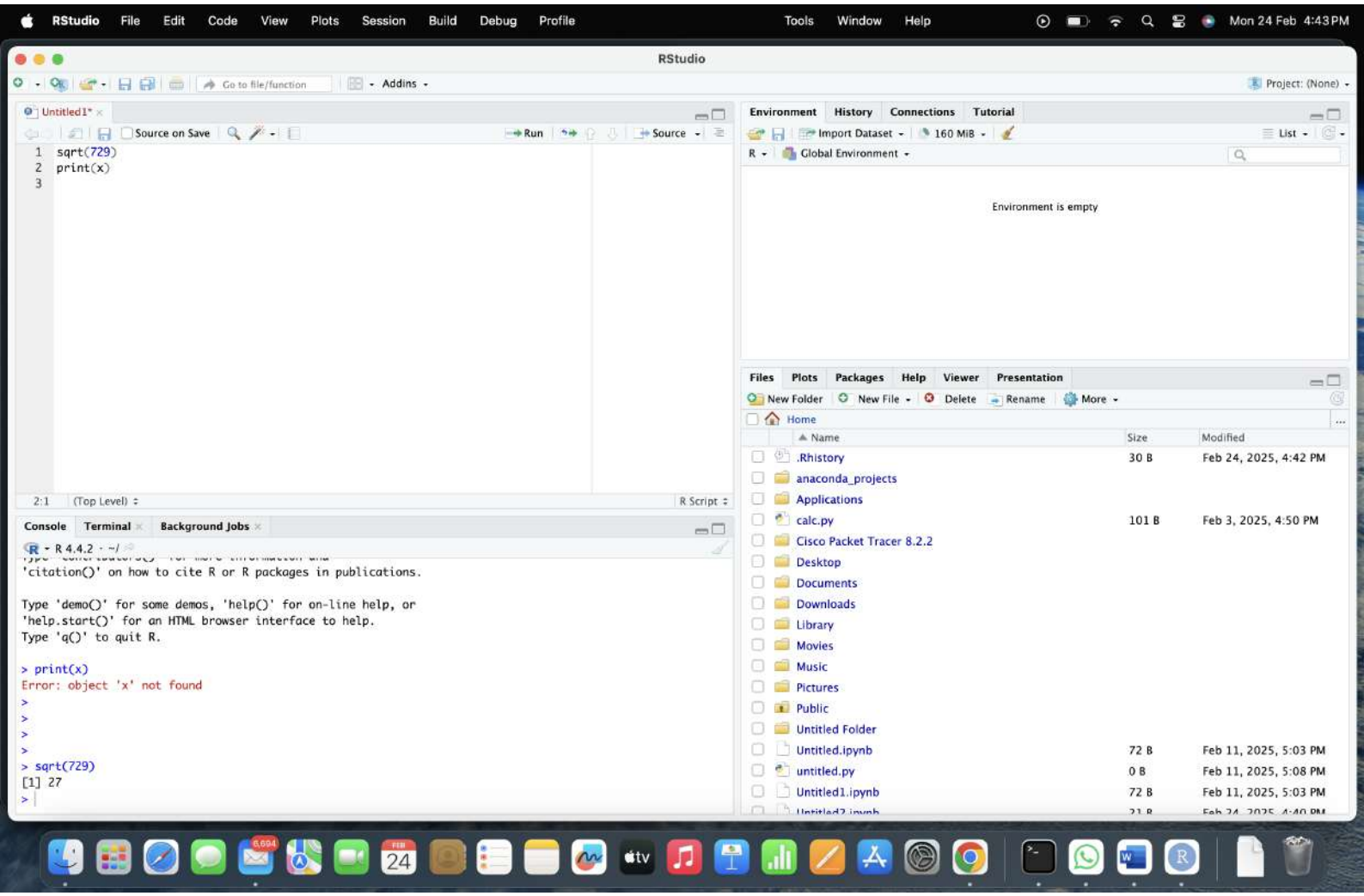
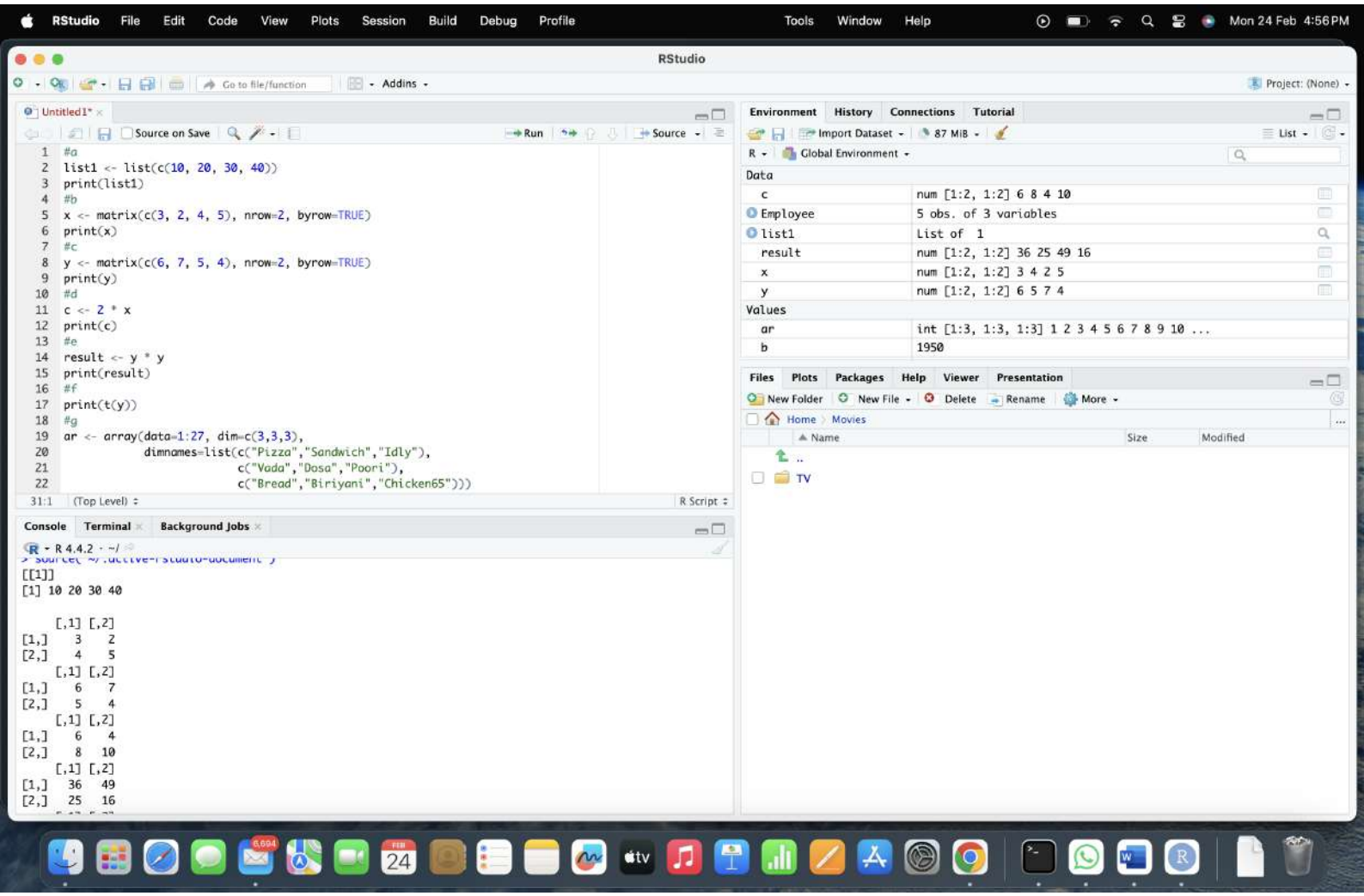
