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Batch: B-4 **Roll no:** 16010422234

Tutorial Name: Software Based (R Software) Tutorial on Correlation and Regression

Tutorial Date: 23 January 2024

Q.1 Draw scatter diagram and determine the coefficient of correlation for the following data.

x: 62 64 65 69 70 71 72 74

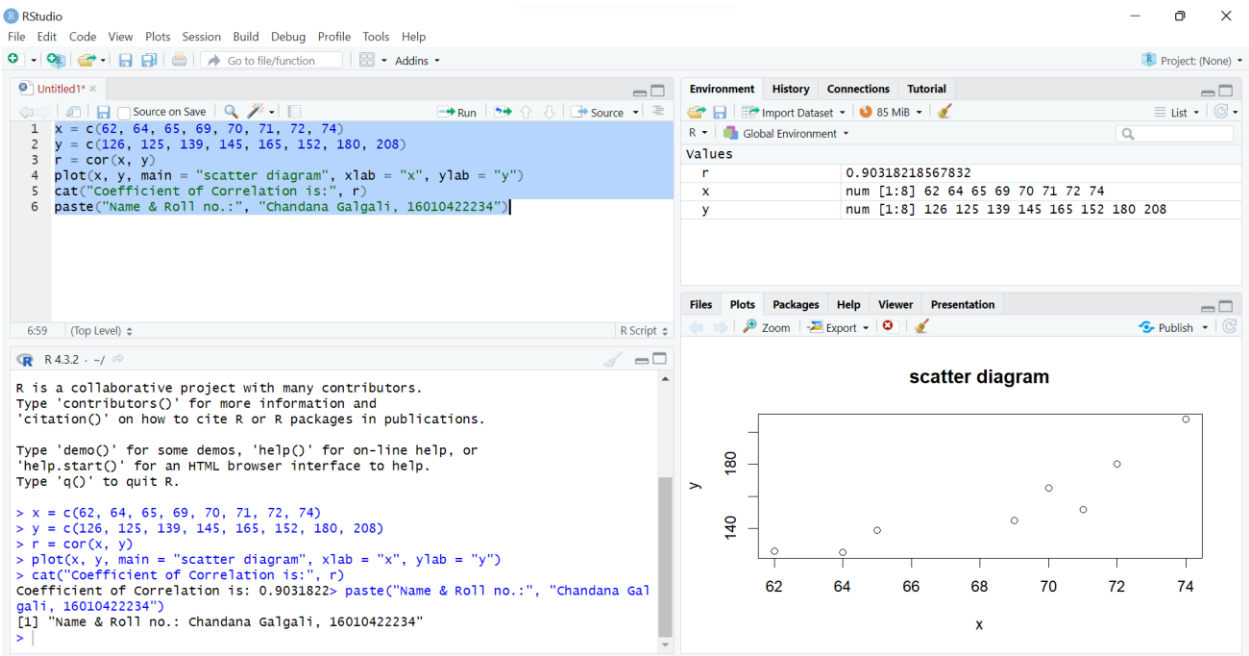
y: 126 125 139 145 165 152 180 208

CODE

```
x = c(62, 64, 65, 69, 70, 71, 72, 74)

y = c(126, 125, 139, 145, 165, 152, 180, 208)

r = cor(x, y)

plot(x, y, main = "scatter diagram", xlab = "x", ylab = "y")

cat("Coefficient of Correlation is:", r)

paste("Name & Roll no.:", "Chandana Galgali, 16010422234")
```

OUTPUT

```
Coefficient of Correlation is: 0.9031822
```



Q.2 Obtain the equation of the line of y on x.

x : 70 72 74 76 78 80

y : 163 170 179 188 196 220

Estimate y when x is 73.

Plot equation of regression line of Y on X.

