strike...
--------------	----------------------------

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

roi2.R*

```
1 toto <- roi33
2 toto
3
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- roi33
Error: object 'roi33' not found
> toto
Error: object 'toto' not found
>
```

2. תאריכים ואופרטורים לוגיים

RStudio interface showing a script, console, and environment pane.

Script Editor (roi2.R* x):

```
1 toto <- "3-12-2019"
2 toto
3 |
```

Console:

```
> toto <- "3-12-2019"
> toto
[1] "3-12-2019"
>
```

Environment Pane:

Global Environment	
Data	
polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables
Values	
myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
Functions	
Polanitze...	function (Stock, Strike...

Files Pane:

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 toto <- "3-12-2019"
2 toto
3
4 totodate <- as.Date("3-12-2019")
5 totodate
```

Environment History Connections

Global Environment

Data

- polanitizer 10 obs. of 4 variables
- x 10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20

Functions

Polanize function (Stock Strike)

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

Console

```
[1] "3-12-2019"
>
> totodate <- as.Date("3-12-2019")
> totodate
[1] "0003-12-20"
>
```

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 toto <- "3-12-2019"
2
3 totodate <- as.Date("3-12-2019")
4
5 class(toto)
6 class(totodate)
```

5:1 (Top Level) R Script

Console Terminal Jobs

```
> class(toto)
[1] "character"
> class(totodate)
[1] "Date"
> |
```

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20

Functions

polanitze function (Stock Strike)

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

2. תאריכים ואופרטורים לוגיים

The screenshot displays the RStudio environment with the following components:

- Script Editor:** Contains the R script `roi2.R` with the code `5>7` on line 1.
- Console:** Shows the execution of `5>7`, resulting in `[1] FALSE`.
- Environment Pane:** Displays the Global Environment with the following data and values:

Data	
polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables
Values	
myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20
- Files Pane:** Shows the project files `.RData` (4.3 KB) and `.Rhistory` (6.9 KB).

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20

Functions

polanitze function (Stock Strike

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

roi2.R*

1 55>7

Run Source

1:1 (Top Level) R Script

Console Terminal Jobs

```
> 55>7
[1] TRUE
>
```

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

roi2.R*

```
1 55>7
2
3 8==5
```

Run Source

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20

Functions

polanitze function (Stock Strike

Console Terminal Jobs

```
> 55>7
[1] TRUE
> 8==5
[1] FALSE
>
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
x	10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
orange	3
toto	"3-12-2019"
totodate	0003-12-20

Functions

polanitizer function (Stock Strike)

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

roi2.R*

1 2!=9

Run Source

1:1 (Top Level) R Script

Console Terminal Jobs

```
> 2!=9
[1] TRUE
>
```


2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 prange <- 5
2 olive <- 3
3
4 orange>olive
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> orange <- 5
> olive <- 3
>
> orange>olive
[1] TRUE
>
```

Environment History Connections

Global Environment

Data

- polanitizer 10 obs. of 4 variables
- x 10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
olive	3
orange	5
toto	"3-12-2019"
totodate	0003-12-20

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
roi2.R*  
1 toto <- "roi"  
2 toto2 <- "ben"  
3  
4 toto==toto2
```

Run Source

Environment History Connections

Global Environment

x 10 obs. of 4 variables

Values

myname	"roi"
number	5
number2	5
olive	3
orange	5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

Console

```
> toto <- "roi"  
> toto2 <- "ben"  
>  
> toto==toto2  
[1] FALSE  
>
```

2. תאריכים ואופרטורים לוגיים

RStudio interface showing a script and its execution results.

Script (roi2.R):

```
1 myname <- "roi frm"
2
3 nchar(myname)
```

Console Output:

```
> myname <- "roi frm"
>
> nchar(myname)
[1] 7
>
```

Environment Panel:

Variable	Value
x	10 obs. of 4 variables
myname	"roi frm"
number	5
number2	5
olive	3
orange	5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Files Panel:

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

x 10 obs. of 4 variables

values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

```
1 myname <- "roi frm"
2
3 nchar(orange)
```

3:1 (Top Level) R Script

Console Terminal Jobs

```
>
> nchar(myname)
[1] 7
> nchar(orange)
[1] 1
>
```

2. תאריכים ואופרטורים לוגיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

roi2.R*

```
1 is.numeric(orange)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> is.numeric(orange)
[1] TRUE
>
```

Environment History Connections

Global Environment

x 10 obs. of 4 variables

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB



3. וקטורים

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1:1 (Top Level) R Script

```
1 roibox <- c(2,9,4,6)
2 roibox
```

Console

```
> roibox <- c(2,9,4,6)
> roibox
[1] 2 9 4 6
>
```

3. וקטורים

RStudio interface showing R code execution and environment variables.

Source Editor (roi2.R* x):

```
1 roibox <- c(2,9,4,6)
2
3 roibox2 <- c("roi","roifrm","beni")
4 roibox2
```

Console:

```
> roibox
[1] 2 9 4 6
> roibox2 <- c("roi","roifrm","beni")
> roibox2
[1] "roi" "roifrm" "beni"
>
```

Environment:

Variable	Value
myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
roibox2	chr [1:3] "roi" "roifrm"...
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Files:

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
roi2.R*  
1 roibox <- c(2,9,4,6)  
2 roibox  
3 roibox*2
```

Run Source

Environment History Connections

Global Environment

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
roibox2	chr [1:3] "roi" "roifrm"...
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

Console

```
> roibox <- c(2,9,4,6)  
> roibox  
[1] 2 9 4 6  
> roibox*2  
[1] 4 18 8 12  
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
roibox2	chr [1:3] "roi" "roifrm"...
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

1:1 (Top Level) R Script

```
1 roibox <- c(2,9,4,6)
2 roibox
3 roibox+2
```

Console Terminal Jobs

```
> roibox <- c(2,9,4,6)
> roibox
[1] 2 9 4 6
> roibox+2
[1] 4 11 6 8
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
roibox2	num [1:4] 2 9 4 6
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

roi2.R*

```
1 roibox <- c(2,9,4,6)
2
3 roibox2 <- c(2,9,4,6)
4
5 roibox*roibox2
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> roibox <- c(2,9,4,6)
>
> roibox2 <- c(2,9,4,6)
>
> roibox*roibox2
[1] 4 81 16 36
>
```

3. וקטורים

RStudio interface showing R code execution and environment variables.

Source Editor (roi2.R*):

```
1 roibox <- c(2,9,4,6)
2
3 roibox2 <- c(2,9,4,6,8)
4
5 roibox*roibox2
```

Console:

```
> roibox <- c(2,9,4,6)
>
> roibox2 <- c(2,9,4,6,8)
>
> roibox*roibox2
[1] 4 81 16 36 16
Warning message:
In roibox * roibox2 :
  longer object length is not a multiple of shorter object length
>
```

Environment:

Variable	Value
myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:4] 2 9 4 6
roibox2	num [1:5] 2 9 4 6 8
toto	"roi"
toto2	"ben"
todate	0003-12-20

Files:

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 roibox <- c(1,2,3)
2
3 roibox2 <- c(1,2,3,4,5)
4
5 roibox*roibox2
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> roibox <- c(1,2,3)
>
> roibox2 <- c(1,2,3,4,5)
>
> roibox*roibox2
[1] 1 4 9 4 10
Warning message:
In roibox * roibox2 :
  longer object length is not a multiple of shorter object length
>
```

Environment History Connections

Global Environment

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 roibox <- c(1,2,3)
2
3 roibox2 <- c(1,2,3,4,5)
4
5 roibox^3
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> roibox <- c(1,2,3)
>
> roibox2 <- c(1,2,3,4,5)
>
> roibox^3
[1] 1 8 27
>
```

Environment History Connections

Global Environment

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Functions

Polanitze... function (Stock. Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:5] 2 3 4 5 6

Functions

Polanitze...function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

roi2.R*

```
1 x <- 2:6
2 x
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 2:6
> x
[1] 2 3 4 5 6
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:5] 2 3 4 5 6
y	int [1:5] 4 5 6 7 8

Functions

Polanitze...function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

roi2.R*

Source on Save Run Source

```
1 x <- 2:6
2 y <- 4:8
3 x
4 y
5 x+y
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 2:6
> y <- 4:8
> x
[1] 2 3 4 5 6
> y
[1] 4 5 6 7 8
> x+y
[1] 6 8 10 12 14
> |
```


3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:500] 1 2 3 4 5 6 ...
y	int [1:5] 4 5 6 7 8

Functions

Polanitze...function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

roi2.R*

```
1 x <- 1:500
2 x
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 1:500
> x
 [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
[17] 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
[33] 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
[49] 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
[65] 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
[81] 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
[97] 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112
[113] 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128
[129] 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144
[145] 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
[161] 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176
[177] 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192
[193] 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208
[209] 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224
[225] 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
[241] 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:5] 1 2 3 4 5
y	int [1:5] 4 5 6 7 8

Functions

Polanitze... function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.3 KB
	.Rhistory	6.9 KB

roi2.R*

```
1 x <- 1:5
2 x<3
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 1:5
> x<3
[1] TRUE TRUE FALSE FALSE FALSE
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:5] 1 2 3 4 5
y	int [1:5] 4 5 6 7 8

Functions

Polanitze... function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

roi2.R*

```
1 x <- 1:5
2
3 x[2]
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 1:5
>
> x[2]
[1] 2
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:6] 5 6 7 8 9 10
y	int [1:5] 4 5 6 7 8

Functions

Polanitze...function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.3 KB
.Rhistory	6.9 KB

roi2.R*

```
1 x <- 5:10
2
3 x[2]
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 5:10
>
> x[2]
[1] 6
>
```

3. וקטורים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20
x	int [1:6] 5 6 7 8 9 10
y	int [1:5] 4 5 6 7 8

Functions

Polanitze...function (Stock, Strike...

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.3 KB
☐	.Rhistory	6.9 KB

roi2.R*

```
1 x <- 5:10
2
3 x[1:3]
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> x <- 5:10
>
> x[1:3]
[1] 5 6 7
>
```



4. פונקציות מובנות

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 num <- -2
2
3 abs(num)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> num <- -2
>
> abs(num)
[1] 2
>
```

Environment History Connections

Global Environment

Values	
myname	"roi frm"
num	-2
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 toto <- c(-2,4,-7,3)
2
3 abs(toto)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- c(-2,4,-7,3)
>
> abs(toto)
[1] 2 4 7 3
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
num	-2
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1* x

```
1 toto <- c(-2,4,-7,3)
2
3 max(toto)
```

1:1 (Top Level) R Script

Console Terminal x Jobs x

```
> toto <- c(-2,4,-7,3)
>
> max(toto)
[1] 4
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
num	-2
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

myname	"roi frm"
num	-2
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

Untitled1*

```
1 toto <- c(-2,4,-7,3)
2
3 min(toto)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- c(-2,4,-7,3)
>
> min(toto)
[1] -7
> |
```

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 toto <- c(-2,4,-7,3)
2 olive <- 9
3
4 sqrt(olive)
```

2:1 (Top Level) R Script

Console Terminal Jobs

```
> olive <- 9
>
> sqrt(olive)
[1] 3
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
num	-2
number	5
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 toto <- c(-2,4,-7,3)
2
3 sum(toto)
```

3:10 (Top Level) R Script

Console Terminal x Jobs x

```
> toto <- c(-2,4,-7,3)
>
> sum(toto)
[1] -2
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
num	-2
number	5
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

myname	"roi frm"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

1:1 (Top Level) R Script

```
1 remove(num)
```

Run the current line or selection (Ctrl+Enter)

Console Terminal Jobs

```
> remove(num)
```

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 is.vector(toto)
```

1:1 (Top Level) R Script

Console Terminal x Jobs x

```
> is.vector(toto)
[1] TRUE
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 is.vector(olive)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> is.vector(olive)
[1] TRUE
>
```

Environment History Connections

Global Environment

Values

myname	"roi frm"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 name <- "roi"
2
3 is.numeric(name)
```

1:1 (Top Level) R Script

Console

```
> name <- "roi"
>
> is.numeric(name)
[1] FALSE
>
```

Environment History Connections

Global Environment

myname	"roi frm"
name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

myname	"roi frm"
name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

Untitled1* x

Source on Save Run Source

```
1 nchar(name)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> nchar(name)
[1] 3
>
```

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 length(toto)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> length(toto)
[1] 4
>
```

Environment History Connections

Global Environment

myname	"roi frm"
name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

myname	"roi frm"
name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

1:1 (Top Level) R Script

```
1 length(olive)
```

Console Terminal Jobs

```
> length(olive)
[1] 1
>
```

4. פונקציות מובנות

RStudio interface showing a script editor, console, and environment pane.

Script Editor: Contains the code `length(name)`.

Console: Shows the output of the command: `> length(name)`
`[1] 1`

Environment Pane: Displays the current environment with the following variables:

Variable	Value
myname	"roi frm"
name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"ben"
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

The variable `name` with value `"roi"` is circled in red.

Files Pane: Shows the file structure with folders `.RData` (4.4 KB) and `.Rhistory` (1.8 KB).

4. פונקציות מובנות

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 toto3 <- c(9,-7,1,5,3,-5)
2 sort(toto3)
```

Run Source

Environment History Connections

Global Environment

name	"roi"
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:4] -2 4 -7 3
toto2	"hen"
toto3	num [1:6] 9 -7 1 5 3 -5
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Functions

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Console

```
> toto3 <- c(9,-7,1,5,3,-5)
> sort(toto3)
[1] -7 -5 1 3 5 9
>
```



Data Frame's .5

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Variable	Class	Value
age	num [1:4]	20 18 19 30
id	int [1:4]	1 2 3 4
myname	chr [1:4]	"roi" "rm"
name	chr [1:4]	"ben" "avi" "r..."
number2	5	
olive	9	
orange	5	
roibox	num [1:3]	1 2 3
roibox2	num [1:5]	1 2 3 4 5
toto	num [1:4]	-2 4 -7 3
toto2	"ben"	
toto3	num [1:6]	9 -7 1 5 3 -5

```
1 name <- c("ben","avi","roi","shir")
2 age <- c(20,18,19,30)
3 id <- 1:4
4
5 table <- data.frame(name,age,id)
6 table
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> name <- c("ben","avi","roi","shir")
> age <- c(20,18,19,30)
> id <- 1:4
>
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
```

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function

Project: (None)

Untitled1* x

```
1 table <- data.frame(name,age,id)
2 table
3
4 nrow(table)
```

4:1 (Top Level) R Script

Console Terminal Jobs

```
> age <- c(20,18,19,30)
> id <- 1:4
>
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
> nrow(table)
[1] 4
>
```

Environment History Connections

Global Environment

age	num [1:4]	20 18 19 30
id	int [1:4]	1 2 3 4
myname		"roi frm"
name	chr [1:4]	"ben" "avi" "r...
number2		5
olive		9
orange		5
roibox	num [1:3]	1 2 3
roibox2	num [1:5]	1 2 3 4 5
toto	num [1:4]	-2 4 -7 3
toto2		"ben"
toto3	num [1:6]	9 -7 1 5 3 -5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 table <- data.frame(name,age,id)
2 table
3
4 ncol(table)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
>
> ncol(table)
[1] 3
>
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 table <- data.frame(name,age,id)
2 table
3
4 dim(table)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> table <- data.frame(name,age,id)
> table
  name age id
1 ben  20  1
2 avi  18  2
3 roi  19  3
4 shir 30  4
>
> dim(table)
[1] 4 3
> |
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 table <- data.frame(name,age,id)
2 table
3
4 table[2]
```

1:1 (Top Level) R Script

Console

```
> table <- data.frame(name,age,id)
> table
  name age id
1 ben  20  1
2 avi  18  2
3 roi  19  3
4 shir 30  4
>
> table[2]
  age
1  20
2  18
3  19
4  30
> |
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 table <- data.frame(name,age,id)
2 table
3
4 names(table)
```

2:1 (Top Level) R Script

Console Terminal Jobs

