***Tutorial 4– Control and Loop Statements***

1. Use proper control and loop statement to write a program to find the maximum of 5 integers received from the operator. The output should be as follows:

**Sample input-output**

Number 1: 8

Number 2: 12

Number 3: 5

Number 4: 22

Number 5: 17

[1] "The maximum value is: 22"

**Hint: Use readline and as.integer functions. For example, val= as.integer(readline(prompt = "Number 1:"));**

1. Use proper control and loop statement to write a program to calculate the product of 10 integers received from the operator. If a negative value is entered ignore it. The output should be as follows:

**Sample input-output**

Please enter an integer: 2

Please enter an integer: 5

Please enter an integer: 4

Please enter an integer: -1

[1] "Total (product): 40"

1. Using a switch statement, write a program to prompt the user to choose their favourite programming language. Choose 1 for C, 2 for Java, and 3 for VB.Net. Display the name of the programming language to the screen when they make the selection.

**Sample input-output**

[1] "Please choose your favourite programming language:"

[1] "1 C"

[1] "2 Java"

[1] "3 VB.Net"

Please enter an integer between 1 and 3: 2

[1] "Your favourite programming language is Java"

1. Write a program to find the summation of n numbers stored in a vector using for, while, and repeat statements.
2. Write a program to find the summation of the numbers stored in the first column in a matrix using for, while, and repeat statements.

**Take home exercise:**

A scientist analyzed in an experiment the influence of curing temperature (variable temp) on the breaking strength (variable breaking) of three alloys (variable alloy). He had four ovens in which he simultaneously tested three alloys. He repeated his experiment on three different days (variable day).

Get the data by using following commands in R:

url <- "http://stat.ethz.ch/Teaching/Datasets/WBL/legierung.dat"

data <- read.table(url, header = TRUE)

DO NOT USE table function when answering these questions.

a) Which curing temperatures did the scientist use? **Hint: Store the unique values in a vector.**

b) Construct a new variable breaking.class (bind it to the data) which indicates by the levels "low" or "high". If the breaking strength is greater than the mean breaking strength then the value is high otherwise the value is low. **Hint: Use the function ifelse().**

c) What is the number of breaks which occur below the mean breaking strength?

d) If the cumulative breaking strength exceeds 250, the scientist needs to calibrate the measurement system newly. How many measurements of breaking strength were done before the first calibration? You can assume that the order in the data represents the order in which the scientist measured the breaking strength. **Hint: Count once by using a while-loop and once using a for-loop.**