

## WQD7004 Programming for Data Science

### Lab 3 Data Structure

1. Create a list using R with the following values  $g1=1:10$ ,  $g2="R Programming"$ ,  $g3="HTML"$ . Then, count the number of objects in the list. After that, get the length of the first two vectors of the given list.
2. Find all elements of a list1 that are not given in list2 using R. Given list1 consists of "x", "y", "z" and list2 consists of "x", "y", "z", "X", "Y", "Z". (You can use the `setdiff()`)
3. Create a list using the following values ("G022", "G003", "G013", "G007", "G012") and then list down the number of items in the list. Then, display the second element in the list. After that, add a new item "G018" to the list and then display the list in ascending order.
4. Create four vectors a, b, c, and d with 3 integers. Combine all the vectors to become a 4x3 matrix. Add a vector with sequence of number from 1 to 4 to the matrix by row.
5. A and B is a 3x4 matrix. Create an R Script to multiply matrix A and B to get the 3x3 dimension.
6. Create a matrix with 10 rows and 2 columns, extract a sub-matrix from original matrix which includes the last 5 rows.
7. A square matrix A is said to be invertible if there exists a matrix B such that  $AB = BA = I$ . Generate a 2x2 matrix A as below. Then, compute B.

$$\begin{array}{cc} & \begin{matrix} [,1] & [,2] \end{matrix} \\ \begin{matrix} [1,] \\ [2,] \end{matrix} & \begin{bmatrix} 2 & 2 \\ 4 & 2 \end{bmatrix} \end{array}$$

8. With regards to the mtcars dataset:
  - retrieve the number of columns
  - retrieve the number of rows
  - retrieve data value from row 3 and column 5
  - retrieve data value from row 3 and column 5 using the names
  - retrieve data of a row (Volvo 142E)
  - retrieve data of column mpg
  - retrieve data of column hp and qsec

9. Create a DataFrame using the following data. SK020 is the ProductCode, Enfagrow A+ is the ProductName and 36.79 is the Price. Then, solve the following statements

SK020,Enfagrow A+,36.79
SK042,Ayamas Nuget Crispy,9.99
SK013,100 Plus,6.49
SK066,Ali Cafe,8.99
SK079,Dettol Natural,4.99

- Display the information above in a table.
- Display the information above in a table sort by product name in ascending order.
- Add a new product SK023, Johnson PH, 5.99 to the data frame and display the information in a table sort by product name in ascending order.
- Display all rows where product price more than 8.00.
- Display the product with maximum price and minimum price.
- Count the number of items where the product name begins with "A"