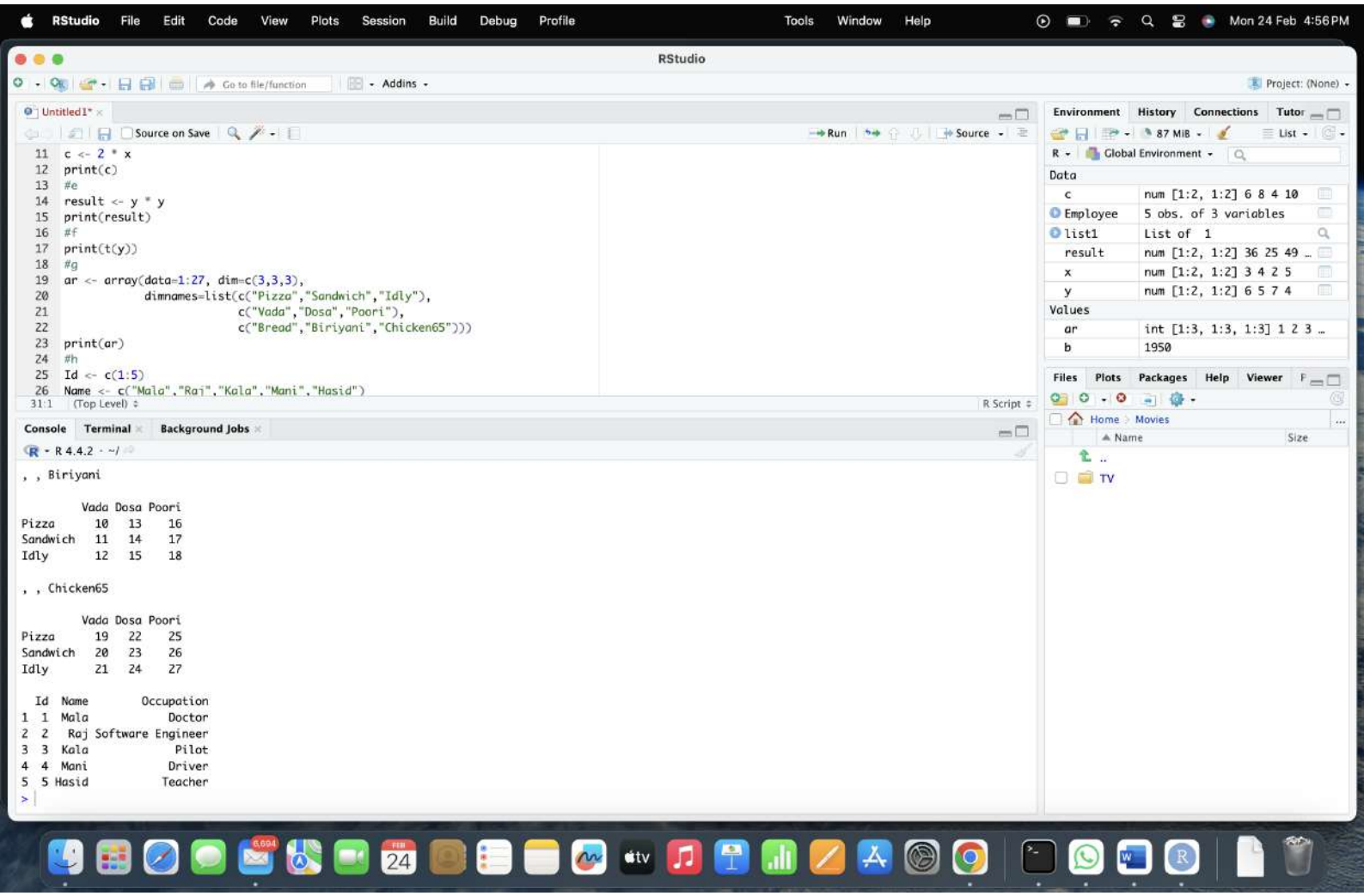
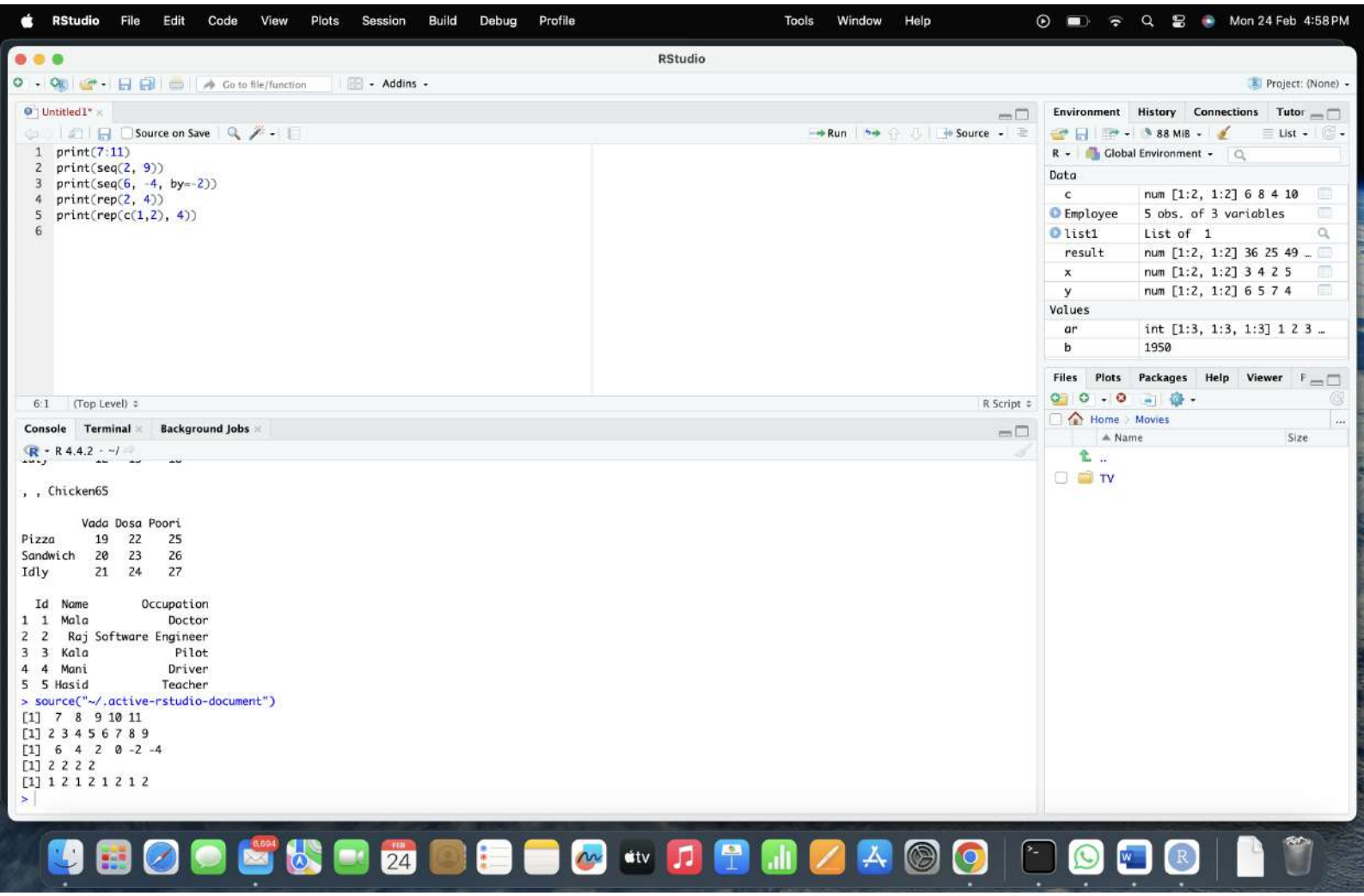
