



Graded Lab 2 – R Programming

Your Name: Garvit man Singh
Major: Data Science

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Instructions

- In this lab assignment, you will solve problem(s) based on what you have learnt in objects and classes.
- There is 1 question in this assignment.
- **This evaluation instrument, if submitted after due date, will not be evaluated, and a score of zero will be awarded. Those who are present in lab in person, only those student's submissions will be considered for evaluation.**
- **Email/paper/other modes of submissions will not be accepted.**
- Upload a pdf **version** of this document.

Due Time: 2 hours after assigning

Submitting this Assignment

You will submit (upload) this assignment in MS Teams. Name this document as A5_JPC2021_John_Doe.pdf in case your name is John Doe. **Paste your code and snapshot of output** after the question, save and upload the document.

Grading: 5 points

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Problem: Write a R script to demonstrate the following:

1. Create a multi-dimensional array and perform the following operations

```
> # 1. Create a multi-dimensional array and perform specified operations
>
> # Create a 3D array (2x2x4)
> multi_arr <- array(1:16, dim = c(2, 2, 4))
`
```

- a. Find if an item is present in an array

```
> # a. Find if an item is present in the array
> item <- 5
> is_present <- item %in% multi_arr
> cat("Is item", item, "present in the array?", is_present, "\n")
Is item 5 present in the array? TRUE
```

- b. Find maximum and minimum of all values.

```
> # b. Find maximum and minimum of all values
> maximum_value <- max(multi_arr)
> minimum_value <- min(multi_arr)
> cat("Maximum value in the array:", maximum_value, "\n")
Maximum value in the array: 16
> cat("Minimum value in the array:", minimum_value, "\n")
Minimum value in the array: 1
```

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2. Create a matrix and perform the following operations:

```
<
> # 2. Create a matrix and perform specified operations
>
> # Create a 4x4 matrix
> new_matrix <- matrix(1:16, nrow = 4, ncol = 4)
<
```

a. Perform element-wise multiplication using *

```
<
> # a. Perform element-wise multiplication
> a <- 2
> result <- new_matrix * a
> cat("Each element is multiplied by", a, ":\n")
Each element is multiplied by 2 :
> print(result)
      [,1] [,2] [,3] [,4]
[1,]    2   10   18   26
[2,]    4   12   20   28
[3,]    6   14   22   30
[4,]    8   16   24   32
>
```

b. Raise all elements of matrix to the power N.

```
> # b. Raise all elements of matrix to the power N
> N <- 3
> result_power <- new_matrix ^ N
> cat("Matrix raised to the power of", N, ":\n")
Matrix raised to the power of 3 :
> print(result_power)
      [,1] [,2] [,3] [,4]
[1,]    1  125  729 2197
[2,]    8  216 1000 2744
[3,]   27  343 1331 3375
[4,]   64  512 1728 4096
<
```

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3. Write a program to convert factor levels to a list.

```
> # 3. Write a program to convert factor levels to a list
>
> # Create a factor
> value<- factor(c("1", "2", "1", "2", "3"))
>
> # Convert factor levels to a list
> ans <- as.list(levels(value))
> cat("Factor levels converted to list:\n")
Factor levels converted to list:
> print(ans)
[[1]]
[1] "1"

[[2]]
[1] "2"

[[3]]
[1] "3"
```