**Experiment-1: Write a R Program to take input from the User (name and age)and display the values .Also print the version of R installation.**

**Source Code:**

name = readline(prompt="Input your name: ")

age = readline(prompt="Input your age: ")

print(paste("My name is",name, "and I am",age ,"years old."))

print(R.version.string)

**Output:**

Input your name: Aditya

Input your age: 13

[1]”My name is Aditya and I am 13 years old.”

[1]”R version 4.1.2 (2021-11-01)”

**EXPERIMENT 2: Write a R Program to get the details of the objects in memory.**

**Source Code:**

name = "Python";

num1 = 8;

num2 = 1.5

nums = c(10, 20, 30, 40, 50, 60)

print(ls())

print("Details of the objects in memory:")

print(ls.str())

**Output:**

"num1" "num2" "name" "nums"

"Details of the objects in memory:"

n1 : num 8

n2 : num 1.5

name : chr "Python"

nums : num [1:6] 10 20 30 40 50 60

**EXPERIMENT 3:Write a R program to create a sequence of numbers from 20 to 50 and find the mean of numbers from 20 to 60 and sum of numbers from 51 to 91.**

**Source Code:**

print("Sequence of numbers from 20 to 50:")

print(seq(20,50))

print("Mean of numbers from 20 to 60:")

print(mean(20:60))

print("Sum of numbers from 51 to 91:")

print(sum(51:91))

**Output:**

"Sequence of numbers from 20 to 50:"

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

45 46 47 48 49 50

"Mean of numbers from 20 to 60:"

40

"Sum of numbers from 51 to 91:"

2911

**EXPERIMENT 4:Write a R program to create a simple bar plot of five subjects marks.**

**Source Code:**

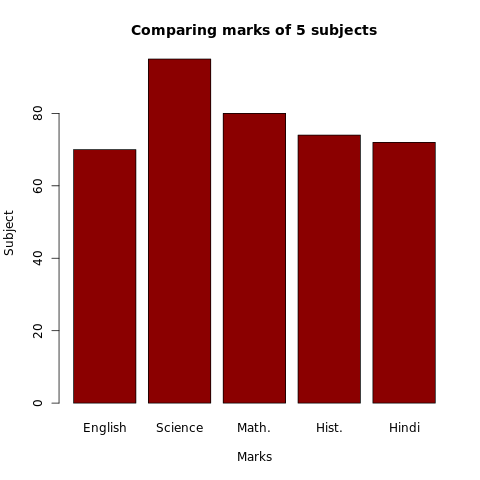
marks = c(70, 95, 80, 74,72)

barplot(marks,main = "Comparing marks of 5 subjects",xlab = "Marks",

ylab = "Subject",names.arg = c("English", "Science", "Math.", "Hist.","Hindi"),

col = "darkred",horiz = FALSE)

**Output:**



**EXPERIMENT 5:Write a R program to get the unique elements of a given string and unique numbers of vector.**

**Source Code:**

str1 = "The quick brown fox jumps over the lazy dog."

print("Original vector(string)")

print(str1)

print("Unique elements of the said vector:")

print(unique(tolower(str1)))

nums = c(1, 2, 2, 3, 4, 4, 5, 6)

print("Original vector(number)")

print(nums)

print("Unique elements of the said vector:")

print(unique(nums))

**Output:**

Original vector(string)"

"The quick brown fox jumps over the lazy dog."

"Unique elements of the said vector:"

"the quick brown fox jumps over the lazy dog."

"Original vector(number)"

1 2 2 3 4 4 5 6

"Unique elements of the said vector:"

1 2 3 4 5 6

**EXPERIMENT 6:Write a R program to create three vectors a,b,c with 3 integers. Combine the three vectors to become a 3×3 matrix where each column represents a vector. Print the content of the matrix.**

**Source Code:**

a<-c(1,2,3)

b<-c(4,5,6)

c<-c(7,8,9)

m<-cbind(a,b,c)

print("Content of the said matrix:")

print(m)

**Output:**

"Content of the said matrix:"

a b c

1 4 7

2 5 8

3 6 9

**EXPERIMENT 7:**

**Write a R program to create a 5 x 4 matrix , 3 x 3 matrix with labels and fill the matrix by rows and 3 × 3 matrix with labels and fill the matrix by columns.**

**Source Code:**

m1 = matrix(1:20, nrow=5, ncol=4)

print("5 × 4 matrix:")

print(m1)

cells = c(1,3,5,7,8,9,11,12,14)

rnames = c("Row1", "Row2", "Row3")

cnames = c("Col1", "Col2", "Col3")

m2 = matrix(cells, nrow=3, ncol=3, byrow=TRUE, dimnames=list(rnames, cnames))

print("3 × 3 matrix with labels, filled by rows: ")

print(m2)

print("3 × 3 matrix with labels, filled by columns: ")

m3 = matrix(cells, nrow=3, ncol=3, byrow=FALSE, dimnames=list(rnames, cnames))

print(m3)