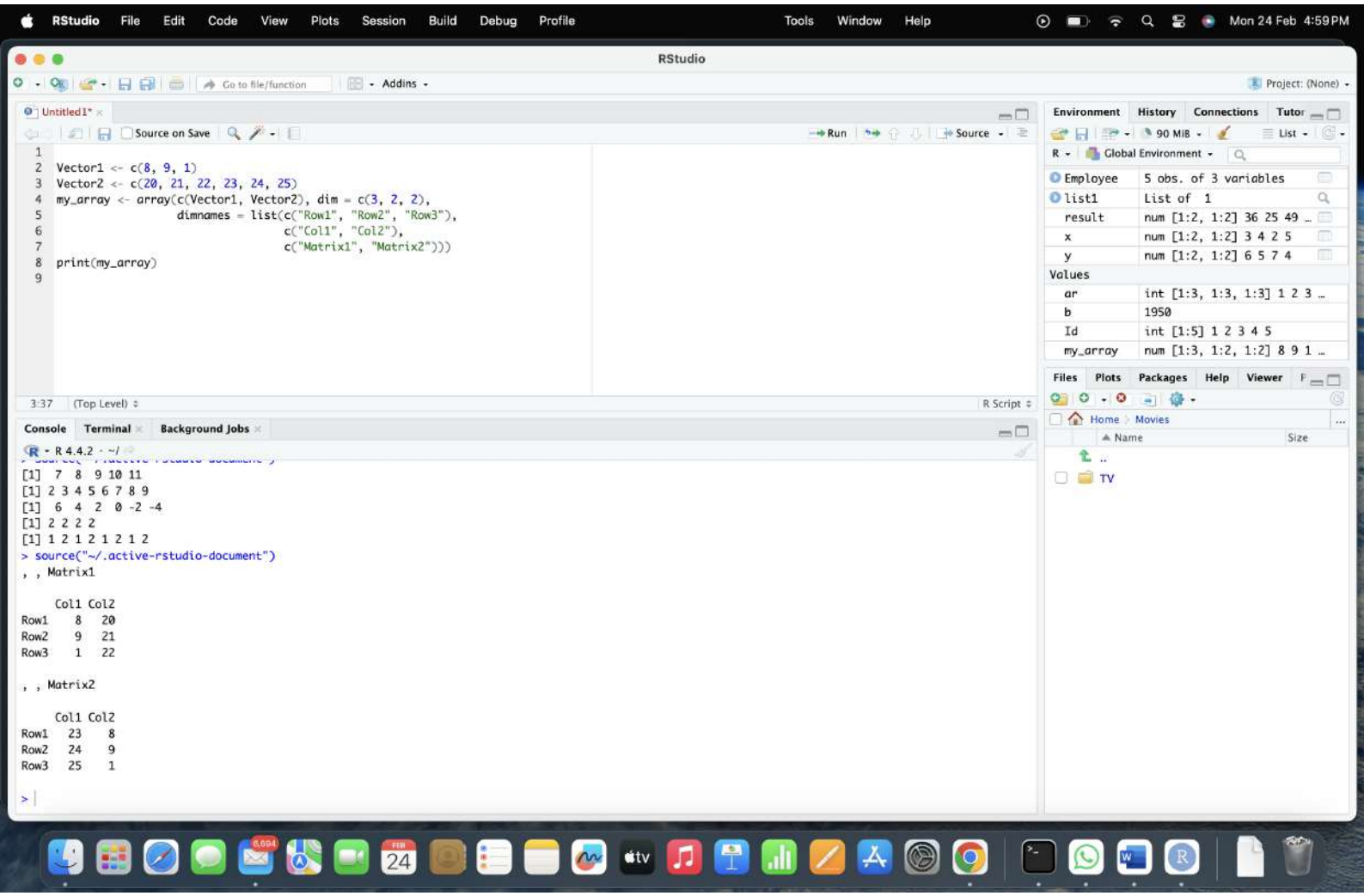
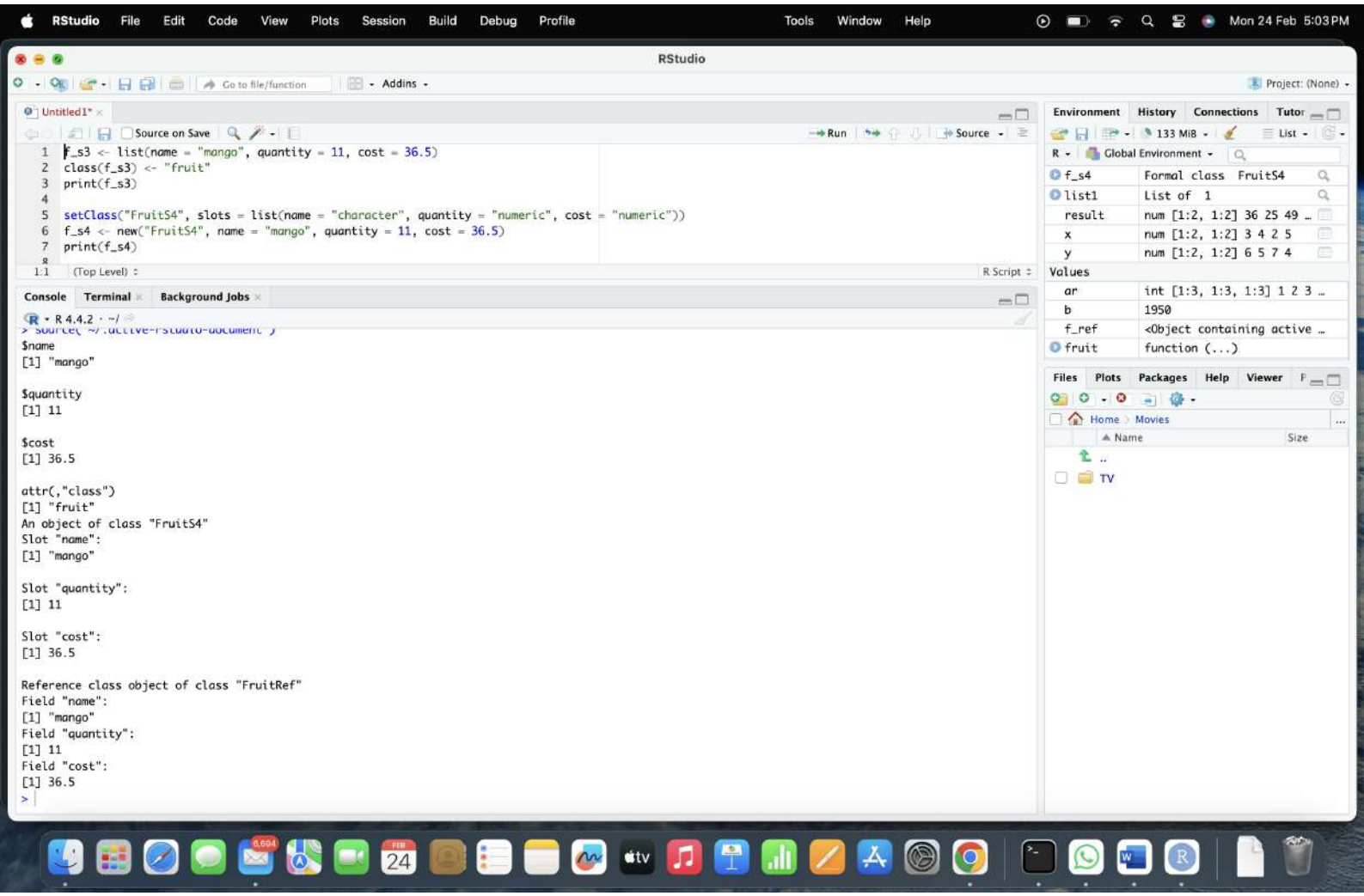

RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 4:43 PM
RStudio
Untitled1*
Source on Save
Run
Source
1 sqrt(729)
2 print(x)
3
2:1 (Top Level)
R Script
Console
Terminal
Background Jobs
R 4.4.2 · ~/
'citation()' on how to cite R or R packages in publications.
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.
> print(x)
Error: object 'x' not found
> sqrt(729)
[1] 27
Environment
History
Connections
Tutorial
Import Dataset
160 MiB
List
R
Global Environment
Environment is empty
Files
Plots
Packages
Help
Viewer
Presentation
New Folder
New File
Delete
Rename
More
Home
Name
Size
Modified
.Rhistory 30 B Feb 24, 2025, 4:42 PM
anaconda_projects
Applications
calc.py 101 B Feb 3, 2025, 4:50 PM
Cisco Packet Tracer 8.2.2
Desktop
Documents
Downloads
Library
Movies
Music
Pictures
Public
Untitled Folder
Untitled.ipynb 72 B Feb 11, 2025, 5:03 PM
untitled.py 0 B Feb 11, 2025, 5:08 PM
Untitled1.ipynb 72 B Feb 11, 2025, 5:03 PM

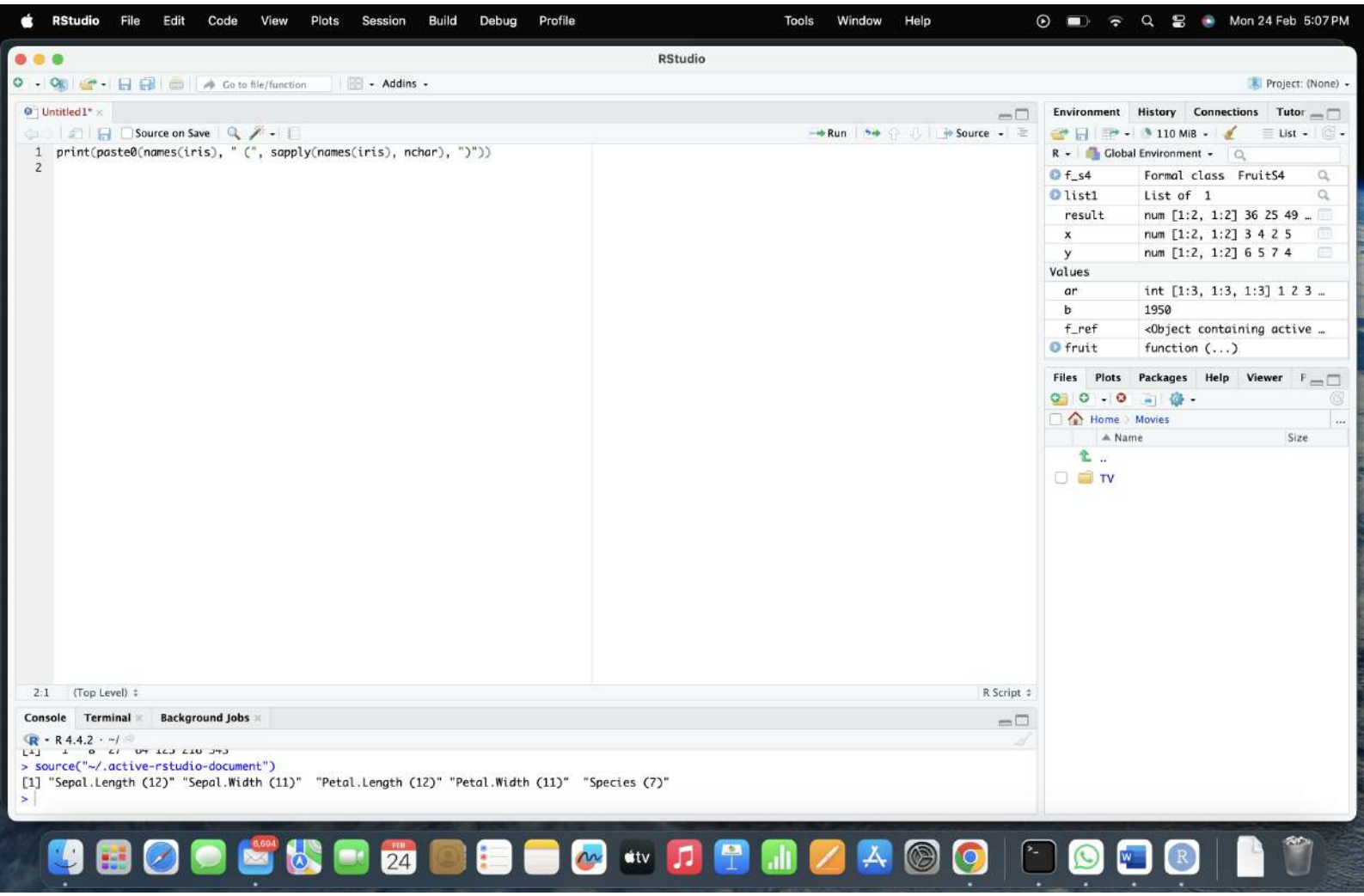

RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 4:56 PM
RStudio
Untitled1*
Source on Save
Run
Source
#a
list1 <- list(c(10, 20, 30, 40))
print(list1)
#b
x <- matrix(c(3, 2, 4, 5), nrow=2, byrow=TRUE)
print(x)
#c
y <- matrix(c(6, 7, 5, 4), nrow=2, byrow=TRUE)
print(y)
#d
c <- 2 * x
print(c)
#e
result <- y * y
print(result)
#f
print(t(y))
#g
ar <- array(data=1:27, dim=c(3,3,3),
dimnames=list(c("Pizza","Sandwich","Idly"),
c("Vada","Dosa","Poori"),
c("Bread","Biriyani","Chicken65")))
31:1 (Top Level) R Script
Console Terminal Background Jobs
R 4.4.2 · ~/
[[1]]
[1] 10 20 30 40
[,1] [,2]
[1,] 3 2
[2,] 4 5
[,1] [,2]
[1,] 6 7
[2,] 5 4
[,1] [,2]
[1,] 6 4
[2,] 8 10
[,1] [,2]
[1,] 36 49
[2,] 25 16
Environment History Connections Tutorial
Import Dataset 87 MiB List
R Global Environment
Data
c num [1:2, 1:2] 6 8 4 10
Employee 5 obs. of 3 variables
list1 List of 1
result num [1:2, 1:2] 36 25 49 16
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 4 5 6 7 8 9 10 ...
b 1950
Files Plots Packages Help Viewer Presentation
New Folder New File Delete Rename More
Home Movies
Name Size Modified
..
TV

