NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR

Cachar, Assam

B.Tech. IVth Sem

Subject Code: CS216

Subject Name: Applied Probability

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Q.2. In A4 paper, in clear handwriting, write short notes and sample R code snippet (don't write whole program) to demonstrate each of the following constructs:

i) Vectors
ii) Lists
iii) Matrices and data frames
iv) Functions definition and function call
v) Associative arrays
vi) R data object.

→ (i) Vectors: These are the sequence of data elements of same type. The c() function is the generic function which combines the arguments to create a vector.

Code Snippet:

```
> V1 <- c(1,2,3,4,5)
> V2 <- c('red', 'green', 'blue')
> V3 <- 5:20
> V4 <- seq(4, 8, by=0.5)
```

(ii) Lists: These are generic vectors that can contain object of different types. The list() function is used to create data frame

Code Snippet:

```
> L1 <- list(c(1,2,3), c("Sun", "Mon"))
> L2 <- list("Red", "Blue", TRUE, 3, 4)
> L3 <- list(c(1,2), matrix(c(1,2,3,4), nrow=2))
```

(iii) Matrices and Data frames: In R, matrices are a collection of data elements arranged in 2-D rectangular layout, and data frames are used to store data in form of a table. The matrix() function is used to create a matrix and the dataframe() function is used to create data frame.

Code Snippets:

```
> M1 <- matrix(c(1:12), nrow=4, byrow=TRUE)
>M2 <- matrix(c(1, 5, 7, 3), nrow= 2)
>M3 <- matrix(c("Red", "Blue", "Green", "Orange",
                                    nrow=2)
> D1 <- dataframe (SNO = c(1:8),
                   Name = c("Red", "Blue", "Green"),
                   Hex = c("FF0000", "0000FF",
                           "00FF00"))
>D2 <- data.frame (SId = c(01, 08, 12),
                   Name = c("Ron", "Bob", "Dan"),
                   DOB = as.Date(c("2012-01-01",
                    "2012-06-27", "2011-05-12"))
```

(iv) Functions definition and function call: A function is a set of statements organised together to perform a specific task. The function() function is used to define a function. The basic syntax of an R function definition and function call is:

```
> function_name <- function (arg1, arg2, ...) {
      function_body
  }
> function_name (arg1, arg2, ...)
```

Code Snippet:

```
> f1 <- function (a) {
    for (i in 1:a) {
      b <- i*a
      print (b)
    }
  }
> f1 (5)
> f2 <- function (a, b) {
    c <- b
    print (a)
    print (c)
  }
> f2 (10, "Blue")
```

(v) Associative Arrays: These are well known key-value data structure. Associative array is also called a hash table. These are generally a list or a function.

(vi) Data Objects: There are 6 data objects in R:

(i) Vectors
(ii) Lists
(iii) Matrices
(iv) Arrays
(v) Factors
(vi) Data Frames.