```
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
>
> names(table)
[1] "name" "age"  "id"
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

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Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4]	20 18 19 30
id	int [1:4]	1 2 3 4
myname		"roi frm"
name	chr [1:4]	"ben" "avi" "r..."
number2		5

```
1 table <- data.frame(name,age,id)
2 table
3
4 names(table)[2]
```

4:1 (Top Level) R Script

Console Terminal Jobs

```
> names(table)[2]
[1] "age"
>
```

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Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 table <- data.frame(name,age,id)
2 table
3
4 table[2,1:3]
5
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
>
> table[2,1:3]
  name age id
2  avi  18  2
> |
```

Environment History Connections

Global Environment

▶ table	4 obs. of 3 variables
▶ test	5916 obs. of 5 variables
▶ train	8695 obs. of 5 variables
▶ train1	297 obs. of 9 variables
▶ x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 table <- data.frame(name,age,id)
2 table
3
4 table[2,]
5
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
>
> table[2,]
  name age id
2  avi  18  2
> |
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

```
1 table <- data.frame(name,age,id)
2 table
3
4 class(table)
5
```

3:1 (Top Level) R Script

Console Terminal Jobs

```
> class(table)
[1] "data.frame"
>
```

Environment History Connections

Global Environment

table	4 obs. of 3 variables
test	5916 obs. of 5 variables
train	8695 obs. of 5 variables
train1	297 obs. of 9 variables
x	10 obs. of 2 variables

Values

age	num [1:4]	20 18 19 30
id	int [1:4]	1 2 3 4
myname		"roi frm"
name	chr [1:4]	"ben" "avi" "r..."
number2		5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

Data Frame's .5

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

▶ table	4 obs. of 3 variables
▶ test	5916 obs. of 5 variables
▶ train	8695 obs. of 5 variables
▶ train1	297 obs. of 9 variables
▶ x	10 obs. of 2 variables

Values

age	num [1:4] 20 18 19 30
id	int [1:4] 1 2 3 4
myname	"roi frm"
name	chr [1:4] "ben" "avi" "r..."
number2	5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

```
1 table <- data.frame(name,age,id)
2 table
3
4 table+2
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> table <- data.frame(name,age,id)
> table
  name age id
1  ben  20  1
2  avi  18  2
3  roi  19  3
4 shir  30  4
>
> table+2
  name age id
1  NA  22  3
2  NA  20  4
3  NA  21  5
4  NA  32  6
Warning message:
In Ops.factor(left, right) : '+' not meaningful for factors
```



List and Matrix .6

List and Matrix .6

RStudio interface showing a script, console, and environment pane.

Script Editor (Untitled1* x):

```
1 toto <- c(3,2,6)
2 class(toto)
3
```

Console:

```
> toto <- c(3,2,6)
> class(toto)
[1] "numeric"
>
```

Environment Pane:

Variable	Value
number2	5
olive	9
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	num [1:3] 3 2 6
toto2	"ben"
toto3	num [1:6] 9 -7 1 5 3 -5
totodate	0003-12-20
y	int [1:5] 4 5 6 7 8

Files Pane:

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

List and Matrix .6

RStudio interface showing the creation and inspection of a list object.

Source Editor:

```
1 toto <- c(3,2,6,"avi")
2 class(toto)
3
```

Console:

```
> toto <- c(3,2,6,"avi")
> class(toto)
[1] "character"
```

Environment:

Object	Class	Value
number2	num	5
olive	num	9
orange	num	5
roibox	num	[1:3] 1 2 3
roibox2	num	[1:5] 1 2 3 4 5
toto	chr	[1:4] "3" "2" "6" "avi"
toto2	chr	"ben"
toto3	num	[1:6] 9 -7 1 5 3 -5
totodate	date	0003-12-20
y	int	[1:5] 4 5 6 7 8

Files:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019
.Rhistory	1.8 KB	Dec 8, 2019

List and Matrix .6

RStudio interface showing the creation and inspection of a list object.

Source Editor:

```
1 mylist <- list(3,1,"gal","amit",5)
2 class(mylist)
3
```

Console:

```
> mylist <- list(3,1,"gal","amit",5)
> class(mylist)
[1] "list"
>
```

Environment Panel:

Object	Value
inearMod	List of 12
linearMod	List of 12
mydata	500 obs. of 9 variables
mylist	List of 5
mylogit	List of 30
mytrain	List of 30
mytrain1	List of 30
polanitizer	10 obs. of 4 variables
table	4 obs. of 3 variables
test	5916 obs. of 5 variables

The **mylist** object is circled in red.

Files Panel:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019, 5
.Rhistory	1.8 KB	Dec 8, 2019, 5

List and Matrix .6

RStudio interface showing the creation and inspection of a list object.

Source Editor:

```
1 mylist <- list(3,1,1:4,"gal","amit",5)
2 mylist
```

Console:

```
> mylist
[[1]]
[1] 3

[[2]]
[1] 1

[[3]]
[1] 1 2 3 4

[[4]]
[1] "gal"

[[5]]
[1] "amit"

[[6]]
[1] 5
```

Environment Pane:

Object	Type
linearMod	List of 12
linearMod	List of 12
mydata	500 obs. of 9 variables
mylist	List of 6
mylogit	List of 30
mytrain	List of 30
mytrain1	List of 30
polanitizer	10 obs. of 4 variables
table	4 obs. of 3 variables
test	5916 obs. of 5 variables

The **mylist** object is circled in red.

Files Pane:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019, 5
.Rhistory	1.8 KB	Dec 8, 2019, 5

List and Matrix .6

RStudio interface showing the creation and inspection of a list object.

Source Editor:

```
1 mylist <- list(3,1,1:4,"gal","amit",5)
2 mylist[3]
3
```

Console:

```
> mylist <- list(3,1,1:4,"gal","amit",5)
> mylist[3]
[[1]]
[1] 1 2 3 4

>
```

Environment Pane:

Global Environment

Data

- mylist: List of 6
- polanitizer: 10 obs. of 4 variables

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"

Files Pane:

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 roimatrix <- matrix(nrow=3,ncol=3)
2 roimatrix
```

1:1 (Top Level) R Script

Console Terminal x Jobs x

```
> roimatrix <- matrix(nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,]   NA   NA   NA
[2,]   NA   NA   NA
[3,]   NA   NA   NA
> |
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	logi [1:3, 1:3] NA NA N...

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

Files Plots Packages Help Viewer

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Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

List and Matrix .6

RStudio interface showing the creation and inspection of a matrix object.

Source Editor:

```
1 roimatrix <- matrix(1,nrow=3,ncol=3)
2 roimatrix
```

Console:

```
> roimatrix <- matrix(1,nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,]    1    1    1
[2,]    1    1    1
[3,]    1    1    1
> |
```

Environment Panel:

Object	Type	Value
mylist	List of 6	
polanitizer	10 obs. of 4 variables	
roimatrix	num [1:3, 1:3]	1 1 1 1

Files Panel:

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

List and Matrix .6

RStudio interface showing the creation and inspection of a matrix.

Code Editor:

```
1 roimatrix <- matrix(1:3,nrow=3,ncol=3)
2 roimatrix
```

Console:

```
> roimatrix <- matrix(1:3,nrow=3,ncol=3)
> roimatrix
     [,1] [,2] [,3]
[1,]    1    1    1
[2,]    2    2    2
[3,]    3    3    3
>
```

Environment Panel:

Object	Class	Value
mylist	List of 6	
polanitizer	10 obs. of 4 variables	
roimatrix	int [1:3, 1:3]	1 2 3 1 2 3 1 2 3
myname	"roi frm"	
number	5	
number2	5	
olive	3	
orange	5	
roibox	num [1:3]	1 2 3
roibox2	num [1:5]	1 2 3 4 5

The **roimatrix** object is highlighted with a red circle.

Files Panel:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019, 5:31
.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio interface showing the creation and inspection of a matrix and a list.

Script Editor:

```
1 roimatrix <- matrix(1:9,nrow=3,ncol=3)
2 roimatrix
```

Console:

```
> roimatrix <- matrix(1:9,nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
>
```

Environment Panel:

Object	Value
mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:3] 1 2 3 4 5 6 7 8 9
myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

The **roimatrix** object is circled in red in the Environment panel.

Files Panel:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019, 5:31
.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=3)
2 roimatrix
```

1:1 (Top Level) R Script

Console Terminal x Jobs x

```
> roimatrix <- matrix(1:12,nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
> |
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:3] 1 2 3 4 5 6 7 8 9

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size	Modified
☐	.RData	4.4 KB	Dec 8, 2019, 5:31
☐	.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=3)
2 roimatrix
3 class(roimatrix)
```

3:17 (Top Level) R Script

Console Terminal Jobs

```
> roimatrix <- matrix(1:12,nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
> class(roimatrix)
[1] "matrix"
>
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:3] 1 2 3 4 5 6 7 8 9

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size	Modified
☐	.RData	4.4 KB	Dec 8, 2019, 5:31
☐	.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio interface showing the creation and inspection of a matrix and a list.

Script Editor (Untitled1* x):

```
1 roimatrix <- matrix("avi",nrow=3,ncol=3)
2 roimatrix
3 class(roimatrix)
```

Console:

```
> roimatrix <- matrix("avi",nrow=3,ncol=3)
> roimatrix
      [,1] [,2] [,3]
[1,] "avi" "avi" "avi"
[2,] "avi" "avi" "avi"
[3,] "avi" "avi" "avi"
> class(roimatrix)
[1] "matrix"
>
```

Environment Panel:

Object	Value
mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	chr [1:3, 1:3] "avi" "avi" "avi"...

Files Panel:

Name	Size	Modified
.RData	4.4 KB	Dec 8, 2019, 5:31
.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1* x

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=3)
2 dim(roimatrix)
```

1:1 (Top Level) R Script

Console Terminal x Jobs x

```
> roimatrix <- matrix(1:12,nrow=3,ncol=3)
> dim(roimatrix)
[1] 3 3
>
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:3] 1 2 3 4 5 6 7 8 9

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size	Modified
☐	.RData	4.4 KB	Dec 8, 2019, 5:31
☐	.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=3)
2 nrow(roimatrix)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> roimatrix <- matrix(1:12,nrow=3,ncol=3)
> nrow(roimatrix)
[1] 3
> |
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:3] 1 2 3 4 5 6 7 8 9

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size	Modified
☐	.RData	4.4 KB	Dec 8, 2019, 5:31
☐	.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio interface showing R code execution and environment variables.

Source Editor (Untitled1* x):

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=4)
2 roimatrix2 <- matrix(1:12,nrow=3,ncol=4)
3 roimatrix
4 roimatrix2
5 roimatrix+roimatrix2
```

Console:

```
> roimatrix
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

> roimatrix2
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

> roimatrix+roimatrix2
     [,1] [,2] [,3] [,4]
[1,]    2    8   14   20
[2,]    4   10   16   22
[3,]    6   12   18   24
```

Environment Panel:

Global Environment

Data

- mylist: List of 6
- polanitizer: 10 obs. of 4 variables
- roimatrix: int [1:3, 1:4] 1 2 3 4 5 6 7 8 9...
- roimatrix2: int [1:3, 1:4] 1 2 3 4 5 6 7 8 9...

Values

- myname: "roi frm"
- number: 5
- number2: 5
- olive: 3
- orange: 5
- roibox: num [1:3] 1 2 3

Files Panel:

- New Folder
- Delete
- Rename
- More
- Home
- .RData (4.4 KB, Dec 8, 2019, 5:31)
- .Rhistory (1.8 KB, Dec 8, 2019, 5:31)

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 roimatrix <- matrix(1:12,nrow=3,ncol=4)
2 roimatrix2 <- matrix(1:12,nrow=3,ncol=4)
3 roimatrix
4 roimatrix2
5 roimatrix*roimatrix2
```

5:21 (Top Level) R Script

Console Terminal Jobs

```
> roimatrix
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

> roimatrix2
     [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12

> roimatrix*roimatrix2
     [,1] [,2] [,3] [,4]
[1,]    1   16   49  100
[2,]    4   25   64  121
[3,]    9   36   81  144
```

Environment History Connections

Global Environment

Data

mylist	List of 6
polanitizer	10 obs. of 4 variables
roimatrix	int [1:3, 1:4] 1 2 3 4 5 6 7 8 9...
roimatrix2	int [1:3, 1:4] 1 2 3 4 5 6 7 8 9...

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size	Modified
☐	.RData	4.4 KB	Dec 8, 2019, 5:31
☐	.Rhistory	1.8 KB	Dec 8, 2019, 5:31

List and Matrix .6

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Polanitzer.R*

```
1 x <- matrix(c(1,3,5,2,4,6),nrow=3,ncol=2)
2 y <- matrix(c(1,-3,0,2,-1,1),nrow=2,ncol=3)
3 x
4 y
5 x%*%y
```

1:1 (Top Level) R Script

Console