CODE

```
x=c(70, 72, 74, 76, 78, 80)

y=c(163, 170, 179, 188, 196, 220)

r1=lm(y~x) # gives equation of line of regression of y on x

co=coef(r1) # gives values of constants a, b in equation  y = a + b*x

mco=matrix(co) # column matrix of  constants a, b

a=mco[1, 1]

cat ("Constant term a is:",a)

b=mco[2,1]

cat ("Constant term b is:",b)

cat ("Equation of the line of y on x is: y =",a,"+",b,"x")
```

esty=fitted(r1) # gives estimated values of y for the given values of x

cat ("Estimated values of y are:", esty) # display estimated values of y for the given values of x

x1 = 73

ey = a + b*x1

cat ("Estimated value of y for x = 73 is:", ey)

plot (x, y, pch = "+") # plots points corresponding to x and given value of y (+)

points(x, esty, pch = "*") # plots points corresponding to x and it's estimated value of y (*)

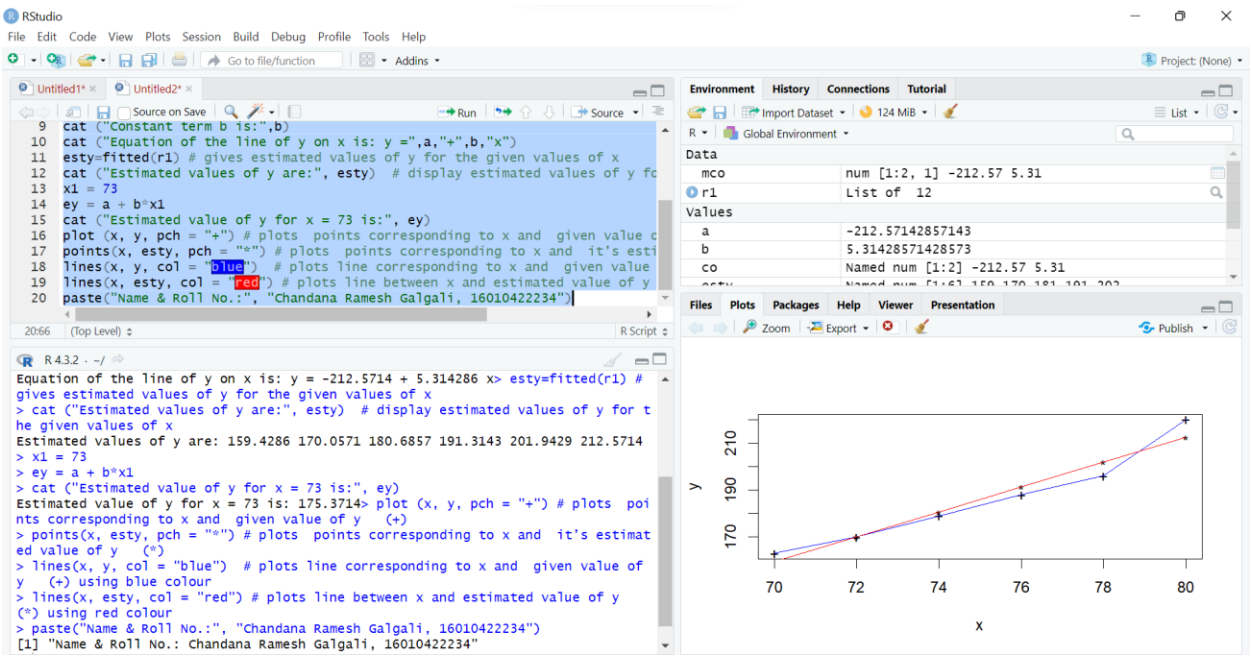
lines(x, y, col = "blue") # plots line corresponding to x and given value of y (+) using blue colour

lines(x, esty, col = "red") # plots line between x and estimated value of y (*) using red colour

paste("Name & Roll No.:", "Chandana Ramesh Galgali, 16010422234")

OUTPUT

```
Constant term a is: -212.5714
Constant term b is: 5.314286
Equation of the line of y on x is: y = -212.5714 + 5.314286 x
Estimated values of y are: 159.4286 170.0571 180.6857 191.3143 201.9429 212.5714
Estimated value of y for x = 73 is: 175.3714
```



Q.3 Find the equations of lines of regression of x on y for the following data.

x : 65 66 67 67 68 69 70 72

y : 67 68 65 66 72 72 69 71

Estimate x when y is 70.

Plot line of regression of x on y.

