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#AUTHOR:AKULA VENKATA SATYA SAI GOPINADH                                  #DATE:04-02-2023
#Regd.No:22228

#MDSC-201(P)
#ASSIGNMENT-I


#DATA TYPES IN R PROGRAMMING

# 1.NUMERIC
#Represents decimal numbers, such as 1, 2.5, -3, etc.

# numeric value
numeric_value1 <- 10 # integer
numeric_value1

numeric_value2<- 10.5 # double
numeric_value2

# 2.INTEGER
#Represents whole numbers, such as 1, 2, -3, etc.

#integer assignment
int_value<- 3L
int_value

# 3.CHARACTER
#Represents strings or text, such as "Satya", "Sai", etc.

#character value
char_value <- "SATYA SAI"
char_value


# 4.LOGICAL
# Represents a binary value, either TRUE or FALSE.

#logical value
logical_value <- TRUE
logical_value

# 5.COMPLEX
# Represents complex numbers, such as 1 + 2i.

#complex value
complex_value <- 1 + 2i
complex_value

# 6. RAW
"A raw data type specifies values as raw bytes.
-> charToRaw() - converts character data to raw data
-> rawToChar() - converts raw data to character data"
#

#character to raw
raw_var<- charToRaw("THIS IS SATYA SAI .HOW CAN I HELP YOU?")

print(raw_var)
print(class(raw_var))

#raw to character
char_var<- rawToChar(raw_var)

print(char_var)
print(class(char_var))

# R OBJECTS

# 1.VECTORS
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"Vectors: A vector is a one-dimensional array that can contain elements
of different data types, such as numbers, characters, and logical values."

# Creating a numeric vector
numeric_vector <- c(1, 2, 3, 4, 5)
numeric_vector

# Creating a character vector
char_vector1 <- c("apple", "banana", "cherry")
char_vector1

char_vector2 <- c('green','black','pink','skyblue','brown','violet','purple')
char_vector2


# Creating a logical vector
logical_vector <- c(TRUE, FALSE, TRUE)
logical_vector

# 2.MATRICES
#Matrices:
"A matrix is a two-dimensional array with rows and
columns. The elements in a matrix must be of the same data type"

# Creating a matrix
matrix1 <- matrix(c(1, 2, 3, 4, 5, 6), nrow=2, ncol=3)
matrix1

matrix2<- matrix(c(1,2,3,4,5,6,7,8,9),nrow=3, ncol=3 ,byrow = TRUE)
matrix2

mat<- matrix(c(1,2,3,4,5,6,7,8,9),nrow=3, ncol=3 ,byrow = TRUE)
mat

m = matrix2+mat # ADDING TWO MATRICES
m

m1 = matrix2-mat # SUBTRACTING TWO MATRICES
m1

m2 = matrix2*mat # MULTIPLING TWO MATRICES
m2

m3 = matrix2/mat # DIVIDING TWO MATRICES
m3

mat1 <- rbind(matrix2,mat)
mat1

mat2 <- cbind(matrix2,mat)
mat2

matrix3 <- matrix(c('Aditya','Kumar','Satya','Vamsee','Hemanth','Lalith','Pavan',
          'Mathura','Saideva','Sai Kumar','Aharniesh','Anirudha','Srihari',
          'Swaroop'),nrow = 7,ncol=2,byrow = FALSE)
matrix3
#since in the above example we took byrow =FALSE it takes the default format which is
by columns

matrix4 <- matrix(1:6, nrow = 2, ncol = 3) # a 2x3 matrix
matrix4
"In the above example we didn't give any numbers ,we just gave the indices from 1:6
which
will give numbers from 1 to 6 (1,2,3,4,5,6) "



# 3.LISTS
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"LIST : A list contain many different types of elements
inside it like vectors, functions and even another list inside it"

list <- list(c(1, 2, 3), c("a", "b", "c"))
list

list1 <- list(c(1,2,3),c('a','b'),2.5,'Satya',tanh(90),"R PROGRAMMING")
list1
"For the above list we used list inside a list,and also different datatypes in that
list"



# 4.ARRAYS
"Array: Arrays can be of any number of dimensions.The array function
takes a dimension (dim) attribute which creates the required number of dimensions"


#An array.

arr1 <- array(c('SATYA','SAI'),dim=c(3,2,5))
arr1

arr2<- array(c('black','white'),dim=c(3,5,1))
arr2

arr3<- array(1:12, dim = c(2, 6, 2))
arr3

arr4 <- array(1:24,dim = c(3,2,2))
arr4




# 5.FACTORS
"Factors are created using a vector. It stores the vector along
with the distinct values of the elements in the vector as labels.
The labels are always character irrespective of whether it is numeric
or character or Boolean etc. in the input vector"
"Factors are created using the factor() function.
The levels functions give the count of levels."



pen_colors <- c('green','blue','black','pink','red','red','green')# vector.
factor_pen <- factor(pen_colors) # factor object.
# Print the factor.
print(factor_pen) # Gives the distinct elements in the vector
print(nlevels(factor_pen))# Gives count of number of distinct elements in the vector



# 6. DATA FRAMEs
'Data frames are tabular data objects. Unlike a matrix in data frame each column
can contain different modes of data. The first column can be numeric while the second
column can be character and third column can be logical. It is a list of vectors of
equal length.
Data Frames are created using the data.frame() function.'


# Create the data frame.
Class <- data.frame(
  Name = c('Aditya','Kumar','Satya','Vamsee','Hemanth','Lalith','Pavan',
           'Mathura','Saideva','Sai Kumar','Aharniesh','Anirudha','Srihari',
           'Swaroop'),
  Gender = c("Male", "Male","Male","Male", "Male","Male","Male", "Male","Male"
             ,"Male", "Male","Male","Male", "Male"),
  Height = c(175.15,160,179.75,162,180,155.12,154.45,178.45,123.5,154.6,157.8,
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            145,156.8,157),
  Weight = c(85,60,95,45,35,67,65,91,14,74,84,65,79,78),
  Age =c(21,22,21,21,21,21,21,21,21,21,21,23,25) )
Class
```