**Output:**

"5 × 4 matrix:"

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

[1,] 1 6 11 16

[2,] 2 7 12 17

[3,] 3 8 13 18

[4,] 4 9 14 19

[5,] 5 10 15 20

[1] "3 × 3 matrix with labels, filled by rows: "

Col1 Col2 Col3

Row1 1 3 5

Row2 7 8 9

Row3 11 12 14

[1] "3 × 3 matrix with labels, filled by columns: "

Col1 Col2 Col3

Row1 1 7 11

Row2 3 8 12

Row3 5 9 14

**EXPERIMENT 8:**

**Write a R program to combine three arrays so that the first row of the first array is Followed by the first row of the second array and then first row of the third array.**

**Source Code:**

num1 = rbind(rep("A",3), rep("B",3), rep("C",3))

print("num1")

print(num1)

num2 = rbind(rep("P",3), rep("Q",3), rep("R",3))

print("num2")

print(num2)

num3 = rbind(rep("X",3), rep("Y",3), rep("Z",3))

print("num3")

print(num3)

a = matrix(t(cbind(num1,num2,num3)),ncol=3, byrow=T)

print("Combine three arrays, taking one row from each one by one:")

print(a)

**Output:**

[1] "num1"

[,1] [,2] [,3]

[1,] "A" "A" "A"

[2,] "B" "B" "B"

[3,] "C" "C" "C"

[1] "num2"

[,1] [,2] [,3]

[1,] "P" "P" "P"

[2,] "Q" "Q" "Q"

[3,] "R" "R" "R"

[1] "num3"

[,1] [,2] [,3]

[1,] "X" "X" "X"

[2,] "Y" "Y" "Y"

[3,] "Z" "Z" "Z"

[1] "Combine three arrays, taking one row from each one by one:"

[,1] [,2] [,3]

[1,] "A" "A" "A"

[2,] "P" "P" "P"

[3,] "X" "X" "X"

[4,] "B" "B" "B"

[5,] "Q" "Q" "Q"

[6,] "Y" "Y" "Y"

[7,] "C" "C" "C"

[8,] "R" "R" "R"

[9,] "Z" "Z" "Z"

**EXPERIMENT 9:**

**Write a R program to create a two-dimensional 5x3 array of sequence of even integers Greater than 50.**

**Source Code:**

a <- array(seq(from = 50, length.out = 15, by = 2), c(5, 3))

print("Content of the array:")

print("5×3 array of sequence of even integers greater than 50:")

print(a)

**Output:**

[1] "Content of the array:"

[1] "5×3 array of sequence of even integers greater than 50:"

[,1] [,2] [,3]

[1,] 50 60 70

[2,] 52 62 72

[3,] 54 64 74

[4,] 56 66 76

[5,] 58 68 78

**EXPERIMENT 10:**

**Write a R program to create an array using four given columns, three given rows, and two given tables and display the content of the array.**

**Source Code:**

array1 = array(1:30, dim=c(3,4,2))

print(array1)

**Output:**

, , 1

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

[1,] 1 4 7 10

[2,] 2 5 8 11

[3,] 3 6 9 12

, , 2

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

[1,] 13 16 19 22

[2,] 14 17 20 23

[3,] 15 18 21 24

**EXPERIMENT 11:**

**Write a R program to create an empty data frame.**

**Source Code:**

df = data.frame(Ints=integer(),

Doubles=double(),

Characters=character(),

Logicals=logical(),

Factors=factor(),

stringsAsFactors=FALSE)

print("Structure of the empty dataframe:")

print(str(df))

**Output:**

[1] "Structure of the empty dataframe:"

'data.frame': 0 obs. of 5 variables:

$ Ints : int

$ Doubles : num

$ Characters: chr

$ Logicals : logi

$ Factors : Factor w/ 0 levels:

NULL

**EXPERIMENT 12:**

**Write a R program to create a data frame from four given vectors.**

**Source Code:**

name = c('Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas')

score = c(12.5, 9, 16.5, 12, 9, 20, 14.5, 13.5, 8, 19)

attempts = c(1, 3, 2, 3, 2, 3, 1, 1, 2, 1)

qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes')

print("Original data frame:")

print(name)

print(score)

print(attempts)

print(qualify)

df = data.frame(name, score, attempts, qualify)

print(df)

**Output:**

[1] "Original data frame:"

[1] "Anastasia" "Dima" "Katherine" "James" "Emily" "Michael"

[7] "Matthew" "Laura" "Kevin" "Jonas"

