Data Science and R – Lab 3

Use the **Editor** panel to type your R code and work out the code/output of the following questions.

1.`# Vectors subsetting and logical operations`

i) Create a vector `tento1` that stores the values 10 to 1, i.e. `10 9 8 .. 1`

Code: _____

ii) Get the 7th to 10th element of the vector `tento1` (Use subsetting `[]`)

Code: _____

Output: _____

iii) Check if the 7th element is smaller than 3. (Use logical operator `<`)

Code: _____

Output: _____

iv) Check if the 5th element is a multiple of 3. (Use logical operator `%%`)

Code: _____

Output: _____

2.`# Vectors practical question`

In a survey about a course, you asked 12 people who attended the course how satisfied they were with the course (Bad 1-10 Best). This is what you got: `8,5,9,3,-1,7,2,0,6,8,999,-1`

i) Create a vector `survey` to store these values

Code: _____

ii) Create another vector `valid_values` to store the valid values of the survey, i.e. `1` to `10`. Any other values apart from these should not be in the vector `valid_values` (Hint: use subsetting `[]` and the logical operator `%in%`). The vector `valid_values` should contain `8 5 9 3 7 2 6 8`

Code: _____

iii) Create another vector `invalid` to store the value `TRUE` for any element that is NOT valid and `FALSE` for any element that is valid, i.e. anything that is in 1 to 10. (Hint: Try removing the subsetting and add another logical operation). The vector `invalid` should contain `FALSE FALSE FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE TRUE TRUE`

Code: _____

iv) Convert any invalid values in `survey` to `NA`. (Hint: use `invalid` to subset survey)

Code: _____

```
3) # Matrices
```

i) Consider the following R code (create these vectors in RStudio)

```
> x <- 1:4
> y <- 5:8
> z <- 9:12
Observe the different outputs using cbind() and rbind()
cbind(x,y,z)   Number of rows:____ Number of columns____
rbind(x,y,z)   Number of rows:____ Number of columns____
```

ii) How would you create a matrix from 1 to 20 with 4 rows and 5 columns, with the first row containing `1 2 3 4 5,` second row `6 . . . 10,` and 4th row containing `16 . . . 20`? You may use `cbind(), rbind()` and `matrix()`.

```
Code: _____
```

```
4) Matrix creation and indexing.
```

i) Using `cbind()` create a 8x4 matrix `ttm` using the following steps:

The first column is `x=1:8`

The next four columns are `x+2, 2*x` and `x^2`

```
Code: _____
```

ii) What is the entry in row 6, column 4 of `ttm`?

```
Code: _____
```
```
Output: _____
```

iii) What is the sum of the 3rd row of `ttm`? Use function `sum()`

```
Code: _____
```
```
Output: _____
```

iv) What is the mean of the 3rd column of `ttm`? Use function `mean()`

```
Code: _____
```
```
Output: _____
```

v) Get the summary of `ttm`. Use function `summary()`. Check if the mean of the third column from `summary()` matches the result given by `mean()` in iv)