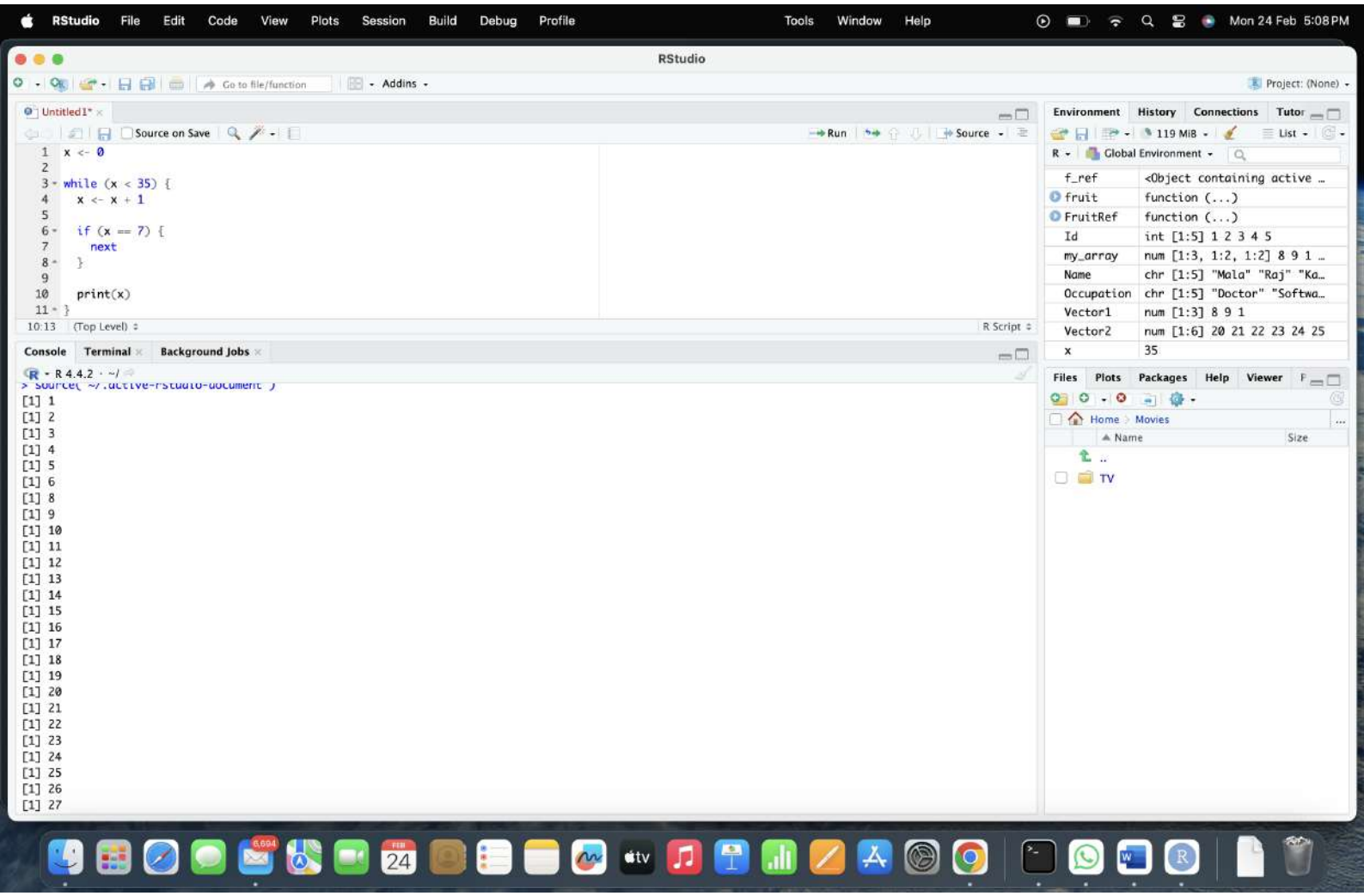

RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 4:56 PM
RStudio
Untitled1*
Source on Save
Run
Source
11 c <- 2 * x
12 print(c)
13 #e
14 result <- y * y
15 print(result)
16 #f
17 print(t(y))
18 #g
19 ar <- array(data=1:27, dim=c(3,3,3),
20 dimnames=list(c("Pizza","Sandwich","Idly"),
21 c("Vada","Dosa","Poori"),
22 c("Bread","Biriyani","Chicken65")))
23 print(ar)
24 #h
25 Id <- c(1:5)
26 Name <- c("Mala","Raj","Kala","Mani","Hasid")
31:1 (Top Level) R Script
Console Terminal Background Jobs
R 4.4.2 · ~/
, , Biriyani
Vada Dosa Poori
Pizza 10 13 16
Sandwich 11 14 17
Idly 12 15 18
, , Chicken65
Vada Dosa Poori
Pizza 19 22 25
Sandwich 20 23 26
Idly 21 24 27
Id Name Occupation
1 1 Mala Doctor
2 2 Raj Software Engineer
3 3 Kala Pilot
4 4 Mani Driver
5 5 Hasid Teacher
Environment History Connections Tutor
Global Environment
Data
c num [1:2, 1:2] 6 8 4 10
Employee 5 obs. of 3 variables
list1 List of 1
result num [1:2, 1:2] 36 25 49 ...
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 ...