```
> x
      [,1] [,2]
[1,]     1     2
[2,]     3     4
[3,]     5     6
> y
      [,1] [,2] [,3]
[1,]     1     0    -1
[2,]    -3     2     1
> x%*%y
      [,1] [,2] [,3]
[1,]    -5     4     1
[2,]    -9     8     1
[3,]   -13    12     1
>
```

Environment

Global Environment

polanitzer	10 obs. of 4 variables				
roima1	num [1:3, 1:2]	1 3 5 2 4 6			
roima2	num [1:2, 1:3]	1 -3 0 2 -1 1			
x	num [1:3, 1:2]	1 3 5 2 4 6			
y	num [1:2, 1:3]	1 -3 0 2 -1 1			

Files Plots Packages Help Viewer

Install Update

	Name	Description	Versi...		
☐	abind	Combine Multidimensional Arrays	1.4-5		
☐	acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1		
☐	actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2		
☐	askpass	Safe Password Entry for R, Git, and SSH	1.1		
☐	assertthat	Easy Pre and Post Assertions	0.2.1		



7. עבודה עם PACKAGES HTML - CSV ,

7. עבודה עם CSV, PACKAGES ו-HTML

docs.google.com/spreadsheets/d/1BsfKB7S2ohsN4v_htUWZ3m4oBynKDoqLLcKjPohtZkU/edit#gid=0

סימניון « בנק ישראל - שערי... ynet בלי ריצה או מ... http://www.iavfa.org דואר נכנס (332) - p... מיובא מ-IE סקירה כללית על ק... Google אפליקציות

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

תצוגה בלבד 100%

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	firstName	lastName	age	btc	relationship	gender	income					
2	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
3	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
4	3	Emma	Williams	38	0.4785	not single	female	23965.63					
5	4	Tony	Masters	44	3.0814	not single	male	212815.06					
6	5	Mike	Smith	56	5.6287	single	male	461873.06					
7	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
8	7	John	Wisdom	61	3.6941	single	male	328050.57					
9	8	Nu	Wilson	63	5.8970	single	male	483122.59					
10	9	Antoinette	Moore	54	2.8097	single	female	208786.28					
11	10	Tamekia	Taylor	58	3.7459	not single	female	405052.62					
12	11	Hubert	Anderson	37	3.1344	not single	male	188299.34					
13	12	Clare	Thomas	64	4.9943	single	male	578179.52					
14	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
15	14	Pierre	White	10	4.3269	single	male	45893.99					
16	15	Clarinda	Harris	31	3.2905	single	male	182695.93					
17	16	Robbie	Martin	53	4.8797	single	female	420064.77					
18	17	Diedra	Thompson	45	2.8965	not single	female	182425.44					

אפשרויות נוספות

Sheet1

7. עבודה עם CSV, PACKAGES ו-HTML

שיתוף

brUsers

קובץ גרסה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

id

	A	B	C	D	E	F	G	H	I	J
	id	firstName	lastName	age	btc	relationship	gender	income		
1	1	Bucky	Roberts	17	3.6706	single	male	63742.60		
2	2	Lisa	Gallagher	37	3.8676	single	female	187523.49		
3	3	Emma	Williams	38	0.4785	not single	female	23965.63		
4	4	Tony	Masters	44	3.0814	not single	male	212815.06		
5	5	Mike	Smith	56	5.6287	single	male			
6	6	Sally	Raphael	37	4.2414	not single	female			
7	7	John	Wisdom	61	3.6941	single	male			
8	8	Nu	Wilson	63	5.8970	single	male			
9	9	Antonette	Moore	54	2.8097	single	female			
10	10	Tamekia	Taylor	58	3.7459	not single	female			
11	11	Hubert	Anderson	37	3.1344	not single	male			
12	12	Clare	Thomas	64	4.9943	single	male			
13	13	Yvette	Jackson	56	3.3008	not single	female			
14	14	Pierre	White	10	4.3269	single	male			
15	15	Clarinda	Harris	31	3.2905	single	male	182695.93		
16	16	Robbie	Martin	53	4.8797	single	female	420064.77		
17	17	Dieder	Thompson	45	2.6865	not single	female	182425.11		

שיתוף

חדש

Ctrl+O פתיחה

ייבוא

יצירת עותק

הורדה

שליחה באימייל כקובץ מצורף

התאמה לעבודה במצב לא מקוון

היסטוריית גרסאות

שינוי שם

העברה

העברה לאשפה

פרסום באינטרנט

שליחה באימייל לשותפי עריכה

Microsoft Excel (.xlsx)

פורמט OpenDocument (.ods)

מסמך PDF (.pdf)

דף אינטרנט (דחוס) (html)

ערכים מופרדים בפסיק (csv, הגיליון הנוכחי)

ערכים מופרדים בטאב (tsv, הגיליון הנוכחי)

אפשרויות נוספות

7. עבודה עם CSV, PACKAGES ו-HTML

שיתוף

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

תצוגה בלבד 100%

id

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	firstName	lastName	age	btc	relationship	gender	income					
2	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
3	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
4	3	Emma	Williams	38	0.4785	not single	female	23965.63					
5	4	Tony	Masters	44	3.0814	not single	male	212815.06					
6	5	Mike	Smith	56	5.6287	single	male	461873.06					
7	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
8	7	John	Wisdom	61	3.6941	single	male	328050.57					
9	8	Nu	Wilson	63	5.8970	single	male	483122.59					
10	9	Antonette	Moore	54	2.8097	single	female	208786.28					
11	10	Tamekia	Taylor	58	3.7459	not single	female	405052.62					
12	11	Hubert	Anderson	37	3.1344	not single	male	188299.34					
13	12	Clare	Thomas	64	4.9943	single	male	578179.52					
14	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
15	14	Pierre	White	10	4.3269	single	male	45893.99					

אפשרויות נוספות

Sheet1

הצג הכל

brUsers - Sheet1 (1).csv

7. עבודה עם CSV, PACKAGES ו-HTML

שיתוף

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

תצוגה בלבד 100%

	A	B	C	D	E	F	G	H	I	J	K	L	M
id	id	firstName	lastName	age	btc	relationship	gender	income					
1	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
2	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
3	3	Emma	Williams	38	0.4785	not single	female	23965.63					
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5	5	Mike	Smith	56	5.6287	single	male	461873.06					
6	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
7	7	John	Wisdom	61	3.6941	single	male	328050.57					
8	8	Nu	Wilson	63	5.8970	single	male	483122.59					
9	9	Antonette	Moore	54	2.8097	single	female	208786.28					
10	10	Tamekia	Taylor	58	3.7459	not single	female	405052.62					
11	11	Hubert	Anderson	37	3.1344	not single	male	188299.34					
12	12	Clare	Thomas	64	4.9943	single	male	578179.52					
13	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
14	14	Pierre	White	10	4.3269	single	male	45893.99					

אפשרויות נוספות

הצג הכל

פתח
פתח תמיד קבצים מסוג זה
הצג בתיקייה
ביטול

Sheet1

brUsers - Sheet1 (1).csv

7. עבודה עם CSV, PACKAGES ו-HTML

חיפוש: מחשב זה < > הורדות

שם	תאריך שינוי	סוג
היום (2) ▾		
Microsoft Excel Co...	19/12/2019 12:54	קובץ JPG
20191218_224301	19/12/2019 00:03	
אתמול (2) ▾		
20191218_224255	18/12/2019 23:05	קובץ JPG
ותיקה דוח רבעוני	18/12/2019 22:03	Adobe Acrobat D...
מוקדם יותר השבוע (38) ▾		
NDA Confident_Komemi 17Dec2019	17/12/2019 23:51	Microsoft Word D...
מסמך במלצת (1)	17/12/2019 12:44	Adobe Acrobat D...

גישה מהירה ★

- שולחן העבודה
- הורדות
- מסמכים
- תמונות
- 1.11.2019
- 06.08.2019
- גילויי דעת של הלשכה
- תכנות בסיסי ב-R

7. עבודה עם CSV, PACKAGES ו-HTML

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

1:8 (Top Level) R Script

```
1 getwd()
```

Console

```
> getwd()
[1] "C:/Users/רועי/Documents"
>
```

Environment History Connections

Global Environment

Data

polanitizer 10 obs. of 4 variables

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"
toto2	"ben"

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
☐	.RData	4.4 KB
☐	.Rhistory	1.8 KB

7. עבודה עם CSV, PACKAGES ו-HTML

שיתוף

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

תצוגה בלבד 100%

Williams

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	firstName	lastName	age	btc	relationship	gender	income					
2	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
3	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
4	3	Emma	Williams	38	0.4785	not single	female	23965.63					
5	4	Tony	Masters	44	3.0814	not single	male	212815.06					
6	5	Mike	Smith	56	5.6287	single	male	461873.06					
7	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
8	7	John	Wisdom	61	3.6941	single	male	328050.57					
9	8	Nu	Wilson	63	5.8970	single	male	483122.59					
10	9	Antonette	Moore	54	2.8097	single	female	208786.28					
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13	12	Clare	Thomas	64	4.9943	single	male	578179.52					
14	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
15	14	Pierre	White	10	4.3269	single	male	45893.99					

אפשרויות נוספות

Sheet1

7. עבודה עם CSV, PACKAGES ו-HTML

RStudio interface showing the execution of an R script to read a CSV file and the resulting data structure.

Source Editor:

```
1 RoiData <- read.csv("Roi.csv", TRUE, ",", "")
2 RoiData
```

Console:

```
> RoiData <- read.csv("Roi.csv", TRUE, ",", "")
> RoiData
```

	id	firstName	lastName	age	btc	relationship	gender
1	1	Bucky	Roberts	53	4.2468	single	male
2	2	Lisa	Gallagher	19	0.0080	single	female
3	3	Emma	Williams	13	2.1327	not single	female
4	4	Tony	Masters	23	4.4420	not single	male
5	5	Mike	Smith	44	4.7982	single	male
6	6	Sally	Raphael	11	0.9683	not single	female
7	7	John	Wisdom	17	4.6899	single	male
8	8	Nu	Wilson	42	1.9515	single	male
9	9	Antonette	Moore	62	1.7903	single	female
10	10	Tamekia	Taylor	41	4.6659	not single	female

Environment:

Object	Value
polanitizer	10 obs. of 4 variables
RoiData	100 obs. of 8 variables

Values:

Variable	Value
myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"

Files:

Name	Size
.RData	4.4 KB
.Rhistory	1.8 KB

7. עבודה עם CSV, PACKAGES ו-HTML

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 RoiData <- read.csv("Roi.csv",TRUE,",")
2 class(RoiData)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> RoiData <- read.csv("Roi.csv",TRUE,",")
> class(RoiData)
[1] "data.frame"
```

Environment History Connections

Global Environment

Data

polanitizer	10 obs. of 4 variables
RoiData	100 obs. of 8 variables

Values

myname	"roi frm"
number	5
number2	5
olive	3
orange	5
roibox	num [1:3] 1 2 3
roibox2	num [1:5] 1 2 3 4 5
toto	"roi"

Files Plots Packages Help Viewer

New Folder Delete Rename More

Home

	Name	Size
	.RData	4.4 KB
	.Rhistory	1.8 KB

7. עבודה עם CSV, PACKAGES ו-HTML

The screenshot displays the RStudio environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. Below the menu is a toolbar with icons for file operations and a search bar labeled 'Go to file/function'. The main workspace on the left shows a script editor with a single line of code '1'. The bottom-left pane contains the Console, Terminal, and Jobs tabs. The right-hand pane is divided into three sections: Environment, History, and Connections. The Environment section shows the 'Global Environment' with a variable 'RoiData2' containing 236 observations of 390 variables. Below this, the 'Packages' tab is selected and circled in red. It displays a list of installed and available R packages with columns for Name, Description, and Version.

Name	Description	Version
	using Birth-Death MCMC	
☐ BH	Boost C++ Header Files	1.69.0-1
☐ boot	Bootstrap Functions (Originally by Angelo Canty for S)	1.3-22
☐ checkmate	Fast and Versatile Argument Checks	1.9.4
☐ class	Functions for Classification	7.3-15
☐ cli	Helpers for Developing Command Line Interfaces	1.1.0
☐ cluster	"Finding Groups in Data": Cluster Analysis Extended Rousseeuw et al.	2.1.0
☐ codetools	Code Analysis Tools for R	0.2-16
☐ colorspace	A Toolbox for Manipulating and Assessing Colors and Palettes	1.4-1
☐ compiler	The R Compiler Package	3.6.1

7. עבודה עם HTML, CSV, PACKAGES

The screenshot displays the RStudio application window. The main editor shows a file named 'Untitled1*' with a single line of code: '1'. The console at the bottom is empty, showing the prompt '>'. The right-hand pane is divided into three tabs: 'Environment', 'History', and 'Connections'. The 'Environment' tab is active, showing the 'Global Environment' with a variable 'RoiData2' containing '236 obs. of 390 variables'. Below this, the 'Values' section shows 'mvname' with the value '"roi frm"'. The bottom of the right pane features a 'Packages' tab, which is circled in red. Within this tab, the 'Install' button is also circled in red. Below the 'Install' button, a list of R packages is displayed, each with an unchecked checkbox, its name, description, version, and icons for documentation and help.

	Package Name	Description	Version	Doc	Help
☐	Formula	Extended Model Formulas	1.2-3		
☐	ggm	Functions for graphical Markov models	2.3		
☐	ggplot2	Create Elegant Data Visualisations Using the Grammar of Graphics	3.2.1		
☐	glasso	Graphical Lasso: Estimation of Gaussian Graphical Models	1.11		
☐	glmnet	Lasso and Elastic-Net Regularized Generalized Linear Models	2.0-18		
☐	glue	Interpreted String Literals	1.3.1		

7. עבודה עם HTML, CSV, PACKAGES

The screenshot shows the RStudio interface with the 'Install Packages' dialog box open. The 'Repository (CRAN)' is selected. The package 'XML' is entered in the text field and highlighted in the dropdown list. The 'Install' button is circled in red.

Install Packages

Install from: [Configuring Repositories](#)

Repository (CRAN)

Packages (separate multiple with space or comma):

XML

XML

xml2

XML2R

xmlparsedata

xmlrpc2

Install

Cancel

Environment History Connections

Global Environment

236 obs. of 390 variables

"roi frm"

Packages Help Viewer

Update

Description	Ver...
Extended Model Formulas	1.2-3
Functions for graphical Markov models	2.3
Create Elegant Data Visualisations Using the Grammar of Graphics	3.2.1
Graphical Lasso: Estimation of Gaussian Graphical Models	1.11
glmnet	Lasso and Elastic-Net Regularized Generalized Linear Models
glue	Interpreted String Literals

7. עבודה עם CSV, PACKAGES ו-HTML

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Untitled1*

1

Run Source

Environment History Connections

Global Environment

RoiData2 236 obs. of 390 va...
Values
mvname "roi_frm"

Files Plots Packages Help View

Install Update

Name Description V...

System Library

☐	abind	Combine Multidimensional Arrays	1.4-5	
☐	acep...	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1	
☐	actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2	
☐	asser...	Easy Pre and Post Assertions	0.2.1	

Console Terminal Jobs

```
~/RStudio
https://cran.rstudio.com/bin/windows/contrib/3.6/XML_3.98-1.20.zip
Installing package into 'C:/Users/רועי/Documents/R/win-library/3.6'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.6/XML_3.98-1.20.zip'
Content type 'application/zip' length 4610084 bytes (4.4 MB)
downloaded 4.4 MB

package 'XML' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\רועי\AppData\Local\Temp\RtmpU7M96j\downloaded_packages
>
```

7. עבודה עם CSV, PACKAGES ו-HTML

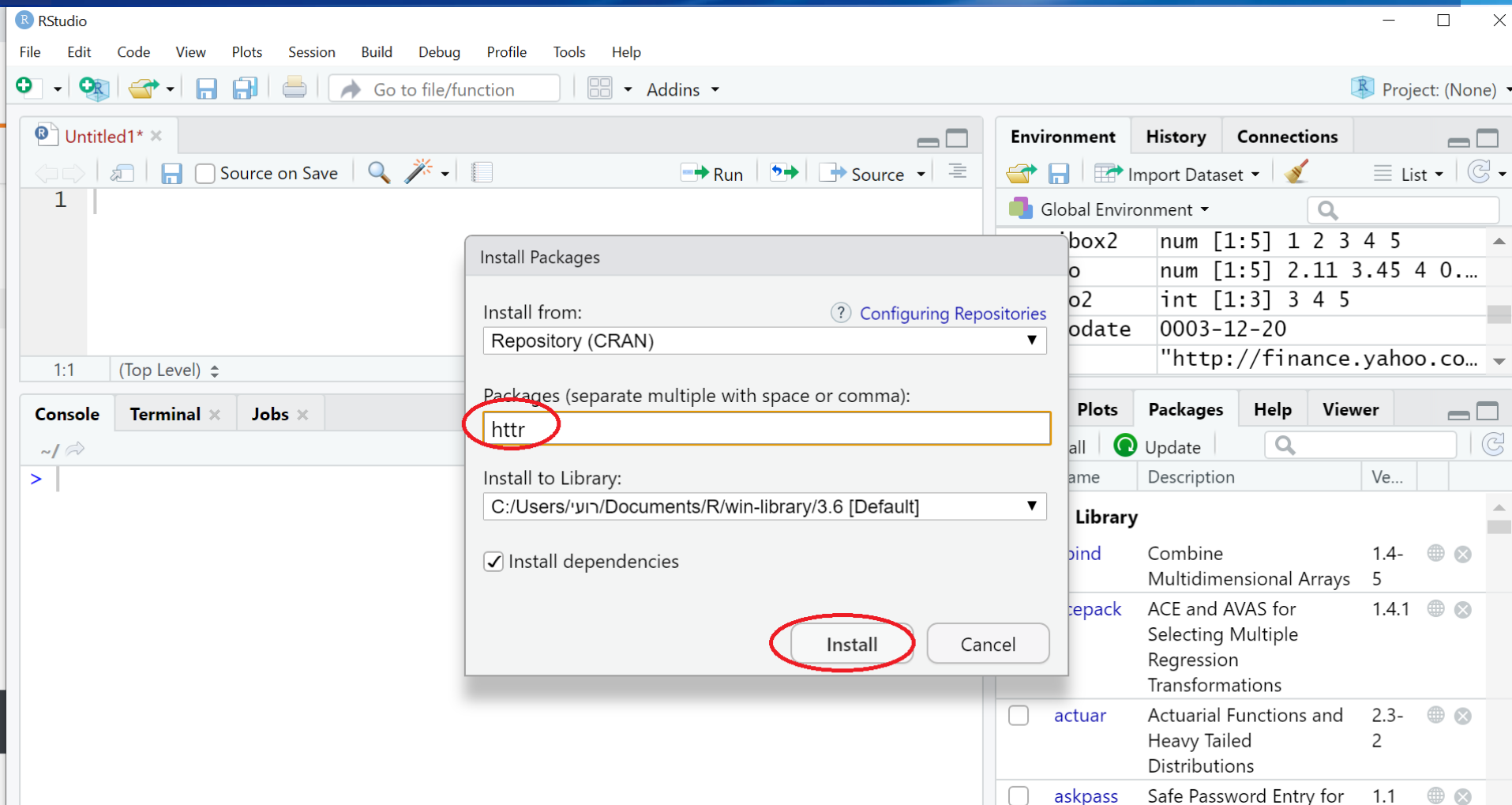
The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains a single line of code: `1`.
- Environment Panel:** Shows the `RoiData2` object with 236 observations and 390 variables. The values for `myname`, `number`, `number2`, `olive`, and `orange` are listed.
- Console:** Displays the output of the following R commands:

```
package 'XML' successfully unpacked and MD5 sums checked  
The downloaded binary packages are in  
  C:\Users\יָרוּעִי\AppData\Local\Temp\RtmpU7M96j  
  \downloaded_packages  
> library(XML)  
>  
>  
> detach("package:XML", unload = TRUE)  
>
```
- Packages Panel:** Lists installed and available packages. The `XML` package is highlighted with a red circle. The table below summarizes the packages shown:

