Q1. 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("Name is: ",name," and age is: ",age," years old"))
print(R.version.string)
```

```
> name = readline(prompt="Input your name: ")
Input your name: ken mile
> age = readline(prompt="Input your age: ")
Input your age: 31
> print(paste("Name is: ",name," and age is: ",age," years old"))
[1] "Name is:  ken mile  and age is:  31  years old"
> print(R.version.string)
[1] "R version 3.6.3 (2020-02-29)"
>
```

Q2. 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())
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q2.R
[1] "n1"   "n2"   "name" "nums"
[1] "Details of the objects in memory:"
n1 :  num 10
n2 :  num 0.5
name :  chr "Python"
nums :  num [1:6] 10 20 30 40 50 60
papai@papai-H81M-S:~/Documents/R$
```

Q3. 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))
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q3.R
[1] "Sequence of numbers from 20 to 50:"
 [1] 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
[26] 45 46 47 48 49 50
[1] "Mean of numbers from 20 to 60:"
[1] 40
[1] "Sum of numbers from 51 to 91:"
[1] 2911
papai@papai-H81M-S:~/Documents/R$
```

Q4. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q4.R
[1] "Content of the vector: "
[1] "10 random integer values between -50 and +50: "
 [1] -40  40 -45  17  43  50  10 -48  28  32
papai@papai-H81M-S:~/Documents/R$
```

Q5. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q5.R
[1] "First 10 Fibonacci numbers:"
 [1]  1  1  2  3  5  8 13 21 34 55
papai@papai-H81M-S:~/Documents/R$
```

Q6. 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 = c(x[(x %% i) != 0], i)
               }
          }
          return(prime_nums)
```

```
        }
        else
        {
                stop("Input number should be at least 2.")
        }
}
prime_numbers(12)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q6.R
[1]  2  3  5  7 11
papai@papai-H81M-S:~/Documents/R$
```

Q7. 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 1:10) {
        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)
}
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q7.R
[1] 1
[1] 2
[1] "Fizz"
[1] 4
[1] "Buzz"
[1] "Fizz"
[1] 7
[1] 8
[1] "Fizz"
[1] "Buzz"
papai@papai-H81M-S:~/Documents/R$
```

Q8. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q8.R
[1] "First 10 letters in lower case:"
 [1] "a" "b" "c" "d" "e" "f" "g" "h" "i" "j"
[1] "Last 10 letters in upper case:"
 [1] "Q" "R" "S" "T" "U" "V" "W" "X" "Y" "Z"
[1] "Letters between 22nd to 24th letters in upper case:"
[1] "V" "W" "X"
papai@papai-H81M-S:~/Documents/R$
```

Q9. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q9.R
[1] "The factors of 4 are:"
[1] 1
[1] 2
[1] 4
[1] "The factors of 7 are:"
[1] 1
[1] 7
[1] "The factors of 12 are:"
[1] 1
[1] 2
[1] 3
[1] 4
[1] 6
[1] 12
papai@papai-H81M-S:~/Documents/R$
```

Q10. 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)))
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q10.R
[1] "Original vector:"
[1] 10 20 30 40 50 60
[1] "Maximum value of the said vector: 60"
[1] "Minimum value of the said vector: 10"
papai@papai-H81M-S:~/Documents/R$
```

Q11. 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))
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q11.R
[1] "Original vector(string)"
[1] "The quick brown fox jumps over the lazy dog."
[1] "Unique elements of the said vector:"
[1] "the quick brown fox jumps over the lazy dog."
[1] "Original vector(number)"
[1] 1 2 2 3 4 4 5 6
[1] "Unique elements of the said vector:"
[1] 1 2 3 4 5 6
papai@papai-H81M-S:~/Documents/R$
```

Q12. Write an 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.

```
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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q12.R
[1] "Content of the said matrix:"
     a b c
[1,] 1 4 7
[2,] 2 5 8
[3,] 3 6 9
papai@papai-H81M-S:~/Documents/R$
```

Q13. Write an R program to create a list of random numbers in normal distribution and count occurrences of each value.

```
n = floor(rnorm(10, 5, 12))
print('List of random numbers in normal distribution:')
print(n)
t = table(n)
print("Count occurrences of each value:")
print(t)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q13.R
[1] "List of random numbers in normal distribution:"
 [1]   7  -8 -17 -14   8 -19  23  18   6  10
[1] "Count occurrences of each value:"
n
-19 -17 -14  -8   6   7   8  10  18  23
  1   1   1   1   1   1   1   1   1   1
papai@papai-H81M-S:~/Documents/R$
```

Q14. 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))
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q14.R
[1]  1  2  5  3  4  0 -1 -3
[1] "double"
[1] "Red"   "Green" "White"
[1] "character"
[1]  TRUE  TRUE  TRUE FALSE  TRUE FALSE
[1] "logical"
papai@papai-H81M-S:~/Documents/R$
```

Q15. 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 × 2 matrix with labels and fill the matrix by columns

```
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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q15.R
[1] "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
papai@papai-H81M-S:~/Documents/R$
```

