UNIVERSITY OF MALAYA

EXAMINATION FOR THE DEGREE OF MASTER OF DATA SCIENCE

ACADEMIC SESSION 2021/2022 : SEMESTER II

WQD7004 : PROGRAMMING FOR DATA SCIENCE

LAB TEST

26 May 2022 Time: 1 Hour

INSTRUCTIONS TO CANDIDATE:

Answer **ALL** questions (10 marks)

(This question paper consists of 2 questions on 3 printed pages)

1. Write R scripts that used to calculate mortgage loan for a year. The program will create a data frame which show the equal total payment plan. You can define the value of P=Principal, i=yearly interest rate in % and N=total number of months. Given the formula as below. Use the last five number of your matric number as principal, example if the matric number is **S2010000, P=10000**.

$$M = (P*\frac{i}{12*100})/(1-(1+\frac{i}{12*100})^{-N})$$

M = Monthly payment
P = Principal
i = yearly interest rate in %
N = total number of months

$$C_n = M * (1+\frac{i}{12*100})^{-(1+N-n)}$$

$$L_n = M - C_n$$

$$R_n = L_n/\frac{i}{12*100} - C_n$$

C = Principal portion due
n = month under consideration
L = interest due
R = remaining principal balance due

P<-10000

i<-4

N<-12

Example Output

	Month	Monthly_Payment	Principal	Interest	Unpaid_Balance	Total_Interest
1	1	851.5	818.17	33.33	9181.83	33.33
2	2	851.5	820.89	30.61	8360.94	63.94
3	3	851.5	823.63	27.87	7537.31	91.81
4	4	851.5	826.37	25.12	6710.94	116.93
5	5	851.5	829.13	22.37	5881.81	139.30
6	6	851.5	831.89	19.61	5049.92	158.91
7	7	851.5	834.67	16.83	4215.25	175.74
8	8	851.5	837.45	14.05	3377.80	189.79
9	9	851.5	840.24	11.26	2537.56	201.05
10	10	851.5	843.04	8.46	1694.52	209.51
11	11	851.5	845.85	5.65	848.67	215.16
12	12	851.5	848.67	2.83	0.00	217.99

(6 marks)

2. Create a R function named **checkString** that return the number of letters and the number of digits of the argument. Use your matric number as the argument value example if the matric number is **S2010000.** The argument value is **"Matric : S2010000"**

   Example Output

   checkString("Matric : S2010000")

```
The argument is  Matric : S2010000
 The number of letters are  7
 The number of digits are  7
```

   (4 marks)

   Create a **matricNumber.r** file, example **S2010000.r.** Copy your answer (question 1 and 2) to the file. Then, submit your answer using the submission link below:

   https://docs.google.com/forms/d/e/1FAIpQLSeHdLTlHy3_GotA38vMxKLQVm7WAYQLGsn0el-55-xTzLan1g/viewform?vc=0&c=0&w=1&flr=0&usp=mail_form_link

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