Name	Description	Version
<code>withr</code>	Run Code 'With' Temporarily Modified Global State	2.1.2
<code>xfun</code>	Miscellaneous Functions by 'Yihui Xie'	0.10
<code>XML</code>	Tools for Parsing and Generating XML Within R and S-Plus	3.98-1.20
<code>yaml</code>	Methods to Convert R Data to YAML and Back	2.2.0
<code>zeallot</code>	Multiple, Unpacking, and Deconstructing Assignment	0.1.0

7. עבודה עם CSV, PACKAGES ו-HTML



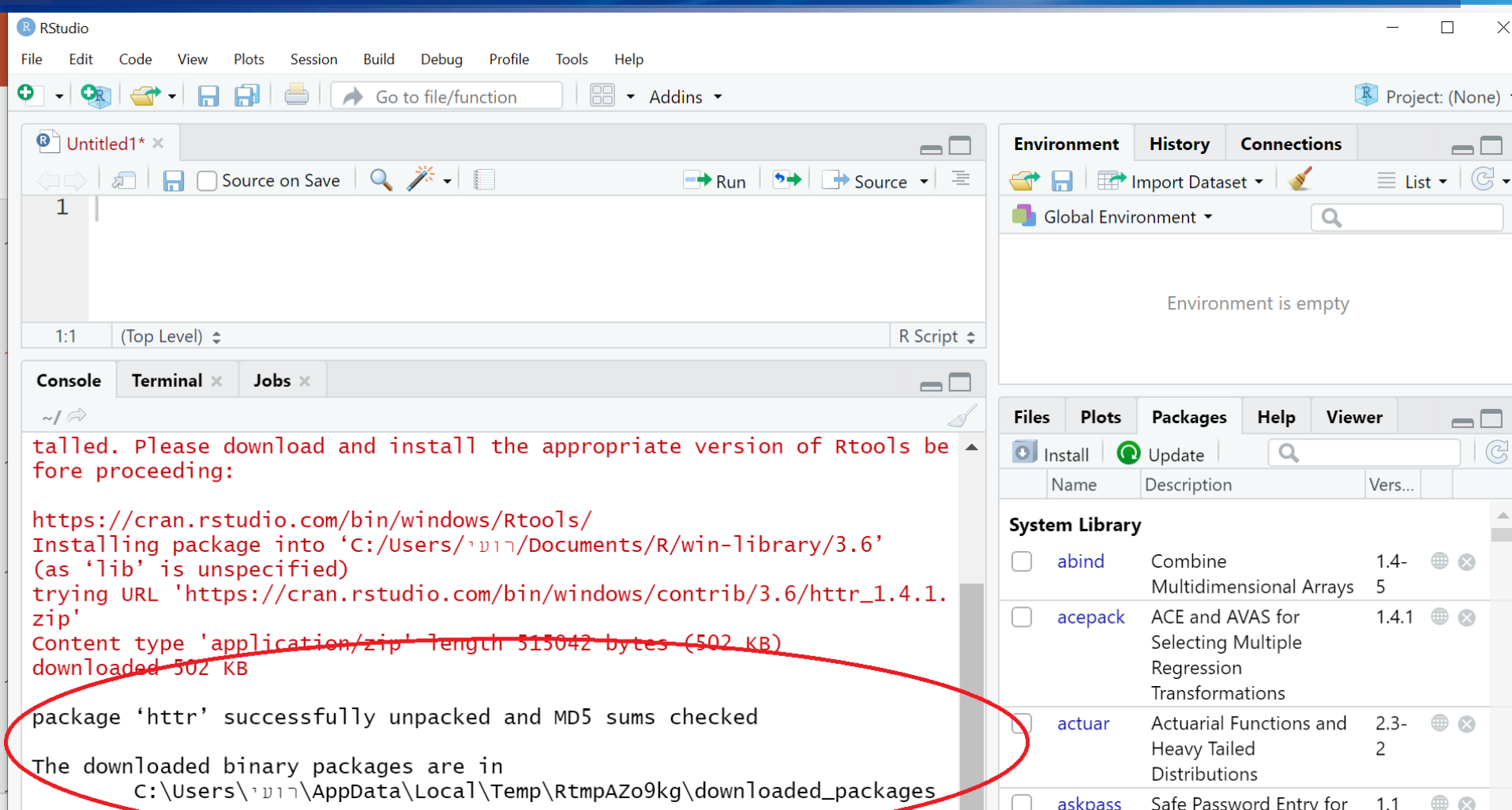
The screenshot shows the RStudio interface with the 'Install Packages' dialog box open. The dialog box has the following fields and options:

- Install from:** Repository (CRAN) (with a link to 'Configuring Repositories')
- Packages (separate multiple with space or comma):** httr (highlighted with a red circle)
- Install to Library:** C:/Users/.../Documents/R/win-library/3.6 [Default]
- ☒ Install dependencies
- Buttons:** Install (highlighted with a red circle) and Cancel

The background shows the RStudio interface with the Environment pane on the right displaying a data frame:

box2	num [1:5]	1	2	3	4 5
o	num [1:5]	2.11	3.45	4	0...
o2	int [1:3]	3	4	5	
odate		0003-12-20			
		"http://finance.yahoo.co...			

7. עבודה עם CSV, PACKAGES ו-HTML



RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Environment is empty

Files Plots Packages Help Viewer

Install Update

Name	Description	Vers...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2
☐ askpass	Safe Password Entry for	1.1

Console

```
talled. Please download and install the appropriate version of Rtools before proceeding:

https://cran.rstudio.com/bin/windows/Rtools/
Installing package into 'C:/Users/רוני/Documents/R/win-library/3.6'
(as 'lib' is unspecified)
trying URL 'https://cran.rstudio.com/bin/windows/contrib/3.6/httr_1.4.1.zip'
Content type 'application/zip' length 515042 bytes (502 KB)
downloaded 502 KB

package 'httr' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
C:\Users\רוני\AppData\Local\Temp\RtmpAZo9kg\downloaded_packages
```

7. עבודה עם PACKAGES, CSV ו-HTML

The screenshot shows a web browser window with the Yahoo Finance website. The address bar displays the URL `finance.yahoo.com/quote/ITCI/options?p=ITCI`. A context menu is open, showing various keyboard shortcuts, with `Ctrl+C` highlighted. The page content includes market indices (S&P 500, Dow 30, Nasdaq) and a detailed view of Intra-Cellular Therapies, Inc. (ITCI) stock, including its price, change, and options data. The 'Options' tab is selected, showing a table of call options for January 17, 2020.

Contract Name	Last Trade Date	Strike	Last Price	Bid	Ask	Change	% Change	Volume	Open Interest	Implied Volatility
ITCI200117C00002500	2019-12-23 11:39AM EST	2.50	38.40	35.20	36.90	0.00		2	8	106.88%

7. עבודה עם CSV, PACKAGES ו-HTML

January 17, 2020

In The Money

Show: List

Straddle

Option Lookup

Q

Calls

for January 17, 2020

Contract Name	Last Trade Date	Strike	Last Price	Bid	Ask	Change	% Change	Volume	Open Interest	Implied Volatility
ITCI200117C00002500	2019-12-23 11:39AM EST	2.50	38.40	35.20	36.90	0.00	-	2	8	496.88%
ITCI200117C00004000	2019-12-23 10:06AM EST	4.00	24.00	33.80	35.50	0.00	-	220	221	474.22%
ITCI200117C00005000	2019-12-23 1:01PM EST	5.00	31.35	32.70	34.40	0.00	-	7	96	364.06%
ITCI200117C00006000	2019-12-23 10:36AM EST	6.00	26.30	31.70	33.40	0.00	-	4	13	331.25%
ITCI200117C00007500	2019-12-24 12:49PM EST	7.50	30.80	30.80	31.90	+0.80	+2.67%	1	358	396.88%
ITCI200117C00009000	2019-12-24 11:04AM EST	9.00	28.50	28.80	30.60	+2.26	+8.61%	1	278	317.19%
ITCI200117C00010000	2019-12-24 12:53PM EST	10.00	28.89	28.00	29.20	+2.47	+9.35%	105	11,132	264.06%
ITCI200117C00011000	2019-12-24 12:37PM EST	11.00	27.50	26.80	28.50	+2.10	+8.27%	1	442	261.72%
ITCI200117C00012500	2019-12-24 12:41PM EST	12.50	26.00	25.20	27.10	+1.45	+5.91%	50	3,598	236.72%
ITCI200117C00014000	2019-12-24 12:43PM EST	14.00	24.42	24.10	25.40	+1.22	+5.26%	42	2,607	234.77%
ITCI200117C00015000	2019-12-24 12:54PM EST	15.00	24.00	22.80	23.70	+2.30	+10.60%	87	23,269	211.33%
ITCI200117C00016000	2019-12-24 12:17PM EST	16.00	22.50	21.80	23.60	+1.80	+8.70%	12	694	198.05%
ITCI200117C00017500	2019-12-24 11:09AM EST	17.50	20.70	20.10	22.00	+1.49	+7.76%	52	985	145.31%
ITCI200117C00019000	2019-12-23 3:21PM EST	19.00	18.26	18.80	20.70	0.00	-	172	208	170.31%
ITCI200117C00020000	2019-12-24 12:55PM EST	20.00	19.10	18.00	19.50	+2.28	+13.56%	59	896	159.57%
ITCI200117C00021000	2019-12-24 11:30AM EST	21.00	17.70	17.00	18.70	+1.52	+9.39%	28	365	160.55%
ITCI200117C00022000	2019-12-24 12:50PM EST	22.00	17.00	16.10	17.40	+1.90	+12.58%	125	4,562	139.45%

7. עבודה עם PACKAGES, CSV ו-HTML

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

```
1 library(httr)
2 library(XML)
3 url <- "https://finance.yahoo.com/quote/ITCI/options?p=ITCI"
4 tabs <- GET(url)
5 tabs <- readHTMLTable(rawToChar(tabs$content), which = 1)
6 tabs
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> library(httr)
> library(XML)
> url <- "https://finance.yahoo.com/quote/ITCI/options?p=ITCI"
> tabs <- GET(url)
> tabs <- readHTMLTable(rawToChar(tabs$content), which = 1)
> tabs
```

	Contract	Name	Last Trade Date	Strike	Last Price	Bid
1	ITCI200117C00002500		2019-12-23 11:39AM EST	2.50	38.40	35.20
2	ITCI200117C00004000		2019-12-23 10:06AM EST	4.00	24.00	33.80
3	ITCI200117C00005000		2019-12-23 1:01PM EST	5.00	31.35	32.70
4	ITCI200117C00006000		2019-12-23 10:36AM EST	6.00	26.30	31.70
5	ITCI200117C00007500		2019-12-24 12:49PM EST	7.50	30.80	30.80
6	ITCI200117C00009000		2019-12-24 11:04AM EST	9.00	28.50	28.80
7	ITCI200117C00010000		2019-12-24 12:53PM EST	10.00	28.89	28.00

Environment History Connections

Global Environment

Data

tabs	17 obs. of 11 variables
------	-------------------------

Values

url	"https://finance.yahoo.c...
-----	-----------------------------

Files Plots Packages Help Viewer

Install Update

	Name	Description	Vers...
☐	tools	Tools for Package Development	3.6.2
☐	transla...	The R Translations Package	3.6.2
☐	utf8	Unicode Text Processing	1.1.4
☒	utils	The R Utils Package	3.6.2
☐	vctr	Vector Helpers	0.2.0
☐	viridis	Default Color Maps from 'matplotlib'	0.5.1
☐	viridisL...	Default Color Maps from 'matplotlib' (Lite	0.3.0

7. עבודה עם CSV, PACKAGES ו-HTML

Puts or January 17, 2020

Contract Name	Last Trade Date	Strike ^ Last Price	Bid	Ask	Change	% Change	Volume	Open Interest	Implied Volatility	
ITCI200117P00001000	2019-12-24 10:58AM EST	1.00	0.02	0.00	0.05	0.00	-	2	46	612.50%
ITCI200117P00002500	2019-12-24 9:31AM EST	2.50	0.01	0.00	0.05	-0.02	-66.67%	8	63,055	440.63%
ITCI200117P00004000	2019-12-24 12:25PM EST	4.00	0.01	0.00	0.05	0.00	-	32	29,563	362.50%
ITCI200117P00005000	2019-12-24 11:35AM EST	5.00	0.02	0.00	0.05	+0.01	+100.00%	129	12,826	325.00%
ITCI200117P00006000	2019-12-24 11:04AM EST	6.00	0.03	0.00	0.05	+0.02	+200.00%	103	12,793	295.31%
ITCI200117P00007500	2019-12-24 11:28AM EST	7.50	0.05	0.00	0.05	+0.02	+66.67%	219	34,672	259.38%
ITCI200117P00009000	2019-12-24 12:53PM EST	9.00	0.05	0.00	0.05	+0.02	+66.67%	26	87,629	231.25%
ITCI200117P00010000	2019-12-24 9:30AM EST	10.00	0.05	0.00	0.05	0.00	-	6	6,730	215.63%
ITCI200117P00011000	2019-12-23 3:53PM EST	11.00	0.05	0.05	0.05	0.00	-	816	1,718	218.75%
ITCI200117P00012500	2019-12-24 12:11PM EST	12.50	0.05	0.00	0.05	-0.06	-54.55%	65	1,715	181.25%
ITCI200117P00014000	2019-12-24 10:04AM EST	14.00	0.05	0.00	0.05	-0.10	-66.67%	8	134	164.06%
ITCI200117P00015000	2019-12-24 12:29PM EST	15.00	0.05	0.05	0.30	-0.15	-75.00%	4	232	204.30%
ITCI200117P00016000	2019-12-24 9:35AM EST	16.00	0.05	0.15	0.15	-0.18	-78.26%	4	117	186.33%
ITCI200117P00017500	2019-12-24 9:51AM EST	17.50	0.15	0.25	0.10	-0.10	-40.00%	1	117	173.83%
ITCI200117P00019000	2019-12-24 12:34PM EST	19.00	0.10	0.05	0.20	-0.25	-71.43%	14	244	148.05%
ITCI200117P00020000	2019-12-24 12:44PM EST	20.00	0.19	0.10	0.20	-0.26	-57.78%	66	440	143.36%

7. עבודה עם PACKAGES, CSV ו-HTML

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains R code for fetching and parsing HTML data from Yahoo Finance.
- Console:** Shows the execution of the R code, resulting in a data table.
- Environment:** Displays the current environment with the 'tabs' object containing 16 observations of 11 variables.
- Files:** Shows the project files, including 'tools', 'transla...', 'utf8', 'utils', 'vctrs', 'viridis', and 'viridisL...'.

