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: ")
Input your name: Devadarshini
> age =  readline(prompt="Input your age: ")
Input your age: 19
> print(paste("My name is",name, "and I am",age ,"years old."))
[1] "My name is Devadarshini and I am 19 years old."
> print(R.version.string)
[1] "R version 4.2.2 (2022-10-31 ucrt)"
```

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

```
> name<- "Apple";
> n1<- 1;
> n2<- 5;
> nums<- c(1,2,3,4,5,6)
> print(ls())
[1] "age"  "n1"   "n2"    "name" "nums"
> print("Details of the objects in memory:")
[1] "Details of the objects in memory:"
> print(ls.str())
age :  chr "19"
n1 :  num 1
n2 :  num 5
name :  chr "Apple"
nums :  num [1:6] 1 2 3 4 5 6
```

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.

```
> print("Sequence of numbers from 20 to 50:")
[1] "Sequence of numbers from 20 to 50:"
> print(seq(20,50))
 [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
> print("Mean of numbers from 20 to 60:")
[1] "Mean of numbers from 20 to 60:"
> print(mean(20:60))
[1] 40
>
>
>
> print("Sum of numbers from 51 to 91:")
[1] "Sum of numbers from 51 to 91:"
> print(sum(51;91))
Error: unexpected ';' in "print(sum(51;"
> print(sum(51:91))
[1] 2911
```

4. Write a 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:")
[1] "Content of the vector:"
> print("10 random integer values between -50 and +50:")
[1] "10 random integer values between -50 and +50:"
> print(v)
 [1]    2 -14  11  25 -21 -14 -23   4  38  23
```

5. Write a 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)
[1]  2  3  5  7 11
```

6. Write a R program to extract first 10 english letter in lower case and last 10 letters in upper case and extract letters between 22 nd to 24 th letters in upper case.

```
> print("First 10 letters in lower case:")
[1] "First 10 letters in lower case:"
> print(letters[1:10])
 [1] "a" "b" "c" "d" "e" "f" "g" "h" "i" "j"
> print(LETTERS[16:26])
 [1] "P" "Q" "R" "S" "T" "U" "V" "W" "X" "Y" "Z"
> print(LETTERS[22:24])
[1] "V" "W" "X"
```

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

```
> nums = c(50,60,70,80,90,100)
> print(paste("Maximum value of the said vector:",max(nums)))
[1] "Maximum value of the said vector: 100"
> print(paste("Minimum value of the said vector:",min(nums)))
[1] "Minimum value of the said vector: 50"
```

8. Write a 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("Unique elements of the said vector:")
[1] "Unique elements of the said vector:"
> print(unique(tolower(str1)))
[1] "the quick brown fox jumps over the lazy dog."
> nums = c(21, 20, 21, 38, 43, 44, 38, 57, 69)
> print("Unique elements of the said vector:")
[1] "Unique elements of the said vector:"
> print(unique(nums))
[1] 21 20 38 43 44 57 69
```

9. 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.

```
> a<-c(1,2,3)
> b<-c(4,5,6)
> c<-c(7,8,9)
> m<-cbind(a,b,c)
> print("Matrix: ")
[1] "Matrix: "
> print(m)
     a b c
[1,] 1 4 7
[2,] 2 5 8
[3,] 3 6 9
```

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

```
> n = floor(rnorm(100, 5, 10))
> t = table(n)
> print("Count occurrences of each value:")
[1] "Count occurrences of each value:"
> print(t)
n
-18 -14 -12 -10  -9  -8  -7  -6  -5  -4  -3  -2  -1   0   1   2   3   4   5   6   7
  1   1   1   2   1   3   2   3   6   2   4   1   5   5   4   4   2   5   6   6   1
  8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  27  33
  3   2   3   2   5   3   1   2   2   3   1   1   1   1   2   1   1   1
```

11. Write a 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)
[1]  1  2  5  3  4  0 -1 -3
> print(typeof(a))
[1] "double"
> print(b)
[1] "Red"   "Green" "White"
> print(typeof(b))
[1] "character"
> print(c)
[1]  TRUE  TRUE  TRUE FALSE  TRUE FALSE
> print(typeof(c))
[1] "logical"
```

12. Write a 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.

```
> a1 = matrix(1:10, nrow=5, ncol=4)
> print(a1)
     [,1] [,2] [,3] [,4]
[1,]    1    6    1    6
[2,]    2    7    2    7
[3,]    3    8    3    8
[4,]    4    9    4    9
[5,]    5   10    5   10
> cells = c(1,2,3,4,5,6,7,8,9)
> rnames = c("R1","R2","R3")
> cnames = c("C1","C2","C3")
> a2 = matrix(cells, nrow=3, ncol=3, byrow=TRUE, dimnames=list(rnames, cnames))
> print(a2)
   C1 C2 C3
R1  1  2  3
R2  4  5  6
R3  7  8  9
> a3 = matrix(cells, nrow=3, ncol=3, byrow=FALSE, dimnames=list(rnames, cnames))
> print(a3)
   C1 C2 C3
R1  1  4  7
R2  2  5  8
R3  3  6  9
```

13. Write a 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)
, , 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
```

14. Write a 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)
, , 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
```

15. Write a 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:")
[1] "Content of the list:"
> print(l)
[[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")
```