b 1950
Files Plots Packages Help Viewer
Home Movies
Name Size
TV

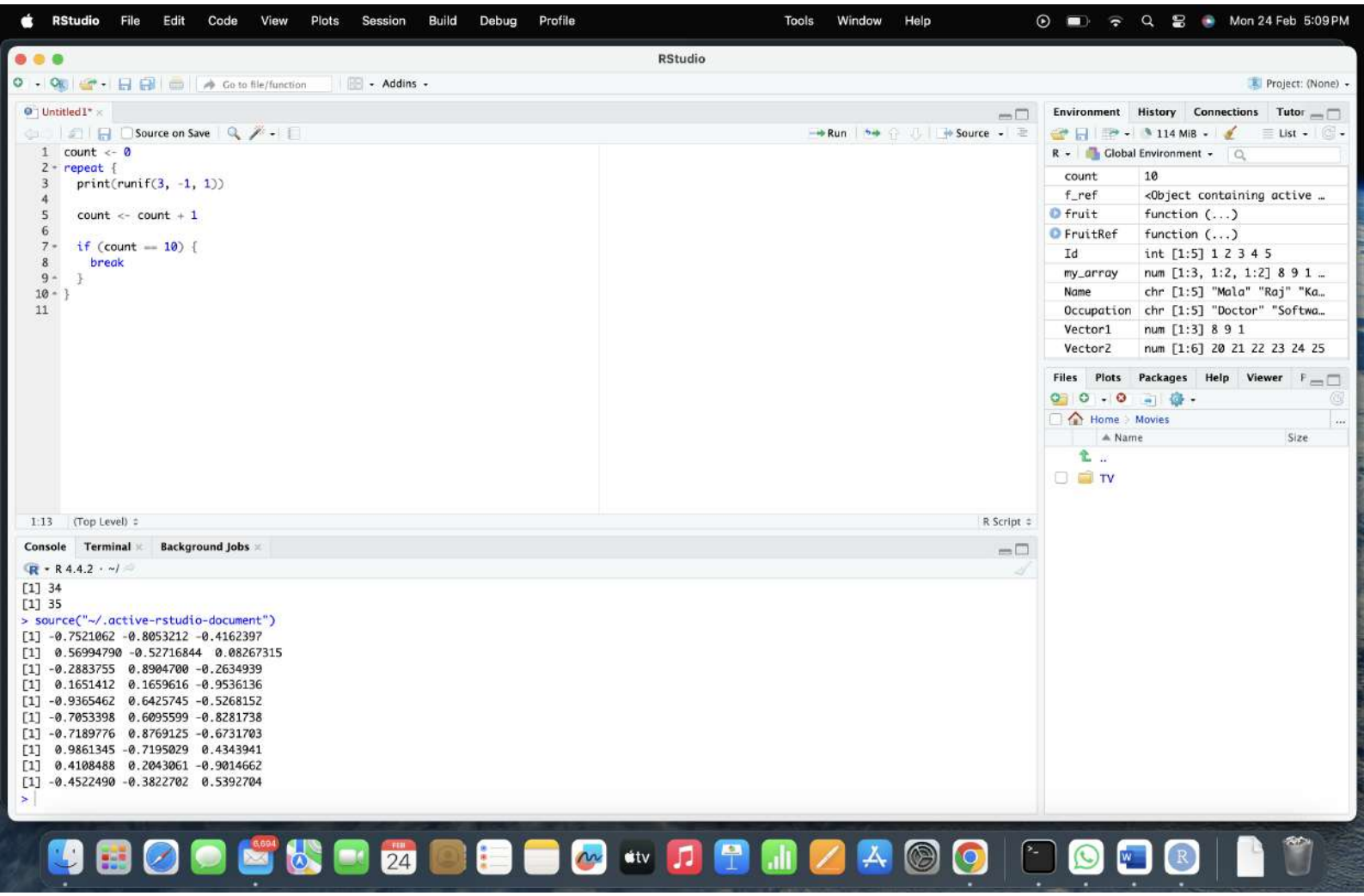

RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 4:58 PM
RStudio
Untitled1*
Source on Save
Run
Source
1 print(7:11)
2 print(seq(2, 9))
3 print(seq(6, -4, by=-2))
4 print(rep(2, 4))
5 print(rep(c(1,2), 4))
6
6:1 (Top Level)
R Script
Console Terminal Background Jobs
R 4.4.2 · ~/
, , Chicken65
Vada Dosa Poori
Pizza 19 22 25
Sandwich 20 23 26
Idly 21 24 27
Id Name Occupation
1 1 Mala Doctor
2 2 Raj Software Engineer
3 3 Kala Pilot
4 4 Mani Driver
5 5 Hasid Teacher
> source("~/.active-rstudio-document")
[1] 7 8 9 10 11
[1] 2 3 4 5 6 7 8 9
[1] 6 4 2 0 -2 -4
[1] 2 2 2 2
[1] 1 2 1 2 1 2 1 2
>
Environment History Connections Tutor
88 MiB
List
R
Global Environment
Data
c num [1:2, 1:2] 6 8 4 10
Employee 5 obs. of 3 variables
list1 List of 1
result num [1:2, 1:2] 36 25 49 ...
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 ...
b 1950
Files Plots Packages Help Viewer
Home Movies
Name
Size
..
TV