R Code (Source Editor):

```
1 library(httr)
2 library(XML)
3 url <- "https://finance.yahoo.com/quote/ITCI/options?p=ITCI"
4 tabs <- GET(url)
5 tabs <- readHTMLTable(rawToChar(tabs$content), which = 2)
6 tabs
```

Console Output:

```
> library(httr)
> library(XML)
> url <- "https://finance.yahoo.com/quote/ITCI/options?p=ITCI"
> tabs <- GET(url)
> tabs <- readHTMLTable(rawToChar(tabs$content), which = 2)
> tabs
```

Data Table:

	Contract Name	Last Trade Date	Strike	Last Price	Bid
1	ITCI200117P00001000	2019-12-24 10:58AM EST	1.00	0.02	0.00
2	ITCI200117P00002500	2019-12-24 9:31AM EST	2.50	0.01	0.00
3	ITCI200117P00004000	2019-12-24 12:25PM EST	4.00	0.01	0.00
4	ITCI200117P00005000	2019-12-24 11:35AM EST	5.00	0.02	0.00
5	ITCI200117P00006000	2019-12-24 11:04AM EST	6.00	0.03	0.00
6	ITCI200117P00007500	2019-12-24 11:28AM EST	7.50	0.05	0.00
7	ITCI200117P00009000	2019-12-24 12:53PM EST	9.00	0.05	0.00



8. שימוש בגרפים hist, hist ו- qplot

8. שימוש בגרפים hist, plot, ו-qqplot

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1* x

```
1 RoiPo <- read.csv("Roi.csv",TRUE,",")
2 RoiPo
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> RoiPo <- read.csv("Roi.csv",TRUE,",")
> RoiPo
```

	id	firstName	lastName	age	btc	relationship	gender	income
1	1	Bucky	Roberts	53	4.2468	single	male	338503.32
2	2	Lisa	Gallagher	19	0.0080	single	female	270.09
3	3	Emma	Williams	13	2.1327	not single	female	29215.48
4	4	Tony	Masters	23	4.4420	not single	male	147852.27
5	5	Mike	Smith	44	4.7982	single	male	259082.43
6	6	Sally	Raphael	11	0.9683	not single	female	18963.43
7	7	John	wisdom	17	4.6899	single	male	83230.54
8	8	Nu	wilson	42	1.9515	single	male	160172.33
9	9	Antonette	Moore	62	1.7903	single	female	186057.95
10	10	Tamekia	Taylor	41	4.6659	not single	female	214560.33
11	11	Hubert	Anderson	67	5.8445	not single	male	451491.31
12	12	Clare	Thomas	39	3.4678	single	male	223412.68
13	13	Yevette	Jackson	43	0.2401	not single	female	17576.10

Environment History Connections

Global Environment

polanitz...	10 obs. of 4 variables	
RoiData	100 obs. of 8 variables	
RoiData2	236 obs. of 390 variab...	
RoiPo	100 obs. of 8 variables	

Values

myname	"roi frm"
number	5

Files Plots Packages Help Viewer

Install Update

	Name	Description	Ve...
	xfun	Miscellaneous Functions by 'Yihui Xie'	0.10
☒	XML	Tools for Parsing and Generating XML Within R and S-Plus	3.98-1.20
☐	yaml	Methods to Convert R Data to YAML and Back	2.2.0

8. שימוש בגרפים hist, plot, ו- qplot

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה

תצוגה בלבד 100%

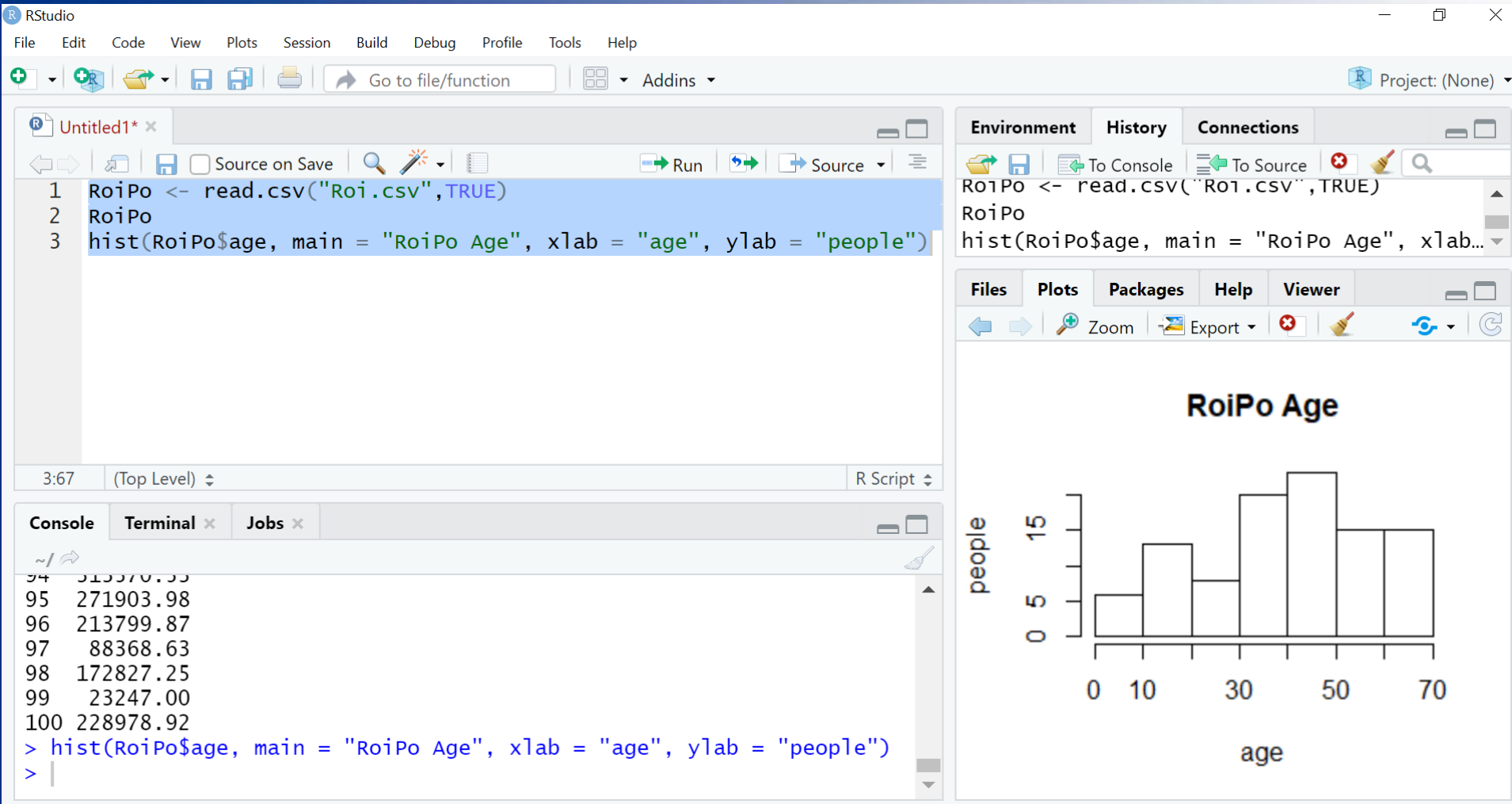
Williams

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	firstName	lastName	age	btc	relationship	gender	income					
2	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
3	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
4	3	Emma	Williams	38	0.4785	not single	female	23965.63					
5	4	Tony	Masters	44	3.0814	not single	male	212815.06					
6	5	Mike	Smith	56	5.6287	single	male	461873.06					
7	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
8	7	John	Wisdom	61	3.6941	single	male	328050.57					
9	8	Nu	Wilson	63	5.8970	single	male	483122.59					
10	9	Antonette	Moore	54	2.8097	single	female	208786.28					
11	10	Tamekia	Taylor	58	3.7459	not single	female	405052.62					
12	11	Hubert	Anderson	37	3.1344	not single	male	188299.34					
13	12	Clare	Thomas	64	4.9943	single	male	578179.52					
14	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
15	14	Pierre	White	10	4.3269	single	male	45893.99					

אפשרויות נוספות

Sheet1

8. שימוש בגרפים hist, plot, ו-qqplot



8. שימוש בגרפים hist, plot, ו- qplot



שיתוף

brUsers

קובץ עריכה הצגה הוספה עיצוב נתונים כלים תוספים עזרה



תצוגה בלבד 100%

=D6*E6*1000*(1+RAND())

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	id	firstName	lastName	age	btc	relationship	gender	income					
2	1	Bucky	Roberts	17	3.6706	single	male	63742.60					
3	2	Lisa	Gallagher	37	3.8676	single	female	187523.49					
4	3	Emma	Williams	38	0.4785	not single	female	23965.63					
5	4	Tony	Masters	44	3.0814	not single	male	212815.06					
6	5	Mike	Smith	56	5.6287	single	male	461873.06					
7	6	Sally	Raphael	37	4.2414	not single	female	260575.27					
8	7	John	Wisdom	61	3.6941	single	male	328050.57					
9	8	Nu	Wilson	63	5.8970	single	male	483122.59					
10	9	Antonette	Moore	54	2.8097	single	female	208786.28					
11	10	Tamekia	Taylor	58	3.7459	not single	female	405052.62					
12	11	Hubert	Anderson	37	3.1344	not single	male	188299.34					
13	12	Clare	Thomas	64	4.9943	single	male	578179.52					
14	13	Yvette	Jackson	56	3.3008	not single	female	369374.28					
15	14	Pierre	White	10	4.3269	single	male	45893.99					

אפשרויות נוספות

Sheet1

8. שימוש בגרפים hist, plot, ו-qqplot

RStudio interface showing a script and its execution results.

Script (Untitled1*):

```
1  
2 plot(RoiPo$age, RoiPo$income, main = "age vs. income", xlab = "age")
```

Console:

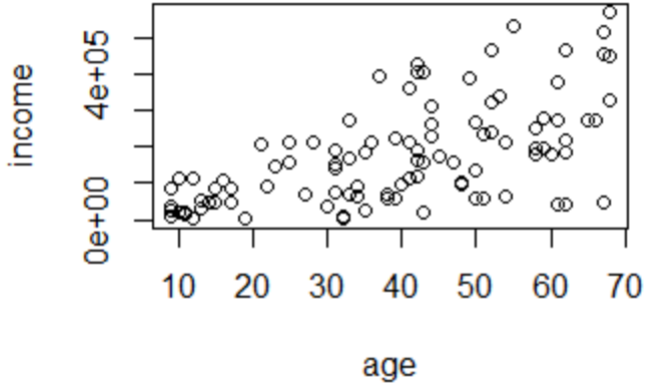
```
> plot(RoiPo$age, RoiPo$income, main = "age vs. income", xlab = "age", ylab = "income")  
> |
```

Environment:

- plot(RoiPo\$age, RoiPo\$income, main = "age ...
- plot(RoiPo\$age, RoiPo\$income, main = "age ...
- plot(RoiPo\$age, RoiPo\$income, main = "age ...

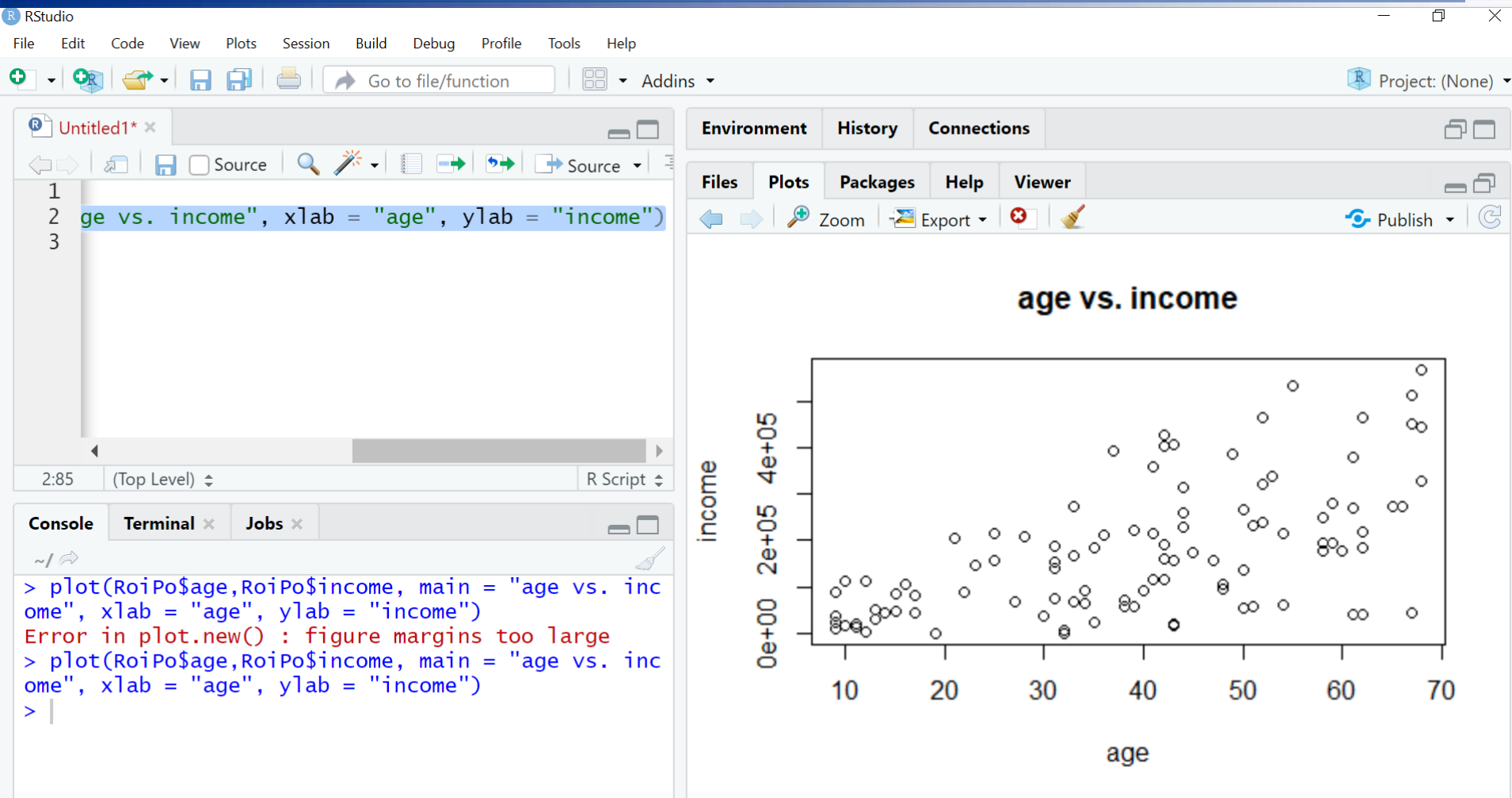
Plots:

age vs. income



The scatter plot displays a positive correlation between age and income. The x-axis, labeled 'age', ranges from 10 to 70. The y-axis, labeled 'income', ranges from 0e+00 to 4e+05. The data points are represented by open circles, showing a general upward trend as age increases.

