

Basics of R Programming

1. Write an R program to take input from the user (name and age) and display the values. Also print the version of R installation.

```
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)
```

2. Write an R program to get the details of the objects in memory.

```
name = "Python";
n1 = 10;
n2 = 0.5
nums = c(10, 20, 30, 40, 50, 60)
print(ls())
print("Details of the objects in memory:")
print(ls.str())
```

3. Write an 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.

```
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))
```

4. Write an R program to create a vector which contains 10 random integer values between -50 and +50.

```
v = sample(-50:50, 10, replace=TRUE)
print("Content of the vector: ")
print("10 random integer values between -50 and +50: ")
print(v)
```

5. Write an R program to get the first 10 Fibonacci numbers.

```
Fibonacci <- numeric(10)
Fibonacci[1] <- Fibonacci[2] <- 1
for (i in 3:10) Fibonacci[i] <- Fibonacci[i - 2] + Fibonacci[i - 1]
print("First 10 Fibonacci numbers:")
print(Fibonacci)
```

6. Write an R program to get all prime numbers up to a given number (based on the sieve of Eratosthenes).

```
prime_numbers <- function(n) {  
  if (n >= 2) {  
    x = seq(2, n)  
    prime_nums = c()  
    for (i in seq(2, n)) {  
      if (any(x == i)) {  
        prime_nums = c(prime_nums, i)  
        x = x[(x %% i) != 0], i  
      }  
    }  
    return(prime_nums)  
  }  
  else  
  {  
    stop("Input number should be at least 2.")  
  }  
}  
prime_numbers(12)
```

7. Write an R program to print the numbers from 1 to 100 and print "Hi" for multiples of 3, print "Hello" for multiples of 5, and print "Bye" for multiples of both.

```
for (n in 1:100) {  
  if (n %% 3 == 0 & n %% 5 == 0)  
  {  
    print("FizzBuzz")  
  }  
  else if (n %% 3 == 0)  
  {  
    print("Fizz")  
  }  
  else if (n %% 5 == 0)  
  {  
    print("Buzz")  
  }  
  else print(n)  
}
```

8. Write an R program to extract first 10 English letter in lower case and last 10 letters in upper case and extract letters between 22nd to 24th letters in upper case.

```
print("First 10 letters in lower case:")  
t = head(letters, 10)  
print(t)
```

```

print("Last 10 letters in upper case:")
t = tail(LETTERS, 10)
print(t)
print("Letters between 22nd to 24th letters in upper case:")
e = tail(LETTERS[22:24])
print(e)

```

9. Write an R program to find the factors of a given number.

```

print_factors = function(n) {
  print(paste("The factors of",n,"are:"))
  for(i in 1:n) {
    if((n %% i) == 0) {
      print(i)
    }
  }
}
print_factors(4)
print_factors(7)
print_factors(12)

```

10. Write an R program to find the maximum and the minimum value of a given vector.

```

nums = c(10, 20, 30, 40, 50, 60)
print('Original vector:')
print(nums)
print(paste("Maximum value of the said vector:",max(nums)))
print(paste("Minimum value of the said vector:",min(nums)))

```

11. Write an R program to get the unique elements of a given string and unique numbers of vector.

```

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))

```

12. Write an R program to create three vectors a, b, c with 3 integers. Combine the three vectors to become a 3x3 matrix where each column represents a vector. Print the content of the matrix.

```

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)

```

13. Write an R program to create a list of random numbers in normal distribution and count occurrences of each value.

```

n = floor(rnorm(1000, 50, 100))
print('List of random numbers in normal distribution:')
print(n)
t = table(n)
print("Count occurrences of each value:")
print(t)

```

14. Write an R program to create three vectors numeric data, character data and logical data. Display the content of the vectors and their type.

```

a = c(1, 2, 5, 3, 4, 0, -1, -3)
b = c("Red", "Green", "White")
c = c(TRUE, TRUE, TRUE, FALSE, TRUE, FALSE)
print(a)
print(typeof(a))
print(b)
print(typeof(b))
print(c)
print(typeof(c))