Q16. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q16.R
, , Part1

     Row1 Row2 Row3
Col1    6   10   14
Col2    7   11   15
Col3    8   12   16
Col4    9   13   17

, , Part2

     Row1 Row2 Row3
Col1   18   22   26
Col2   19   23   27
Col3   20   24   28
Col4   21   25   29

papai@papai-H81M-S:~/Documents/R$
```

Q17. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q17.R
, , 1

     [,1] [,2] [,3]
[1,]    1    7    6
[2,]    3    2    8
[3,]    5    4   10

, , 2

     [,1] [,2] [,3]
[1,]    1    7    6
[2,]    3    2    8
[3,]    5    4   10

papai@papai-H81M-S:~/Documents/R$
```

Q18. Write an R program to create a list of elements using vectors, matrices and a functions. Print the content of the list.

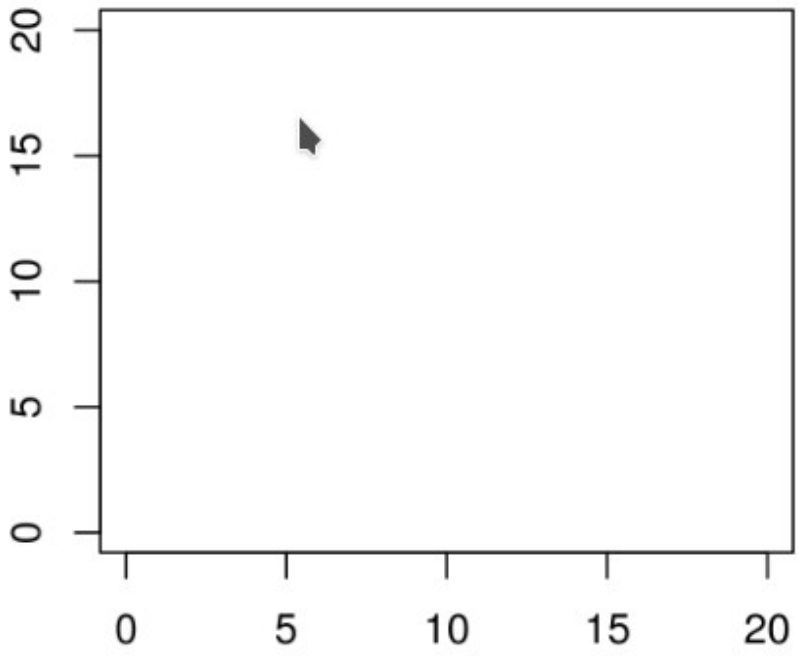
```
l = list(
 c(1, 2, 2, 5, 7, 12),
 month.abb,
 matrix(c(3, -8, 1, -3), nrow = 2),
 asin
)
print("Content of the list:")
print(l)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q18.R
[1] "Content of the list:"
[[1]]
[1]  1  2  2  5  7 12

[[2]]
 [1] "Jan" "Feb" "Mar" "Apr" "May" "Jun" "Jul" "Aug" "Sep" "Oct" "Nov" "Dec"

[[3]]
     [,1] [,2]
[1,]    3    1
[2,]   -8   -3

[[4]]
function (x)  .Primitive("asin")

papai@papai-H81M-S:~/Documents/R$
```