8. שימוש בגרפים hist, plot, ו-qqplot

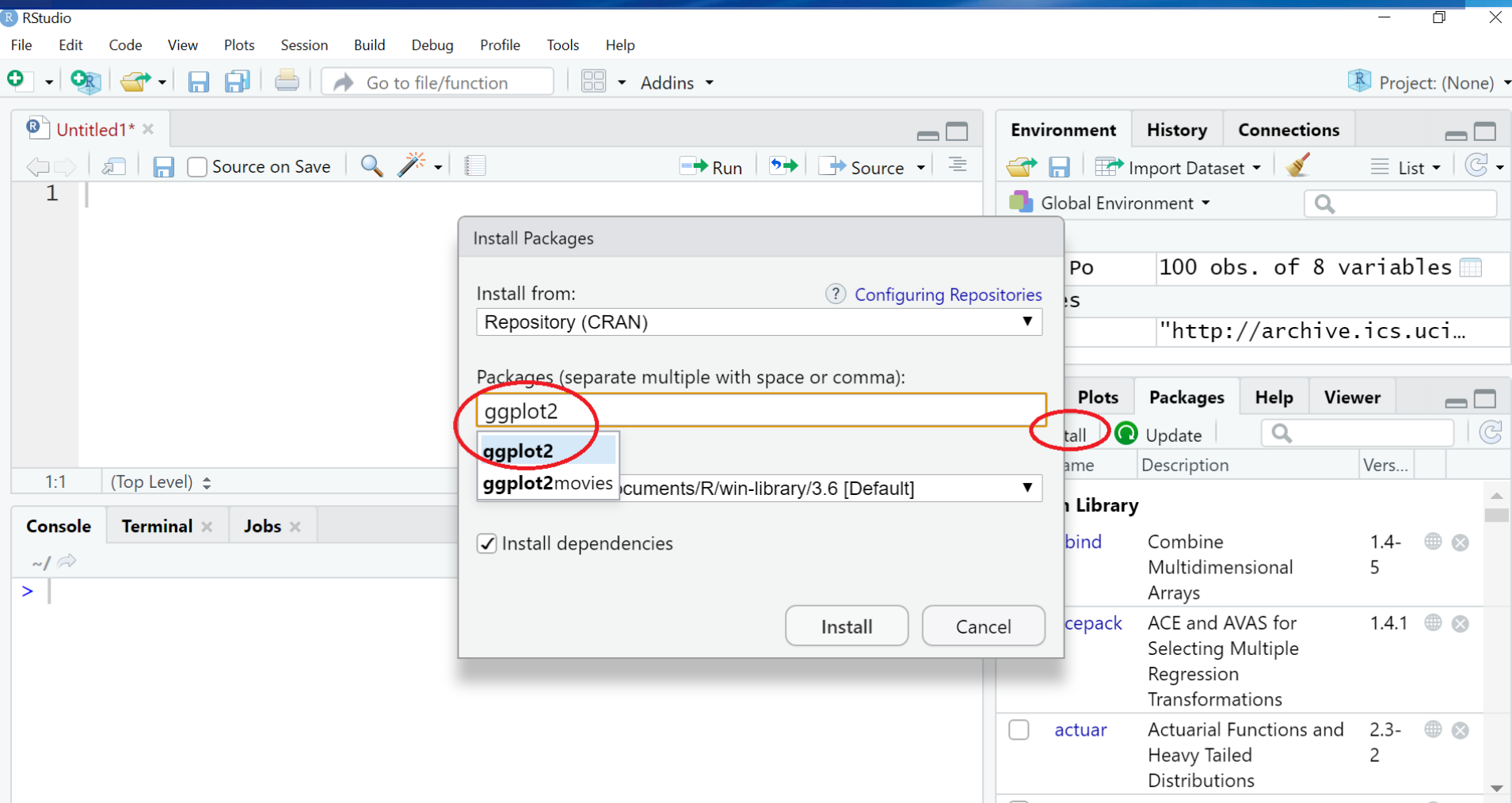


8. שימוש בגרפים hist, plot, ו-qqplot

The screenshot displays the RStudio environment. The top menu bar includes File, Edit, Code, View, Plots, Session, Build, Debug, Profile, Tools, and Help. The toolbar contains icons for saving, running, and other functions. The main editor window shows a script titled 'Untitled1*' with a single line of code: `1`. The console at the bottom shows the prompt `>`. The right-hand pane is divided into several sections: 'Environment' (showing 'Global Environment'), 'History', 'Connections', 'Files', 'Plots', 'Packages', 'Help', and 'Viewer'. The 'Packages' section is active, showing a list of installed and available packages. The 'Install' button is circled in red. Below the 'Install' button, the 'System Library' section lists several packages with their descriptions and versions.

Package	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

8. שימוש בגרפים hist, plot, ו- qplot



RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Import Dataset

Global Environment

100 obs. of 8 variables

"http://archive.ics.uci..."

Plots Packages Help Viewer

ggplot2

ggplot2movies

documents/R/win-library/3.6 [Default]

☒ Install dependencies

Install Cancel

bind Combine Multidimensional Arrays 1.4-5

cepack ACE and AVAS for Selecting Multiple Regression Transformations 1.4.1

actuar Actuarial Functions and Heavy Tailed Distributions 2.3-2

8. שימוש בגרפים hist, plot, ו-qplot

The screenshot shows the RStudio interface with the following components:

- Source Editor:** A file named 'Untitled1*' is open, showing a single line of code: `1`.
- Environment Panel:** Shows 'Global Environment' with the message 'Environment is empty'.
- Plots Panel:** Empty.
- Packages Panel:** Shows the 'System Library' with a list of installed packages:

Name	Description	Vers...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2
- Console:** Shows the output of the `install.packages()` command:

```
1.2.zip  
Content type 'application/zip' length 3975547 bytes (3.8 MB)  
downloaded 3.8 MB  
  
package 'ggplot2' successfully unpacked and MD5 sums checked  
The downloaded binary packages are in  
C:\Users\רועי\AppData\Local\Temp\RtmpszkwzD\downloaded_packages  
> |
```

8. שימוש בגרפים hist, plot, ו-qplot

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

```
1 RoiPo <- read.csv("Roi.csv", TRUE, ",", "")
2 RoiPo
3 library(ggplot2)
4
5 qplot(RoiPo$age, RoiPo$income, main = "age vs. income")
```

Environment History Connections

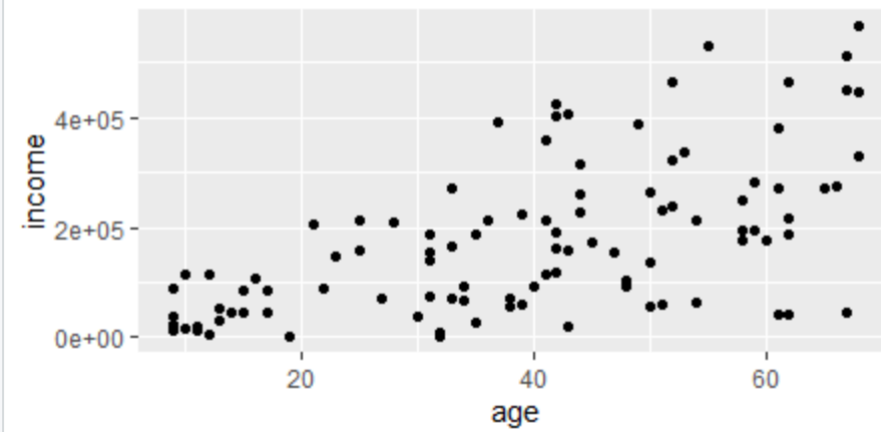
New Connection

Connection Status

Files Plots Packages Help Viewer

Zoom Export

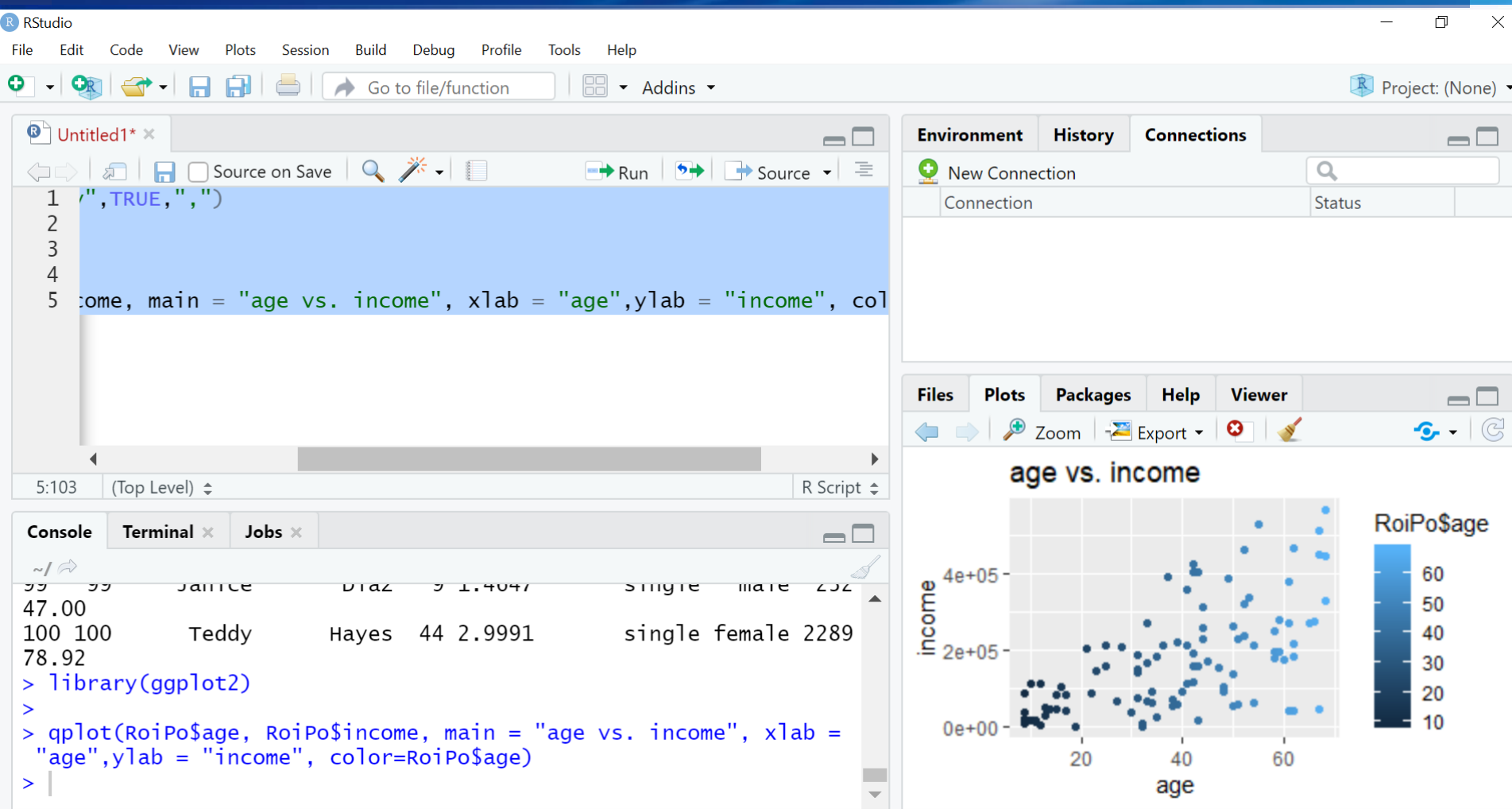
age vs. income



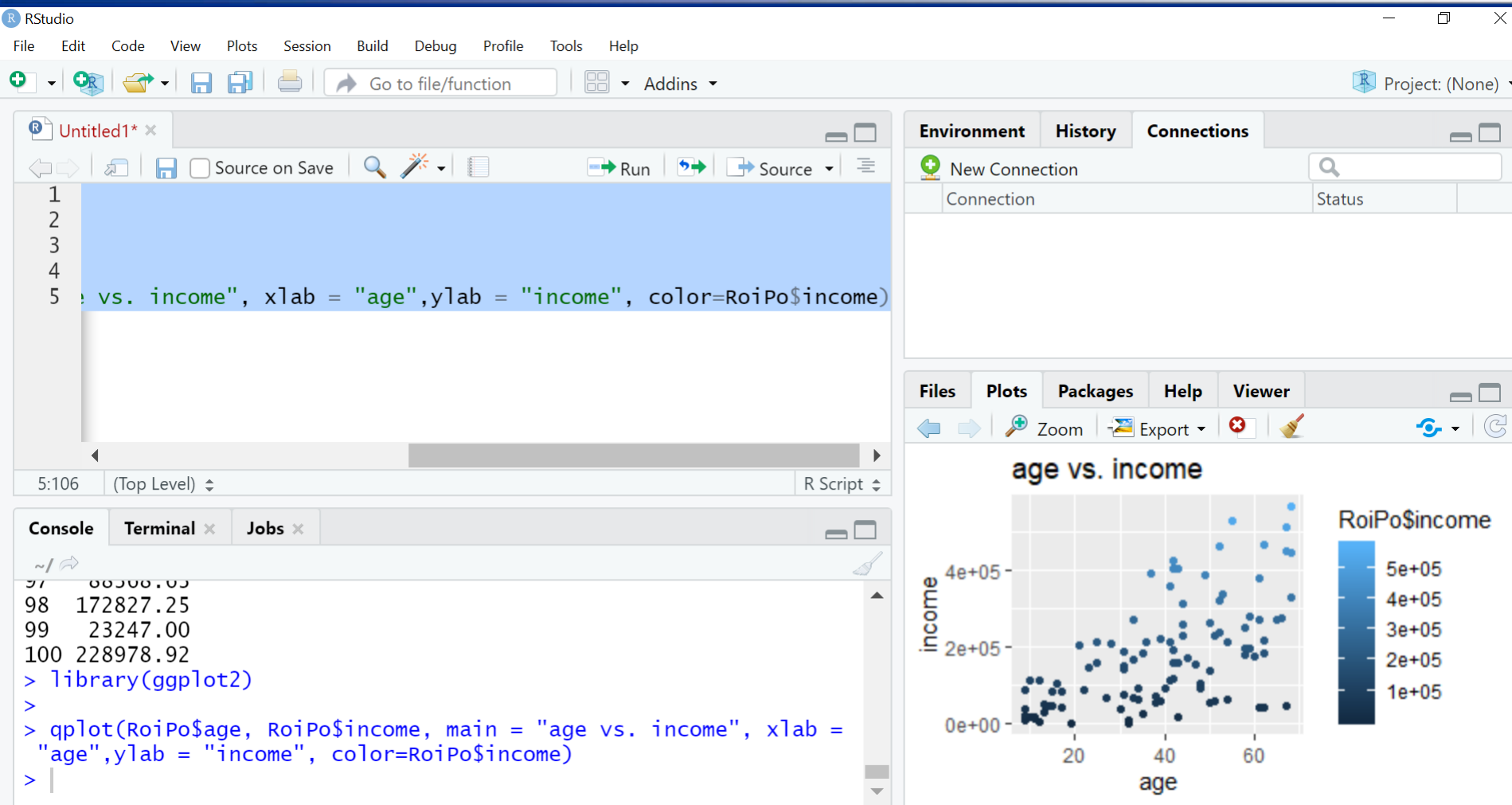
Console

```
97 female 88308.03
98 male 172827.25
99 male 23247.00
100 female 228978.92
> library(ggplot2)
>
> qplot(RoiPo$age, RoiPo$income, main = "age vs. income",
> xlab = "age", ylab = "income")
> |
```

8. שימוש בגרפים hist, plot, ו-qplot



8. שימוש בגרפים hist, plot, ו-qplot



8. שימוש בגרפים hist, plot, ו-qplot

RStudio interface showing the execution of R code to create a scatter plot.

Code Editor (Untitled1* x):

```
1 RoiPo <- read.csv("Roi.csv", TRUE, ",")
2 RoiPo
3 library(ggplot2)
4
5 qplot(RoiPo$age, RoiPo$income, main = "age vs. income", color=RoiPo$
```

Environment Panel:

- Connections: New Connection
- Table: Connection | Status

Plots Panel:

- Files: Baker, Barnes, Bell, Bennett, Brooks, Bryant, Butler, Campbell, Carter
- Plots: vs. income
- Packages: Gallagner, Garcia, Gonzales, Gonzalez, Gray, Green, Griffin, Hall, Harris
- Help: Lee, Lewis, Long, Lopez, Martin, Martinez, Masters, Mitchell, Moore
- Viewer: Price, Ramirez, Raphael, Reed, Richardson, Rivera, Roberts, Robinson, Rodriguez

Console:

```
43 19385.96
44 513878.40
45 44738.16
46 273941.66
47 156137.16
48 379732.11
49 157228.51
50 190641.43
51 114846.94
```

8. שימוש בגרפים hist, plot, ו- qplot

The screenshot displays the RStudio environment. The 'Plots' menu is open, with 'Save as Image...' highlighted. The script editor shows the following code:

```
1 read.csv("RoiPo.csv")
2
3 plot2)
4
5 $age, RoiPo$income, color=RoiPo$income)
```

The console shows the execution of the following commands:

```
> library(ggplot2)
>
> qplot(RoiPo$age, RoiPo$income, main = "age vs. income", color=RoiPo$income)
>
```

The 'Plots' pane on the right shows a scatter plot titled 'age vs. income'. The x-axis is labeled 'RoiPo\$age' and the y-axis is labeled 'RoiPo\$income'. A color scale on the right indicates income values from 1e+05 to 5e+05.