```

15. Write an R program to create a 5 x 4 matrix, 3 x 3 matrix with labels and fill the matrix by rows and 2 x 2 matrix with labels and fill the matrix by columns.

```

m1 = matrix(1:20, nrow=5, ncol=4)
print("5 x 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 x 3 matrix with labels, filled by rows: ")
print(m2)
print("3 x 3 matrix with labels, filled by columns: ")
m3 = matrix(cells, nrow=3, ncol=3, byrow=FALSE,
dimnames=list(rnames, cnames))
print(m3)

```

16. Write an R program to create an array, passing in a vector of values and a vector of dimensions. Also provide names for each dimension.

```

a = array(6:30, dim = c(4, 3, 2), dimnames = list(
  c("Col1", "Col2", "Col3", "Col4"),
  c("Row1", "Row2", "Row3"),
  c("Part1", "Part2")
)
)
print(a)

```

17. Write an R program to create an array with three columns, three rows, and two "tables", taking two vectors as input to the array. Print the array.

```

v1 = c(1, 3, 5, 7)
v2 = c(2, 4, 6, 8, 10)
arra1 = array(c(v1, v2), dim = c(3, 3, 2))
print(arra1)

```

18. Write an R program to create a list of elements using vectors, matrices and a functions. Print the content of the list.

```

l = list(
  c(1, 2, 2, 5, 7, 12),
  month.abb,
  matrix(c(3, -8, 1, -3), nrow = 2),
  asin
)
print("Content of the list:")
print(l)

```

19. Write an R program to draw an empty plot and an empty plot specify the axes limits of the graphic.

```

#print("Empty plot:")
plot.new()
#print("Empty plot specify the axes limits of the graphic:")
plot(1, type="n", xlab="", ylab="", xlim=c(0, 20), ylim=c(0, 20))

```

20. Write an R program to create a simple bar plot of five subject's marks.

```

marks = c(70, 95, 80, 74)
barplot(marks,
  main = "Comparing marks of 5 subjects",
  xlab = "Marks",
  ylab = "Subject",
  names.arg = c("English", "Science", "Math.", "Hist."),
  col = "darkred",
  horiz = FALSE)

```

21. Write an R program to create bell curve of a random normal distribution.

```
n = floor(rnorm(10000, 500, 100))
t = table(n)
barplot(t)
```

22. Write an R program to compute sum, mean and product of a given vector elements.

```
print('Original vector:')
print(nums)
print(paste("Sum of vector elements:",sum(nums)))
print(paste("Mean of vector elements:",mean(nums)))
print(paste("Product of vector elements:",prod(nums)))
```

23. Write an R program to create a list of heterogeneous data, which include character, numeric and logical vectors. Print the lists.

```
my_list = list(Chr="Python", nums = 1:15, flag=TRUE)
print(my_list)
```

24. Write an R program to create a Data frames which contain details of 5 employees and display the details.

```
Employees = data.frame(Name=c("Anastasia S","Dima R","Katherine S",
"JAMES A","LAURA MARTIN"), Gender=c("M","M","F","F","M"),
Age=c(23,22,25,26,32),
Designation=c("Clerk","Manager","Exective","CEO","ASSISTANT"),
SSN=c("123-34-2346","123-44-779","556-24-433","123-98-987","679-77-
576") )
print("Details of the employees:")
print(Employees)
```

25. Write an R program to create a Data Frames which contain details of 5 employees and display summary of the data.

```
Employees = data.frame(Name=c("Anastasia S","Dima R","Katherine S",
"JAMES A","LAURA MARTIN"), Gender=c("M","M","F","F","M"),
Age=c(23,22,25,26,32),
Designation=c("Clerk","Manager","Exective","CEO","ASSISTANT"),
SSN=c("123-34-2346","123-44-779","556-24-433","123-98-987","679-77-
576") )
print("Summary of the data:")
print(summary(Employees))
```

26. Write an R program to create the system's idea of the current date with and without time.

```
print("System's idea of the current date with and without time:")
print(Sys.Date())
```

```
print(Sys.time())
```