Q19. 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))
```

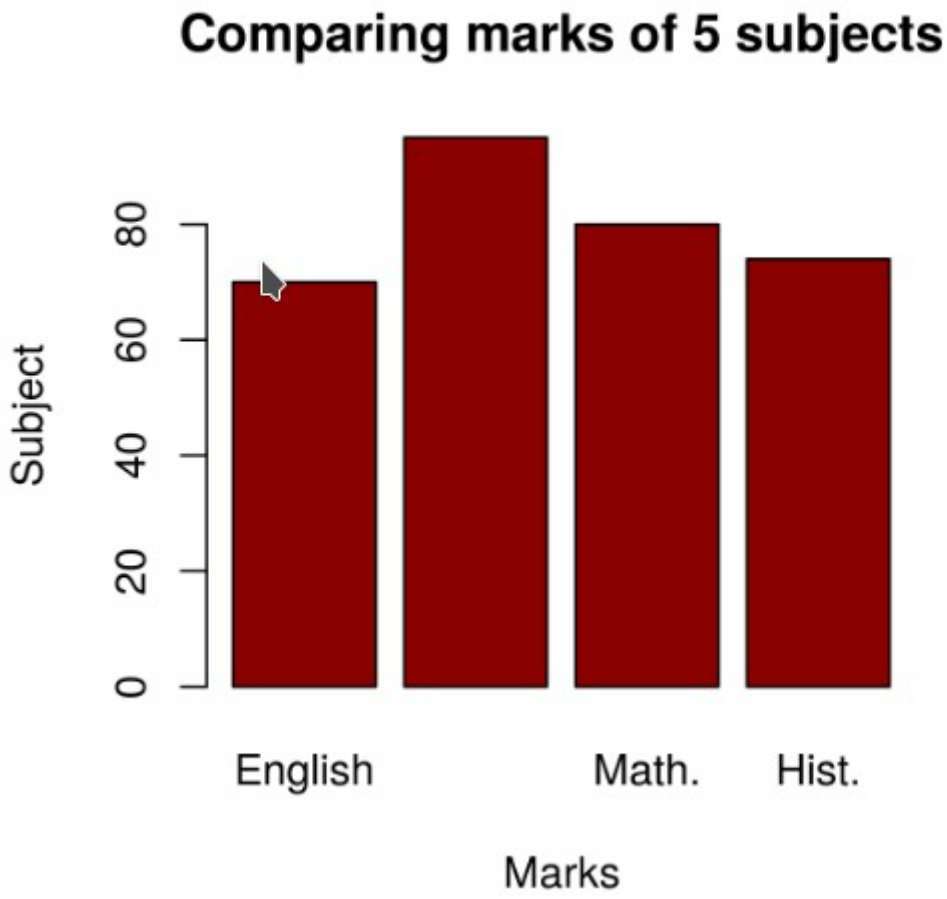
```
$Rscript main.r
[1] "Empty plot:"
[1] "Empty plot specify the axes limits of the graphic:"
```



Q20. Write an R program to create a simple bar plot of five subject's marks.

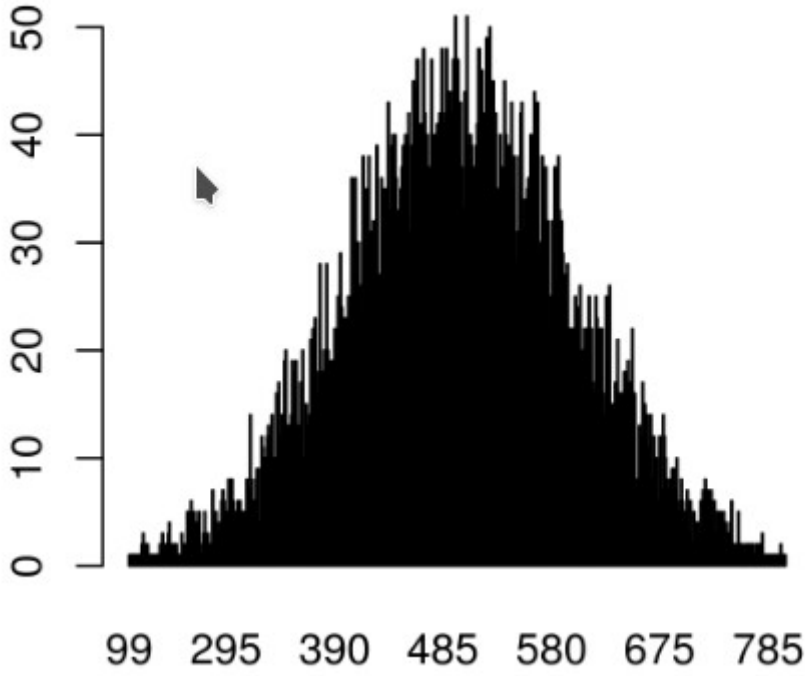
```
marks = c(70, 95, 80, 74)
barplot(marks,
main = "Comparing marks of 5 subjects",
xlab = "Marks",
ylab = "Subject",
names.arg = c("English", "Science", "Math.", "Hist."),
col = "darkred",
horiz = FALSE)
```

```
$Rscript main.r
```



Q21. Write an R program to create bell curve of a random normal distribution.

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



Q22. 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)))
```

Q23. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q23.R
$Chr
[1] "Python"

$nums
 [1]  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15

$flag
[1] TRUE

papai@papai-H81M-S:~/Documents/R$
```

Q24. 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)
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q24.R
[1] "Details of the employees:"
          Name Gender Age Designation          SSN
1  Anastasia S      M  23       Clerk  123-34-2346
2        Dima R      M  22     Manager   123-44-779
3  Katherine S      F  25    Exective   556-24-433
4       JAMES A      F  26         CEO   123-98-987
5 LAURA MARTIN      M  32   ASSISTANT 679-77-\n576
papai@papai-H81M-S:~/Documents/R$
```

Q25. 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))
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q25.R
[1] "Summary of the data:"
          Name   Gender       Age            Designation          SSN
 Anastasia S :1   F:2    Min.   :22.0   ASSISTANT:1    123-34-2346 :1
 Dima R      :1   M:3    1st Qu.:23.0   CEO       :1    123-44-779  :1
 JAMES A     :1          Median :25.0   Clerk     :1    123-98-987  :1
 Katherine S :1          Mean   :25.6   Exective  :1    556-24-433  :1
 LAURA MARTIN:1          3rd Qu.:26.0   Manager   :1    679-77-\n576:1
                         Max.   :32.0
papai@papai-H81M-S:~/Documents/R$
```

Q26. 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())
```

```
papai@papai-H81M-S:~/Documents/R$ Rscript Q26.R
[1] "System's idea of the current date with and without time:"
[1] "2021-07-13"
[1] "2021-07-13 19:45:21 IST"
papai@papai-H81M-S:~/Documents/R$
```