8. שימוש בגרפים hist, plot, ו- qplot

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1* x

```
1 read.csv("Roi.csv", TRUE)
2
3 plot2)
4
5 $age, RoiPo$income,
```

Save Plot as Image

Image format: PNG Width: 372 Height: 199

Directory... ~

File name: RoiPoPlot

☐ Maintain aspect ratio

Update Preview

age vs. income

RoiPo\$income

RoiPo\$age

☒ View plot after saving

Save Cancel

Console

```
57 88308.03
98 172827.25
99 23247.00
100 228978.92
> library(ggplot2)
>
> qplot(RoiPo$age, RoiPo$income, main = "age vs. income", color = RoiPo$income)
>
```

8. שימוש בגרפים hist, plot, ו- qqplot

חיפוש בתיקיית מסמכים

בחור קובץ לתצוגה מקדימה.

סוג	תאריך שינוי	שם
PNG קובץ	20/12/2019 01:55	RoiPoPlot
PNG קובץ	20/12/2019 01:49	Rplot01
Adobe Acrobat Document	20/12/2019 01:49	Rplot01
soft Excel Comma Separate...	19/12/2019 23:16	nadav
soft Excel Comma Separate...	19/12/2019 12:54	roi
R קובץ	09/12/2019 01:47	roi12.R
soft Excel Comma Separate...	09/12/2019 00:59	nhtest
soft Excel Comma Separate...	09/12/2019 00:54	nhtrain
soft Excel Comma Separate...	08/12/2019 22:10	train
soft Excel Comma Separate...	08/12/2019 22:01	test
soft Excel Comma Separate...	08/12/2019 21:40	mle
soft Excel Comma Separate...	08/12/2019 21:15	DATA
R Workspace	08/12/2019 17:31	.RData
RHISTORY קובץ	08/12/2019 17:31	.Rhistry
R קובץ	08/12/2019 17:31	roi2.R
R קובץ	06/12/2019 20:13	gdp.R
Chrome HTML Document	28/11/2019 00:17	תמג
soft Excel Comma Separate...	27/11/2019 23:15	gdp
מסמך טקסט	09/11/2019 15:34	data_file
MALES40 קובץ	08/11/2019 22:14	diets.males40

גישה מהירה

- שולחן העבודה
- הורדות
- מסמכים
- תמונות
- 1.11.2019
- גילויי דעת של הלשכה
- כללי
- תכנות בסיסי ב-R
- OneDrive
- מחשב זה
- אובייקטי תלת-ממד
- הורדות
- מוסיקה
- מסמכים
- סרטי וידאו
- שולחן העבודה
- תמונות
- דיסק מקומי (C:)

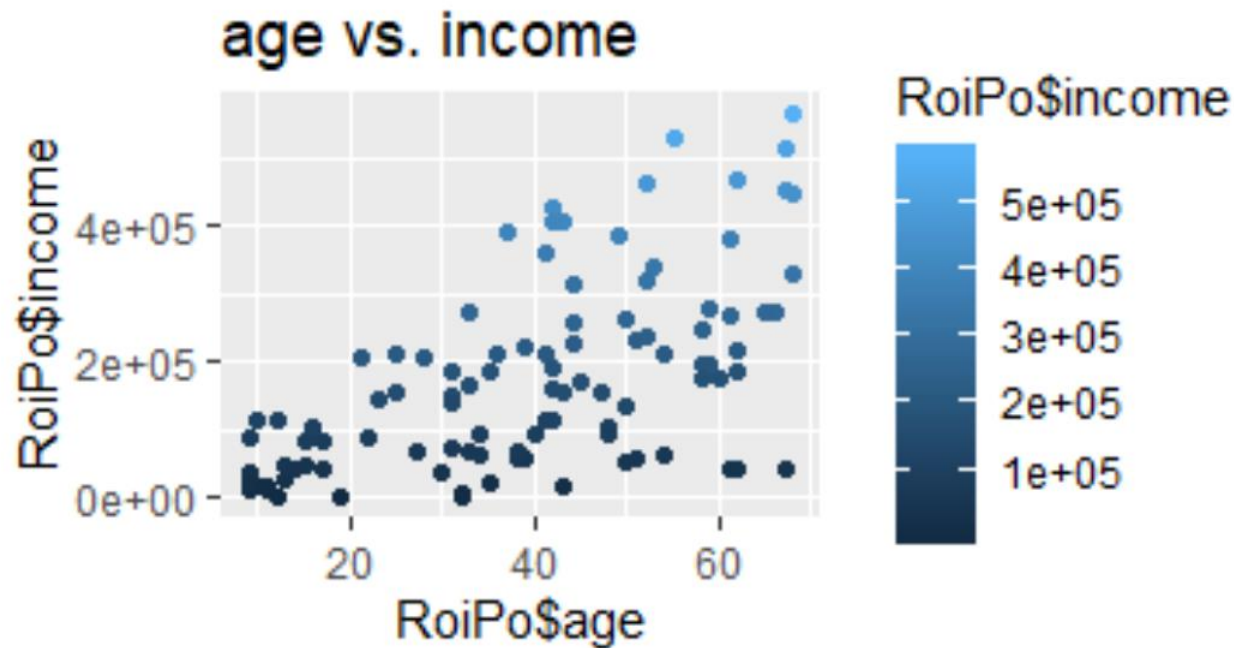
529 פריטים

8. שימוש בגרפים hist, plot, ו-qqplot

ערוך וצור

הוסף ל-

ל התמונות





round ,runif ,%in% .9

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

New Connection

Connection Status

Files Plots Packages Help Viewer

Install Update

Name Description Ve...

System Library

☐	abind	Combine Multidimensional Arrays	1.4-5	
☐	acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1	
☐	actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2	

2:1 (Top Level) R Script

```
1
2 matrix(1:12, ncol=4, nrow=3)
```

Console

```
> matrix(1:12, ncol=4, nrow=3)
      [,1] [,2] [,3] [,4]
[1,]    1    4    7   10
[2,]    2    5    8   11
[3,]    3    6    9   12
> |
```

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

New Connection

Connection Status

Files Plots Packages Help Viewer

Install Update

Name Description Ve...

System Library

☐	abind	Combine Multidimensional Arrays	1.4-5	
☐	acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1	
☐	actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2	

```
1
2 matrix(runif(12,min=1,max=30), ncol=4, nrow=3)
```

2:1 (Top Level) R Script

Console Terminal Jobs

```
> matrix(runif(12,min=1,max=30), ncol=4, nrow=3)
      [,1] [,2] [,3] [,4]
[1,] 7.91864 20.54800 9.603447 7.696025
[2,] 19.10299 24.88794 16.186807 20.450588
[3,] 27.24852 16.83607 24.543934 10.967578
> matrix(runif(12,min=1,max=30), ncol=4, nrow=3)
      [,1] [,2] [,3] [,4]
[1,] 29.04023 19.735274 18.94592 20.66148
[2,] 11.40920 10.393447 17.42055 17.19628
[3,] 15.37520 3.917745 18.15351 24.71348
> matrix(runif(12,min=1,max=30), ncol=4, nrow=3)
      [,1] [,2] [,3] [,4]
[1,] 6.131605 22.772990 11.198082 14.22904
[2,] 4.401281 3.351791 14.967825 17.04561
[3,] 2.924925 1.460215 7.622428 15.60310
>
```

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

toto	num [1:5]	2.93 1.08 2.6...
------	-----------	------------------

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-0
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

```
1  
2 toto <- runif(5,min = 1,max = 3)  
3 toto
```

3:6 (Top Level) R Script

Console Terminal Jobs

```
> toto <- runif(5,min = 1,max = 3)  
> toto  
[1] 2.934846 1.078364 2.679923 1.202716 1.319467  
>
```

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 toto <- 1:6
2 one <- 1
3
4 one %in% toto
5
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- 1:6
> one <- 1
>
> one %in% toto
[1] TRUE
>
```

Environment History Connections

Global Environment

Values

one	1
toto	int [1:6] 1 2 3 4 5 6

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

round ,runif ,%in% .9

The screenshot displays the RStudio interface with the following components:

- Source Editor:** Contains the following R code:

```
1 toto <- 1:6
2 one <- 8
3
4 one %in% toto
5
```
- Console:** Shows the execution output:

```
> toto <- 1:6
> one <- 8
>
> one %in% toto
[1] FALSE
>
```
- Environment Pane:** Displays the current environment with the following values:

Variable	Value
one	8
toto	int [1:6] 1 2 3 4 5 6

The entire Environment pane is circled in red.
- Files Pane:** Shows the project structure with tabs for Files, Plots, Packages, Help, and Viewer.
- System Library:** Lists installed packages with their descriptions and versions:

Package	Description	Version
abind	Combine Multidimensional Arrays	1.4-5
acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

round ,runif ,%in% .9

RStudio interface showing a script and its execution results.

Script (Untitled1*):

```
1 toto <- 1:6
2 toto2 <- 3:5
3 toto
4 toto2
5 toto %in% toto2
6
```

Console:

```
> toto <- 1:6
> toto2 <- 3:5
> toto
[1] 1 2 3 4 5 6
> toto2
[1] 3 4 5
> toto %in% toto2
[1] FALSE FALSE TRUE TRUE TRUE FALSE
>
```

Environment:

Variable	Value
one	8
toto	int [1:6] 1 2 3 4 5 6
toto2	int [1:3] 3 4 5

The Environment pane shows the variables created in the script. The variable 'one' has a value of 8. The variable 'toto' is an integer vector of length 6, containing the values 1 through 6. The variable 'toto2' is an integer vector of length 3, containing the values 3, 4, and 5. The 'Values' column shows the data type and the values of the vectors.

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 toto <- c(2.1,3.3,4,0.9,5)
2
3 toto
4
```

1:1 (Top Level) R Script

Console

```
> toto <- c(2.1,3.3,4,0.9,5)
>
> toto
[1] 2.1 3.3 4.0 0.9 5.0
>
```

Environment History Connections

Global Environment

Values

one	8
toto	num [1:5] 2.1 3.3 4 0.9...
toto2	int [1:5] 5 4 5

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

round ,runif ,%in% .9

RStudio interface showing a script and its execution results.

Script (Untitled1*):

```
1 toto <- c(2.1,3.3,4,0.9,5)
2
3 toto
4 round(toto)
```

Console Output:

```
> toto <- c(2.1,3.3,4,0.9,5)
>
> toto
[1] 2.1 3.3 4.0 0.9 5.0
> round(toto)
[1] 2 3 4 1 5
> |
```

Environment Panel:

Variable	Value
one	8
toto	num [1:5] 2.1 3.3 4 0.9...
toto2	int [1:3] 3 4 5

System Library Panel:

Name	Description	Version
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

one	8
toto	num [1:5] 2.1 3.3 4 0.9...
toto2	int [1:3] 3 4 5

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

Console

```
> toto <- c(2.1,3.3,4,0.9,5)
> toto
[1] 2.1 3.3 4.0 0.9 5.0
> round(toto,2)
[1] 2.1 3.3 4.0 0.9 5.0
>
```

4:14 (Top Level) R Script

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

one	8
toto	num [1:5] 2.11 3.45 4 0...
toto2	int [1:3] 3 4 5

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

```
1 toto <- c(2.1125,3.44553,4,0.9,5)
2
3 toto
4
```

4:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- c(2.1125,3.44553,4,0.9,5)
>
> toto
[1] 2.11250 3.44553 4.00000 0.90000 5.00000
>
```

round , runif , %in% - Word% - 9 חלק - R

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Environment History Connections

Global Environment

Values

one	8
toto	num [1:5] 2.11 3.45 4 0...
toto2	int [1:3] 3 4 5

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2

```
1 toto <- c(2.1125,3.44553,4,0.9,5)
2
3 toto
4
5 round(toto)
```

1:1 (Top Level) R Script

Console Terminal Jobs

```
> toto <- c(2.1125,3.44553,4,0.9,5)
>
> toto
[1] 2.11250 3.44553 4.00000 0.90000 5.00000
>
> round(toto)
[1] 2 3 4 1 5
>
```

round ,runif ,%in% .9

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins Project: (None)

Untitled1*

```
1 toto <- c(2.1125,3.44553,4,0.9,5)
2
3 toto
4
5 round(toto,digits=1)
```

5:21 (Top Level) R Script

Console Terminal Jobs

```
> toto <- c(2.1125,3.44553,4,0.9,5)
>
> toto
[1] 2.11250 3.44553 4.00000 0.90000 5.00000
>
> round(toto,digits=1)
[1] 2.1 3.4 4.0 0.9 5.0
> |
```

Environment History Connections

Global Environment

Values

one	8
toto	num [1:5] 2.11 3.45 4 0...
toto2	int [1:3] 3 4 5

Files Plots Packages Help Viewer

Install Update

Name	Description	Ve...
☐ abind	Combine Multidimensional Arrays	1.4-5
☐ acepack	ACE and AVAS for Selecting Multiple Regression Transformations	1.4.1
☐ actuar	Actuarial Functions and Heavy Tailed Distributions	2.3-2



10. פיתוח קודים לתמחור נכסים פיננסיים

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ להלן נוסחת Makeham (1874) להערכת שווי איגרת חוב סטרייט בסיסית שבה הקופונים משולמים מידי שנה והקרן נפדית במועד הפדיון בלבד:

$$\text{Bond Value} = d_1 + d_2 \cdot (1 + y)^{(N-T)}$$

כאשר:

$$d_1 = \frac{F}{(1+y)^T}, \quad d_2 = (F \cdot c) \cdot \frac{[1-(1+y)^{(-N)}]}{y}$$

כאשר:

T - הטווח לפדיון של האיגרת בשנים

F - הערך הנקוב

N - מספר הקופונים שנשאר לאיגרת לשלם

c - שיעור הריבית הנקובה השנתית

y - שיעור התשואה לפדיון השנתי

10. פיתוח קודים לתמחור נכסים פיננסיים

```
PolanitzerBond <- function(Maturity, FaceValue, CouponRate, CouponNumber, YtM) {  
  d1 <- FaceValue/(1+YtM)^(Maturity)  
  d2 <- (FaceValue*CouponRate)*((1-(1+YtM)^(-CouponNumber))/YtM)  
  PolanitzerBond <- d1+d2*(1+YtM)^(CouponNumber-Maturity)  
  return(PolanitzerBond)  
}
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ כמה שווה איגרת חוב סטרייט שנשארו לה עוד 3 קופונים לשלם, בעלת ערך נקוב של 100 אגורות, ריבית קופון שנתית של 4% וטווח לפדיון של 2.25 שנים, אם שיעור התשואה השנתי הנדרש על ידי המשקיעים בשוק כיום עומד על 3%?

10. פיתוח קודים לתמחור נכסים פיננסיים

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Project: (None)

Untitled1*

```
1 PolanitzerBond <- function(Maturity, FaceValue, CouponRate, CouponNumber, YtM) {  
2   d1 <- FaceValue/(1+YtM)^(Maturity)  
3   d2 <- (FaceValue*CouponRate)*((1-(1+YtM)^(-CouponNumber))/YtM)  
4   PolanitzerBond <- d1+d2*(1+YtM)^(CouponNumber-Maturity)  
5   return(PolanitzerBond)  
6 }  
7  
8 PolanitzerBond(2.25,100,0.04,3,0.03)
```

1:1 PolanitzerBond(Maturity, FaceValue, CouponRate, CouponNumber, YtM) R Script

Console Terminal Jobs

```
> PolanitzerBond <- function(Maturity, FaceValue, CouponRate, CouponNumber, YtM) {  
+   d1 <- FaceValue/(1+YtM)^(Maturity)  
+   d2 <- (FaceValue*CouponRate)*((1-(1+YtM)^(-CouponNumber))/YtM)  
+   PolanitzerBond <- d1+d2*(1+YtM)^(CouponNumber-Maturity)  
+   return(PolanitzerBond)  
+ }  
>  
> PolanitzerBond(2.25,100,0.04,3,0.03)  
[1] 105.1337  
>
```

Environment History Connections

Global Environment

Data

tabs Large responses...

