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Institute of Technology
(An Autonomous Institute Affiliated to University of Mumbai, Approved by A.I.C.T.E & Recognized by Govt. of Maharashtra)
Department of Artificial Intelligence and Data Science

R Assignment 1

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Class	D11 AD		
Subject	Skill based Lab: R Programming and Tableau		
LO Mapped			
DOP		**DOS**	
LAB OUTCOME		**GRADE**	
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R assignment - 1

Q1 What is R, and what are its main characteristics?

Ans R is a programming language and environment ~~lang~~ specifically designed for statistical computing and data analysis.

Its main characteristics include a vast collection of statistical and mathematical function, a comprehensive ecosystem of package for various purposes, strong graphic capablities, and ~~and~~ an open-source nature that encourages collaboration and community contributions. R is widely used in fields such as statistics, data science.

Charecteristics

1) statistical computing - data analysis and visualzation
2) Open source - rich ecosystem of package and community.
3) Extensive package - wide range of functions
4) Data visualzation - creating high quality graphics and visualization
5) Data handling - offers various data structure.

AASTMAR

Q2 What are disadvantages of R?

ans. While R is a powerful for statistical computing and data analysis, it does have some disadvantages -

1) ~~Lear~~ speed -
In certain situation R may be slower than language like C, Python specially for computation intensive task

2) Memory management
R may be not be as efficient in memory management as other language

3) Data ~~Size~~ limitation
Large data sets can sometime pose challenge in R, as R struggles in processing large amount of data.

4) Limited gui support
R lack comprehensive graphic user interface

5) Corporate adoption
In some corporate settings, there may be a preference for tools like SAS or SPSS.

Q3) List and define some basic data structures in R?

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Ans Basic data types in R.

1) Numeric
Represents real number and its the default data types for numeric in R
x ← 3.14

2) Integer
Represents whole number without decimal points
y ← 5L

3) Logical
Represents binary values, TRUE or FALSE
z ← TRUE

4) Charector
Represent text or strings
text ← "hello"

5) complex
Represent complex number with real and imaginary part
c ← 2 + 3i

Q 3 List and define basic data structure in R.

ans A data structure is a particular way of organizing data in a computer so that it can be used effectively.

The most essential data structure in R include -

1) vector - a vector is an ordered collection of basic data types of a given length

```
x ← c(1, 8, 9, 10)
```

2) list - list is a generic object consisting of an ordered collection of objed. Lists are heterogenous data structure

```
x ← list(c(1,2), 4, "do")
```

3) data frame - data frame are data objects of R which are used to store the tabular data.

```
df ← data.frame(Name, Age)
```

4) matrices - a matrix is a rectangular arrangement of numbers in row & columns.

```
A ← matrix(c(1,2,3,4), nrow=2, ncol=2)
```

5) factor - factors are used to represent categorical data.

```
blood ← factor(c("A", "B", 'O', "AB"))
```

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Q5 How to assign a value to a variable in R ?

ans Variable allows you to store a data in R to use it later. In R variable are assigned using a to less than (<) and a dash (-). & Like this (<-).

Suppose you want to assign height of variable in a variable called heigh

height <- 2

Q6 How to concate strings in R ?

ans In R, you can concate strings using the paste() function. Here's a simple example

```
str1 ← "Hello"
str2 ← "world"
result ← paste(str1, str2)
```

This will output "hello world".

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Q57 what is the use of switch() in R?

ans The switch() function in R is used for conditional execution based on a specified value. It allows you to choose among several alternatives based on the value of an expression. The basic syntax is:

```
switch(EXPR, CASE1, CASE2, ...
       default)
```

EXPR: value determine the case to select
CASE1, CASE2: possible cases
default: value to return if none cases match

Eg
```
day ← 3
weekday ← switch(day,
                 "M",
                 "T",
                 "W",
                 "T",
                 "F",
                 "S",
                 "S",
                 "invalid")
```

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Q 8 List and ~~explain~~ define the control statements in R ?

ans control statements in R

1) if - else
used for conditional executions
eg. if (condition) {
# true
} else {
# false
}

2) for loop
used for itteration over a sequence
eg. for (variable in sequence) {
# code
}

3) while loop
repeat code repeatedly while condition is true
eg. while (condition) {
#
}

4) repeat loop
repeat ~~until~~ untill explicitily broken out.
eg. repeat {
if (condition) {
break
}
}

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5) next
used to skip remaining of the current iteration and move to next one

Q9 what is the difference between the with() and within() functions ?

ans

with()	within()
1) with() evaluates the expression without modifying the original data frame	2) within() evaluates the expression and create a copy of the original data frame
df ← list("x" = c(1,2,3), "y" = c(4,5,6))	df ← ("x" = c(1,2,3), "y" = c(4,5,6",)
with(df, x + y)	within(df, z ← x + y)

Q10) How to create a new column in a df in R based on other columns ?

ans
① directassignment - use the $ operator
eg df $ ~~col~~ new = df $ col1 + 2
② transform - apply transformation
df = transform(df, newcol = col1, col2)
③ using [ ] operator.