CODE

```
x = c(65, 66, 67, 67, 68, 69, 70, 72)

y = c(67, 68, 65, 66, 72, 72, 69, 71)

r1 = lm(x~y) # gives equation of of regression line of x on y (i.e.x = a + by)

co = coef(r1) # gives values of a, b

mco = matrix(co) # column matrix of a, b

a = mco[1, 1]

cat ("Constant term a is:",a)

b = mco[2, 1]

cat ("Constant term b is:",b)

cat ("Equation of the line of x on y is: x =",a,"+",b,"y")
```

estx = fitted(r1) # gives estimated values of x for the given values of y

cat ("Estimated values of x are:", estx) # display estimated values of x for the given values of y

y1 = 70

ex = a + b*y1

cat ("Estimated value of x is", ex)

plot (x, y, pch = "+") # plots points corresponding to y and given value of x (+)

points(estx, y, pch = "*") # plots points corresponding to y and it's estimated value of x (*)

lines(x, y, col = "green") # plots line corresponding to y and given value of x (+) using green colour

lines(estx, y, col = "red") # plots line between y and estimated value of x (*) using red colour

paste("Name & Roll No.:", "Chandana Ramesh Galgali, 16010422234")

OUTPUT

Constant term a is: 33.29126

Constant term b is: 0.5048544

Equation of the line of x on y is: x = 33.29126 + 0.5048544 y

```
Estimated values of x are: 67.1165 67.62136 66.1068 66.61165 69.64078 69.64078
68.12621 69.13592
```

```
Estimated value of x is 68.63107
```

RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Untitled1* Untitled2* Untitled3*

```
cat ("Constant term b is:",b)
cat ("Equation of the line of x on y is: x =",a,"+",b,"y")
estx = fitted(r1) # gives estimated values of x for the given values of y
cat ("Estimated values of x are:", estx) # display estimated values of x for
y1 = 70
ex = a + b*y1
cat ("Estimated value of x is", ex)
plot (x, y, pch = "+") # plots points corresponding to y and given value of
points(estx, y, pch = "*") # plots points corresponding to y and it's estima
lines(x, y, col = "green") # plots line corresponding to y and given value o
lines(estx, y, col = "red") # plots line between y and estimated value of x
paste("Name & Roll No.:", "Chandana Ramesh Galgali, 16010422234")
```

20:66 (Top Level) R Script

Environment History Connections Tutorial

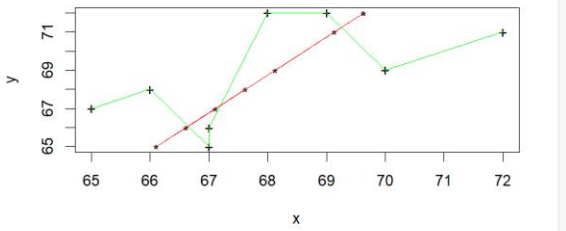
Import Dataset 113 MiB List

R Global Environment

Data	
mco	num [1:2, 1] 33.291 0.505
r1	List of 12
Values	
a	33.2912621359222
b	0.50485436893204
co	Named num [1:2] 33.291 0.505

Files Plots Packages Help Viewer Presentation

Zoom Export Publish



R 4.3.2 · ~/

```
Equation of the line of x on y is: x = 33.29126 + 0.5048544 y> estx = fitted(r1)
# gives estimated values of x for the given values of y
> cat ("Estimated values of x are:", estx) # display estimated values of x for th
e given values of y
Estimated values of x are: 67.1165 67.62136 66.1068 66.61165 69.64078 69.64078 6
8.12621 69.13592> y1 = 70
> ex = a + b*y1
> cat ("Estimated value of x is", ex)
Estimated value of x is 68.63107> plot (x, y, pch = "+") # plots points correspon
ding to y and given value of x   (+)
> points(estx, y, pch = "*") # plots points corresponding to y and it's estimated
value of x   (*)
> lines(x, y, col = "green") # plots line corresponding to y and given value of x
(+) using green colour
> lines(estx, y, col = "red") # plots line between y and estimated value of x (*)
using red colour
> paste("Name & Roll No.:", "Chandana Ramesh Galgali, 16010422234")
[1] "Name & Roll No.: Chandana Ramesh Galgali, 16010422234"
```