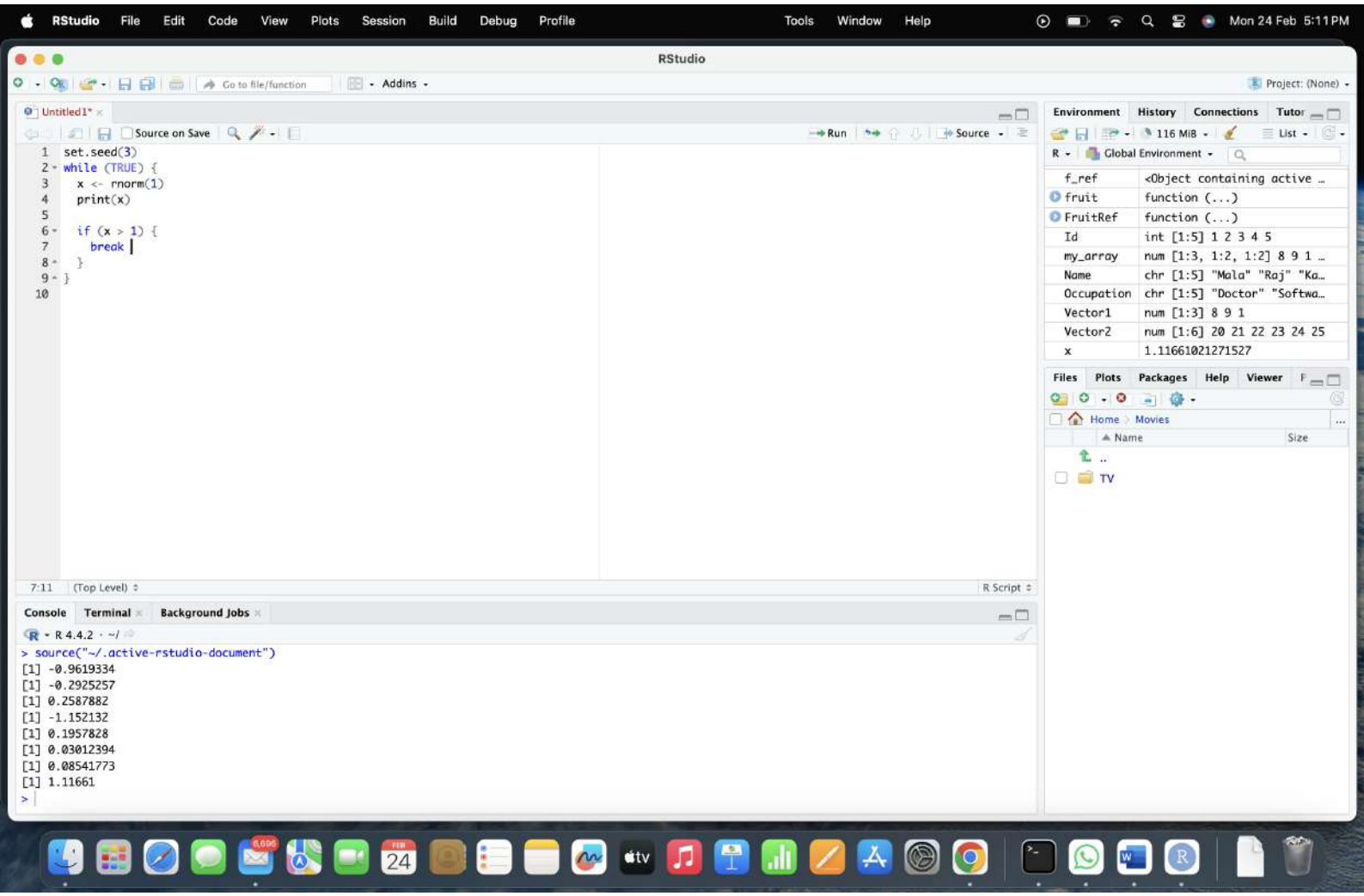

RStudio
Untitled1*
Source on Save
Run
Source
Vector1 <- c(8, 9, 1)
Vector2 <- c(20, 21, 22, 23, 24, 25)
my_array <- array(c(Vector1, Vector2), dim = c(3, 2, 2),
dimnames = list(c("Row1", "Row2", "Row3"),
c("Col1", "Col2"),
c("Matrix1", "Matrix2")))
print(my_array)
Console
Terminal
Background Jobs
[1] 7 8 9 10 11
[1] 2 3 4 5 6 7 8 9
[1] 6 4 2 0 -2 -4
[1] 2 2 2 2
[1] 1 2 1 2 1 2 1 2
> source("~/.active-rstudio-document")
, , Matrix1
Col1 Col2
Row1 8 20
Row2 9 21
Row3 1 22
, , Matrix2
Col1 Col2
Row1 23 8
Row2 24 9
Row3 25 1
Environment
History
Connections
Employee 5 obs. of 3 variables
list1 List of 1
result num [1:2, 1:2] 36 25 49 ...
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 ...
b 1950
Id int [1:5] 1 2 3 4 5
my_array num [1:3, 1:2, 1:2] 8 9 1 ...
Files
Plots
Packages
Help
Viewer
Home
Movies
Name
Size
TV


RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 5:03 PM
RStudio
Untitled1*
Source on Save
Run
Source
1 f_s3 <- list(name = "mango", quantity = 11, cost = 36.5)
2 class(f_s3) <- "fruit"
3 print(f_s3)
4
5 setClass("FruitS4", slots = list(name = "character", quantity = "numeric", cost = "numeric"))
6 f_s4 <- new("FruitS4", name = "mango", quantity = 11, cost = 36.5)
7 print(f_s4)
(Top Level)
R Script
Console
Terminal
Background Jobs
R 4.4.2 · ~/
$name
[1] "mango"
$quantity
[1] 11
$cost
[1] 36.5
attr(,"class")
[1] "fruit"
An object of class "FruitS4"
Slot "name":
[1] "mango"
Slot "quantity":
[1] 11
Slot "cost":
[1] 36.5
Reference class object of class "FruitRef"
Field "name":
[1] "mango"
Field "quantity":
[1] 11
Field "cost":
[1] 36.5
Environment
History
Connections
Tutor
Global Environment
f_s4 Formal class FruitS4
list1 List of 1
result num [1:2, 1:2] 36 25 49 …
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 …
b 1950
f_ref <Object containing active …
fruit function (...)
Files
Plots
Packages
Help
Viewer
Home
Movies
Name
Size
..
TV


RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 5:07 PM
RStudio
Untitled1*
Source on Save
Run
Source
print(paste0(names(iris), " (", sapply(names(iris), nchar), ")"))
Environment History Connections Tutor
Global Environment
f_s4 Formal class FruitS4
list1 List of 1
result num [1:2, 1:2] 36 25 49 …
x num [1:2, 1:2] 3 4 2 5
y num [1:2, 1:2] 6 5 7 4
Values
ar int [1:3, 1:3, 1:3] 1 2 3 …
b 1950
f_ref <Object containing active …
fruit function (...)
Files Plots Packages Help Viewer
Home Movies
Name Size
TV
Console Terminal Background Jobs
R 4.4.2 · ~/
> source("~/.active-rstudio-document")
[1] "Sepal.Length (12)" "Sepal.Width (11)" "Petal.Length (12)" "Petal.Width (11)" "Species (7)"


RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 5:08 PM
RStudio
Untitled1*
Source on Save
Run
Source
x <- 0
while (x < 35) {
x <- x + 1
if (x == 7) {
next
}
print(x)
}
10:13 (Top Level) R Script
Console Terminal Background Jobs
R 4.4.2 · ~/
[1] 1
[1] 2
[1] 3
[1] 4
[1] 5
[1] 6
[1] 8
[1] 9
[1] 10
[1] 11
[1] 12
[1] 13
[1] 14
[1] 15
[1] 16
[1] 17
[1] 18
[1] 19
[1] 20
[1] 21
[1] 22
[1] 23
[1] 24
[1] 25
[1] 26
[1] 27
Environment History Connections Tutor
Global Environment
f_ref <Object containing active …
fruit function (...)
FruitRef function (...)
Id int [1:5] 1 2 3 4 5
my_array num [1:3, 1:2, 1:2] 8 9 1 …
Name chr [1:5] "Mala" "Raj" "Ka…
Occupation chr [1:5] "Doctor" "Softwa…
Vector1 num [1:3] 8 9 1
Vector2 num [1:6] 20 21 22 23 24 25
x 35
Files Plots Packages Help Viewer
Home Movies
Name Size
..
TV


RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 5:09 PM
RStudio
Untitled1*
Source on Save
Run
Source
count <- 0
repeat {
print(runif(3, -1, 1))
count <- count + 1
if (count == 10) {
break
}
}
1:13 (Top Level)
R Script
Environment History Connections Tutor
Global Environment
count 10
f_ref <Object containing active …
fruit function (...)
FruitRef function (...)
Id int [1:5] 1 2 3 4 5
my_array num [1:3, 1:2, 1:2] 8 9 1 …
Name chr [1:5] "Mala" "Raj" "Ka…
Occupation chr [1:5] "Doctor" "Softwa…
Vector1 num [1:3] 8 9 1
Vector2 num [1:6] 20 21 22 23 24 25
Files Plots Packages Help Viewer
Home Movies
Name Size
..
TV
Console Terminal Background Jobs
R 4.4.2 · ~/
[1] 34
[1] 35
> source("~/.active-rstudio-document")
[1] -0.7521062 -0.8053212 -0.4162397
[1] 0.56994790 -0.52716844 0.08267315
[1] -0.2883755 0.8904700 -0.2634939
[1] 0.1651412 0.1659616 -0.9536136
[1] -0.9365462 0.6425745 -0.5268152
[1] -0.7053398 0.6095599 -0.8281738
[1] -0.7189776 0.8769125 -0.6731703
[1] 0.9861345 -0.7195029 0.4343941
[1] 0.4108488 0.2043061 -0.9014662
[1] -0.4522490 -0.3822702 0.5392704


RStudio File Edit Code View Plots Session Build Debug Profile Tools Window Help Mon 24 Feb 5:11 PM
RStudio
Untitled1*
Source on Save
Run
Source
set.seed(3)
while (TRUE) {
x <- rnorm(1)
print(x)
if (x > 1) {
break
}
}
7:11 (Top Level) R Script
Console Terminal Background Jobs
R 4.4.2 · ~/
> source("~/.active-rstudio-document")
[1] -0.9619334
[1] -0.2925257
[1] 0.2587882
[1] -1.152132
[1] 0.1957828
[1] 0.03012394
[1] 0.08541773
[1] 1.11661
Environment History Connections Tutor
Global Environment
f_ref <Object containing active …
fruit function (...)
FruitRef function (...)
Id int [1:5] 1 2 3 4 5
my_array num [1:3, 1:2, 1:2] 8 9 1 …
Name chr [1:5] "Mala" "Raj" "Ka…
Occupation chr [1:5] "Doctor" "Softwa…
Vector1 num [1:3] 8 9 1
Vector2 num [1:6] 20 21 22 23 24 25
x 1.11661021271527
Files Plots Packages Help Viewer
Home Movies
Name Size
..
TV

BRUTE FORCE ALGORITHM (*String matching)*

- A brute force algorithm is a straight forward approach to solving a problem. It also refers to a programming style that does not include any shortcuts to improve performance.
- It is based on trial and error where the programmer tries to merely utilize the computer's fast processing power to solve a problem, rather than applying some advanced algorithms and techniques developed with human intelligence.
- It might increase both space and time complexity.
- A simple example of applying brute force would be linearly searching for an element in an array. When each and every element of an array is compared with the data to be searched, it might be termed as a brute force approach, as it is the most direct and simple way one could think of searching the given data in the array.

STRING MATCHING

The string matching problem is to find if a pattern P[1...m] occurs within the text T[1....n].

1. It is also known as substring search.
2. Given a text T and a pattern P,
   - Is the pattern a substring of the text
   - Is there a position i where the entire pattern occurs in the given text.
3. In every position of the given text T, do the next m elements of the array, match the M elements of the pattern.

ALGORITHM [T(0...n-1),P(0.....m-1)]

```
// input: array T(0..n-1) of n chars, text.
// an array P(0...m-1) of m chars, a pattern
for  i ← 0 to n-m do
     j ← 0
          while j<m and P[j] =T[i+j]
               j← j+1
               if j=m return i
return - 1
```

Example is given below,