Values

url "https://financ..."

Functions

Files Plots Packages Help

Install Update

Name	Description	V...
	Visualization and Graphical Model Estimation	
☐ R6	Encapsulated Classes with Reference Semantics	2.4
☐ R...	ColorBrewer Palettes	1.1 2
☐ Rc...	Seamless R	1.0

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ להלן נוסחה להערכת שווי עסקת אקדמה (Forward) על נכס מניב תשואה במועד הקמת העסקה:

$$F_0^T = S_0 \cdot e^{[(r-q) \cdot T]}$$

כאשר:

$-q$ שיעור התשואה השנתית שמניב הנכס (במטבע הבסיסי)

$-F_0^T$ המחיר העתידי של עסקת אקדמה בעת ביצוע העסקה

$-T$ הטווח לפקיעה, משך הזמן עד לפקיעת העסקה

$-S_0$ מחיר נכס הבסיס בעת ביצוע העסקה (שער הספוט)

$-r$ שיעור הריבית השנתית חסרת הסיכון במטבע התשלום

10. פיתוח קודים לתמחור נכסים פיננסיים

```
PolanitzerForwardPrice <- function(Maturity, Spot, RiskFree, Yield) {  
  PolanitzerForwardPrice <- Spot*exp((RiskFree-Yield)*Maturity)  
  return(PolanitzerForwardPrice)  
}
```

PolanitzerForwardPrice(Maturity, Spot, RiskFree, Yield)

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ מהו המחיר העתידי של עסקת אקדמה שקל-דולר לחצי שנה, אם ידוע כי שער הספוט עומד על 4.6 שקלים לדולר ארה"ב, הריבית השקלית השנתית הינה 5.0% והריבית הדולרית השנתית הינה 3.0%?

10. פיתוח קודים לתמחור נכסים פיננסיים

The screenshot displays the RStudio interface. The main editor window shows a script for a function named `PolanitzerForwardPrice`. The function takes four arguments: `Maturity`, `Spot`, `RiskFree`, and `Yield`. It calculates the forward price using the formula $Spot * \exp((RiskFree - Yield) * Maturity)$ and returns the result. Below the script, the console shows the function being executed with the values `0.5`, `4.6`, `0.05`, and `0.03`, resulting in the output `[1] 4.646231`.

```
PolanitzerForwardPrice <- function(Maturity, Spot, RiskFree, Yield) {  
  PolanitzerForwardPrice <- Spot*exp((RiskFree-Yield)*Maturity)  
  return(PolanitzerForwardPrice)  
}  
PolanitzerForwardPrice(0.5,4.6,0.05,0.03)
```

Console output:

```
> PolanitzerForwardPrice <- function(Maturity, Spot, RiskFree, Yield) {  
+   PolanitzerForwardPrice <- Spot*exp((RiskFree-Yield)*Maturity)  
+   return(PolanitzerForwardPrice)  
+ }  
> PolanitzerForwardPrice(0.5,4.6,0.05,0.03)  
[1] 4.646231  
>
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ להלן נוסחה להערכת שווי עסקת אקדמה (Forward) על נכס מניב תשואה במהלך חיי העסקה:

$$V_t = S_t \cdot e^{(-q \cdot t)} - F_0^T \cdot e^{(-r \cdot t)}$$

$-F_0^T$ המחיר העתידי של עסקת אקדמה בעת ביצוע העסקה

$-S_t$ מחיר נכס הבסיס בעת הערכת השווי

$-r$ שיעור הריבית השנתית חסרת הסיכון בעת הערכת השווי

$-q$ שיעור התשואה השנתית שמניב הנכס בעת הערכת השווי

$-t$ משך החיים שנותר לעסקת האקדמה

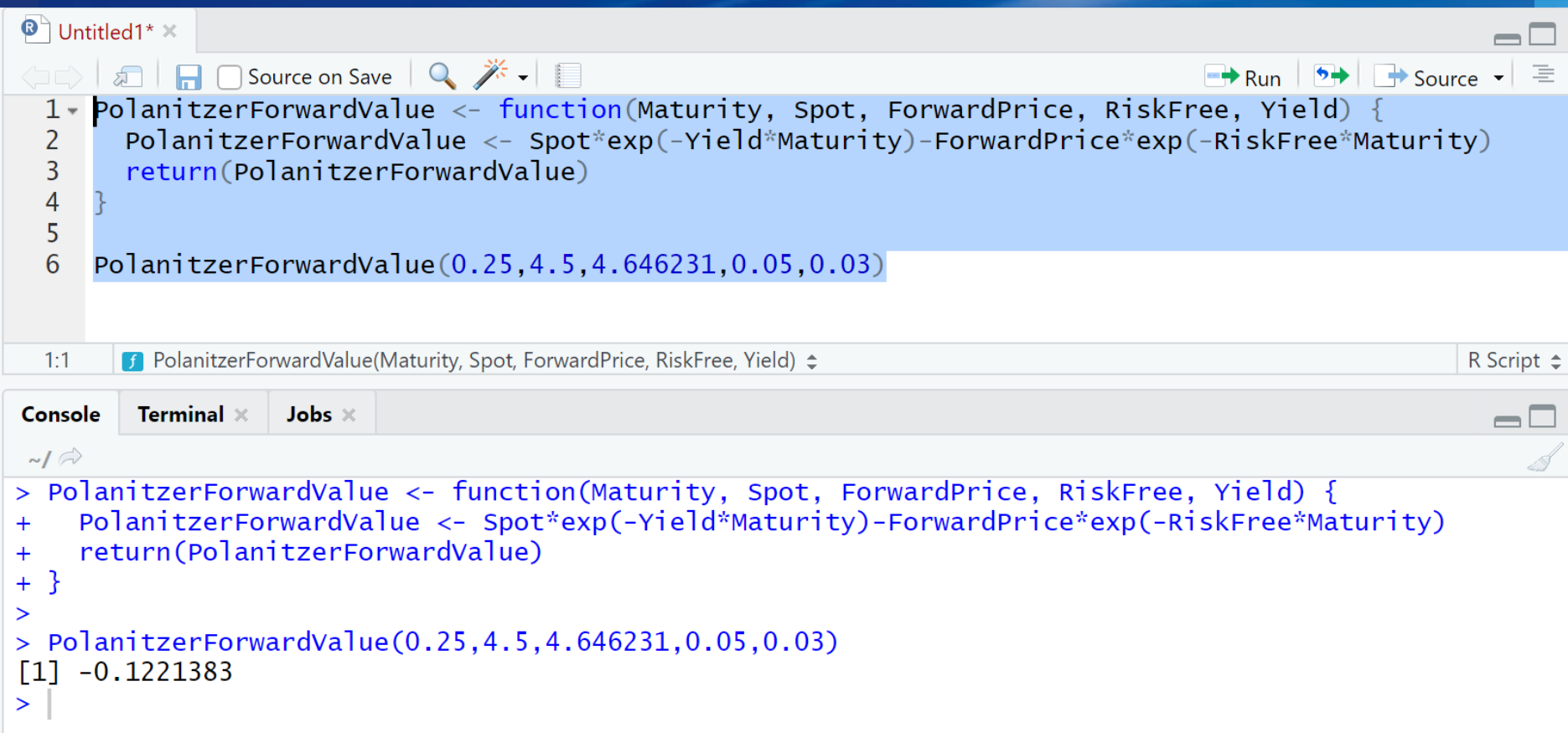
10. פיתוח קודים לתמחור נכסים פיננסיים

```
1 PolanitzerForwardValue <- function(Maturity, Spot, ForwardPrice, RiskFree, Yield) {  
2   PolanitzerForwardValue <- Spot*exp(-Yield*Maturity)-ForwardPrice*exp(-RiskFree*Maturity)  
3   return(PolanitzerForwardValue)  
4 }  
5
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ מהו השווי ההוגן של עסקת אקדמה שקל-דולר שלושה חודשים לפני פקיעתה, אם ידוע כי שער הספוט ירד ל- 4.5 שקלים לדולר ארה"ב, המחיר העתידי הוא 4.646231 שקלים לדולר ארה"ב הריבית השקלית השנתית הינה 5.0% והריבית הדולרית השנתית הינה 3.0%?

10. פיתוח קודים לתמחור נכסים פיננסיים



The screenshot displays the RStudio environment. The top pane shows the source editor with the following R code:

```
1 PolanitzerForwardValue <- function(Maturity, Spot, ForwardPrice, RiskFree, Yield) {  
2   PolanitzerForwardValue <- Spot*exp(-Yield*Maturity)-ForwardPrice*exp(-RiskFree*Maturity)  
3   return(PolanitzerForwardValue)  
4 }  
5  
6 PolanitzerForwardValue(0.25,4.5,4.646231,0.05,0.03)
```

The bottom pane shows the console output:

```
> PolanitzerForwardValue <- function(Maturity, Spot, ForwardPrice, RiskFree, Yield) {  
+   PolanitzerForwardValue <- Spot*exp(-Yield*Maturity)-ForwardPrice*exp(-RiskFree*Maturity)  
+   return(PolanitzerForwardValue)  
+ }  
>  
> PolanitzerForwardValue(0.25,4.5,4.646231,0.05,0.03)  
[1] -0.1221383  
>
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ להלן נוסחת Black & Scholes (1973) להערכת שווי אופציית רכש (Call) על נכס מניב תשואה:

$$Call = S \cdot e^{(-q \cdot t)} \cdot N(d_1) - K \cdot e^{(-r \cdot t)} \cdot N(d_2)$$

כאשר:

$$d_1 = \frac{\ln(S/K) + (r - q + 0.5 \cdot \sigma^2) \cdot T}{\sigma \cdot \sqrt{T}} \quad d_2 = \frac{\ln(S/K) + (r - q - 0.5 \cdot \sigma^2) \cdot T}{\sigma \cdot \sqrt{T}}$$

10. פיתוח קודים לתמחור נכסים פיננסיים

כאשר:

$Call$ - שווי אופציית רכש

S - מחיר נכס הבסיס במועד הערכת השווי

K - מחיר המימוש של האופציה

T - משך חיי האופציה

r - שיעור הריבית השנתית חסרת הסיכון למשך חיי האופציה

q - שיעור התשואה השנתית שמניב הנכס למשך חיי האופציה

σ - סטיית התקן השנתית של תשואות מחירי נכס הבסיס

$N(d)$ פונקציית ההתפלגות המצטברת הנורמלית סטנדרטית עד לנקודה d

10. פיתוח קודים לתמחור נכסים פיננסיים

```
1 PolanitzerCallValue <- function(Maturity, Spot, Strike, RiskFree, Yield, Volatility) {  
2   d1 <- (log(Spot/Strike)+(RiskFree-Yield+0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))  
3   d2 <- (log(Spot/Strike)+(RiskFree-Yield-0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))  
4   PolanitzerCallValue <- Spot*exp(-Yield*Maturity)*pnorm(d1)-Strike*exp(-RiskFree*Maturity)*pnorm(d2)  
5   return(PolanitzerCallValue)  
6 }  
7
```


10. פיתוח קודים לתמחור נכסים פיננסיים

❖ מהו השווי ההוגן של אופציית Call לשנתיים, אם ידוע כי שער הספוט הינו 4.5 שקלים לדולר ארה"ב, מחיר המימוש הינו 4.6 שקלים לדולר ארה"ב, סטיית התקן השנתית של תשואות שע"ח שקל-דולר היא 20%, הריבית השקלית השנתית הינה 5.0% והריבית הדולרית השנתית הינה 3.0%?

10. פיתוח קודים לתמחור נכסים פיננסיים

```
Untitled1* x
Source on Save
Run
Source

1 PolanitzerCallValue <- function(Maturity, Spot, Strike, RiskFree, Yield, Volatility) {
2   d1 <- (log(Spot/Strike)+(RiskFree-Yield+0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Matu
3   d2 <- (log(Spot/Strike)+(RiskFree-Yield-0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Matu
4   PolanitzerCallValue <- Spot*exp(-Yield*Maturity)*pnorm(d1)-Strike*exp(-RiskFree*Maturity)
5   return(PolanitzerCallValue)
6 }
7
8 PolanitzerCallValue(2,4.5,4.6,0.05,0.03,0.2)
```

8:1 (Top Level) R Script

Console Terminal x Jobs x

```
> PolanitzerCallValue(2,4.5,4.6,0.05,0.03,0.2)
[1] 0.5111512
>
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ להלן נוסחת Black & Scholes (1973) להערכת שווי אופציית מכר (Put) על נכס מניב תשואה:

$$Put = K \cdot e^{(-r \cdot t)} \cdot N(-d_2) - S \cdot e^{(-q \cdot t)} \cdot N(-d_1)$$

כאשר:

$$d_1 = \frac{\ln(S/K) + (r - q + 0.5 \cdot \sigma^2) \cdot T}{\sigma \cdot \sqrt{T}} \quad d_2 = \frac{\ln(S/K) + (r - q - 0.5 \cdot \sigma^2) \cdot T}{\sigma \cdot \sqrt{T}}$$

10. פיתוח קודים לתמחור נכסים פיננסיים

כאשר:

Put - שווי אופציית מכר

S - מחיר נכס הבסיס במועד הערכת השווי

K - מחיר המימוש של האופציה

T - משך חיי האופציה

r - שיעור הריבית השנתית חסרת הסיכון למשך חיי האופציה

q - שיעור התשואה השנתית שמניב הנכס למשך חיי האופציה

σ - סטיית התקן השנתית של תשואות מחירי נכס הבסיס

$N(d)$ פונקצית ההתפלגות המצטברת הנורמלית סטנדרטית עד לנקודה d

10. פיתוח קודים לתמחור נכסים פיננסיים

```
Untitled1* x
Source on Save
Run
Source

1 PolanitzerPutValue <- function(Maturity, Spot, Strike, RiskFree, Yield, Volatility) {
2   d1 <- (log(Spot/Strike)+(RiskFree-Yield+0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))
3   d2 <- (log(Spot/Strike)+(RiskFree-Yield-0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))
4   PolanitzerPutValue <- Strike*exp(-RiskFree*Maturity)*pnorm(-d2)-Spot*exp(-Yield*Maturity)*pnorm(-d1)
5   return(PolanitzerPutValue)
6 }
```

10. פיתוח קודים לתמחור נכסים פיננסיים

❖ מהו השווי ההוגן של אופציית Put לשנתיים, אם ידוע כי שער הספוט הינו 4.5 שקלים לדולר ארה"ב, מחיר המימוש הינו 4.6 שקלים לדולר ארה"ב, סטיית התקן השנתית של תשואות שע"ח שקל-דולר היא 20%, הריבית השקלית השנתית הינה 5.0% והריבית הדולרית השנתית הינה 3.0%?

10. פיתוח קודים לתמחור נכסים פיננסיים

```
Untitled1* x
Source on Save
Run
Source

1 PolanitzerPutValue <- function(Maturity, Spot, Strike, RiskFree, Yield, volatility) {
2   d1 <- (log(Spot/Strike)+(RiskFree-Yield+0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))
3   d2 <- (log(Spot/Strike)+(RiskFree-Yield-0.5*Volatility^2)*Maturity)/(Volatility*sqrt(Maturity))
4   PolanitzerPutValue <- Strike*exp(-RiskFree*Maturity)*pnorm(-d2)-Spot*exp(-Yield*Maturity)*pnorm(-d1)
5   return(PolanitzerPutValue)
6 }
7
8 PolanitzerPutValue(2,4.5,4.6,0.05,0.03,0.2)

8:1 (Top Level) R Script

Console Terminal x Jobs x
~/
> PolanitzerPutValue(2,4.5,4.6,0.05,0.03,0.2)
[1] 0.435463
> |
```

נשמח לעמוד לרשותכם

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