[1] 12.5 9.0 16.5 12.0 9.0 20.0 14.5 13.5 8.0 19.0

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

[1] "yes" "no" "yes" "no" "no" "yes" "yes" "no" "no" "yes"

name score attempts qualify

1 Anastasia 12.5 1 yes

2 Dima 9.0 3 no

3 Katherine 16.5 2 yes

4 James 12.0 3 no

5 Emily 9.0 2 no

6 Michael 20.0 3 yes

7 Matthew 14.5 1 yes

8 Laura 13.5 1 no

9 Kevin 8.0 2 no

10 Jonas 19.0 1 yes

**EXPERIMENT 13:**

**Write a R program to create a data frame using two given vectors and display the**

**duplicated elements and unique rows of the said data frame.**

**Source Code:**

v1 = c(10,20,10,10,40,50,20,30)

v2 = c(10,30,10,20,0,50,30,30)

print("Original data frame:")

v1v2= data.frame(v1,v2)

print(v1v2)

print("Duplicate elements of the said data frame:")

print(duplicated(v1v2))

print("Unique rows of the said data frame:")

print(unique(v1v2))

**Output:**

[1] "Original data frame:"

v1 v2

1 10 10

2 20 30

3 10 10

4 10 20

5 40 0

6 50 50

7 20 30

8 30 30

[1] "Duplicate elements of the data frame:"

[1] FALSE FALSE TRUE FALSE FALSE FALSE TRUE FALSE

[1] "Unique rows of the data frame:"

v1 v2

1 10 10

2 20 30

4 10 20

5 40 0

6 50 50

8 30 30

**EXPERIMENT 14:**

**Write a R program to save the information of a data frame in a file and display the**

**Information of the file.**

**Source Code:**

exam\_data = data.frame(

name = c('Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'),

score = c(12.5, 9, 16.5, 12, 9, 20, 14.5, 13.5, 8, 19),

attempts = c(1, 3, 2, 3, 2, 3, 1, 1, 2, 1),

qualify = c('yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes')

)

print("Original dataframe:")

print(exam\_data)

save(exam\_data,file="data.rda")

load("data.rda")

file.info("data.rda")

**EXPERIMENT 15:**

**Write a R program to create a matrix from a list of given vectors.**

**Source Code:**

l = list()

for (i in 1:5) l[[i]] <- c(i, 1:4)

print("List of vectors:")

print(l)

result = do.call(rbind, l)

print("New Matrix:")

print(result)

**EXPERIMENT 16:**

**Write a R program to concatenate two given matrixes of same column but different rows.**

**Source Code:**

x = matrix(1:12, ncol=3)

y = matrix(13:24, ncol=3)

print("Matrix-1")

print(x)

print("Matrix-2")

print(y)

print("After concatenating dimensions of matrix:")

result = dim(rbind(x,y))

print(result)

print("After concatenating two given matrices:")

print(rbind(x,y))

**EXPERIMENT 17:**

**Write a R program to find row and column index of maximum and minimum value in a given matrix**

**Source Code:**

m = matrix(c(1:16), nrow = 4, byrow = TRUE)

print("Original Matrix:")

print(m)

result = which(m == max(m), arr.ind=TRUE)

print("Row and column of maximum value of the said matrix:")

print(result)

print(paste("maximum value is",m[result]))

result = which(m == min(m), arr.ind=TRUE)

print("Row and column of minimum value of the said matrix:")

print(result)

print(paste("minimum value is",m[result]))

**EXPERIMENT 18:**

**Write a R program to append value to a given empty vector.**

**Source Code:**

vector = c()

values = c(0,1,2,3,4,5,6,7,8,9)

for (i in 1:length(values))

vector[i] <- values[i]

print(vector)

**EXPERIMENT 19:**

**Write a R program to multiply two vectors of integers type and length 3.**

**Source Code:**

x = c(10, 20, 30)

y = c(20, 10, 40)

print("Original Vectors:")

print(x)

print(y)

print("Product of two Vectors:")

z = x \* y

print(z)

**EXPERIMENT 20:**

**Write a R program to find Sum, Mean and Product of a Vector, ignore element like NA or NaN**

**Source Code:**

x = c(10, NULL, 20, 30, NA)

print("Sum:")

#ignore NA and NaN values

print(sum(x, na.rm=TRUE))

print("Mean:")

print(mean(x, na.rm=TRUE))

print("Product:")

print(prod(x, na.rm=TRUE))

**EXPERIMENT 22:**

**Write a R program to create a list containing a vector, a matrix and a list and give names to the elements in the list. Access the first and second element of the list**.

**Source Code:**

list\_data <- list(c("Red","Green","Black"), matrix(c(1,3,5,7,9,11), nrow = 2),

list("Python", "PHP", "Java"))

print("List:")

print(list\_data)

names(list\_data) = c("Color", "Odd numbers", "Language(s)")

print("List with column names:")

print(list\_data)

print('1st element:')

print(list\_data[1])

print('2nd element:')

print(list\_data[2])

**EXPERIMENT 23:**

**Write a R program to create a list containing a vector, a matrix and a list and remove the second element.**

**Source Code:**

list\_data <- list(c("Red","Green","Black"), matrix(c(1,3,5,7,9,11), nrow = 2),

list("Python", "PHP", "Java"))

print("List:")

print(list\_data)

print("Remove the second element of the list:")

list\_data[2] = NULL

print("New list:")

print(list\_data)