Department of Statistics
2020/21 – Semester II

STA272 – STATISTICAL COMPUTING

Assignment 2

Due: 08/MAR/20 **Time: 12h00**

Instructions:

- All of your work must be typeset using `Rmarkdown` and submitted online through the course's blackboard shell.
- Any work submitted late would be penalized as follows:
  - any work submitted before midnight of the due date would attract a penalty of up to 10%
  - any work submitted a day late would attract a penalty of up to 25%
  - any work submitted two days late would attract a penalty of up to 50%
  - otherwise you'll be awarded a zero mark.
- You are encouraged to discuss the assignment with others but at the end you submit your individual work.
- Any form cheating is not allowed and plagiarized work will be awarded a zero mark.

---

1. Use the `rep()` function and a vector, `ab = c("a", "b")` to create the following character vectors.

```
[1] "a" "b" "a" "b" "a" "b" "a" "b"
```

```
[1] "a" "a" "a" "a" "b" "b" "b" "b"
```

```
[1] "a" "a" "b" "b" "a" "a" "b" "b"
```

2. The following are the highest level of education for the parents of some 20 STA272 students:

```
Tertiary Primary None BGCSE JC JC BGCSE Tertiary JC None BGCSE
BGCSE Primary Tertiary JC BGCSE Tertiary BGCSE Primary Tertiary
```

   (a) Create an ordered factor object in `R` which contains the parents' highest level of education.

   (b) Use `R` to compute the total number of students whose parents' highest level of education are BGCSE or above. `Hint:` use `as.numeric()` function.

3. Solve the following system of linear equations using `R`.

$$\begin{aligned} 2x + y + 2z + 2t &= 2 \\ x - y + 2z + t &= 6 \\ 4x + 3y + 3z + 3t &= 1 \\ 3x + y - 2z + 4t &= -7 \end{aligned}$$

4. Suppose you are tasked with creating email addresses and default passwords for first year students.

   (a) Input the following names, surnames and student IDs as individual vectors in R.

Names	Surnames	Student ID
KABO	MALOME	202001428
DAVID	APRIL	202000090
LERATO	SEBAGA	202000178
MMABATHO	KGOSI	202005533

   (b) The `strsplit()` function in `R` is used to split the elements of a character vector into substrings according to your preference. Use this function to split the names, surnames and IDs of the students to create the default email password made up first 3 letters of their names and surnames and the last 4 numbers of their student numbers. For example, the first student password would be `KABMAL1428`.

   HINT: `strsplit()` produces a `list` object and to convert it into a character vector use the function `unlist()`.

5. Create the following vectors in `R` for all the courses you are currently registered for this semster

   `subject`: the first three letters of your subject (e.g. STA for Statistics)
   `code`: the course code numbers of your classes this semester (e.g. 272)
   `CA`: your expected CA mark
   `EXM`: your expected exam mark

   Now using the vectors created above, create a data frame, named `schedule` which consists of the following two variables:

   (a) `coursecode`: course code combining the first three letters of your subject and its code (e.g `STA272`)

   (b) `FM`: a weighted average of the `CA` and `EXM` with ratio of `40:60` respectively.