WIX1002 Fundamentals of Programming
Lab 4: Flow of Control (Repetition)

1. Write a program that accepts an integer from user. Then, display its entire factors in increasing order.

```
Enter an Integer: 24
The factors are: 1, 2, 3, 4, 6, 8, 12, 24
```

2. Write a program that accepts an integer n from user and then sum the following series.

   $1 + (1+2) + (1+2+3) + \ldots + (1+2+3+\ldots+n)$

3. Write a program that calculates the minimum, maximum, average and standard deviation (s) of the exam score in a subject. The program will accepts the score and quit if negative score is enter. A sample output is given below.

$$s = \sqrt{\dfrac{\Sigma X^2 - \dfrac{(\Sigma X)^2}{N}}{N-1}}$$

```
Enter a score [negative score to quit]:75
Enter a score [negative score to quit]:34
Enter a score [negative score to quit]:58
Enter a score [negative score to quit]:12
Enter a score [negative score to quit]:96
Enter a score [negative score to quit]:-1
1095.0
Minimum Score: 12
Maximum Score: 96
Average Score: 55.00
Standard Deviation: 33.09
```

4. Write a program that ask user to enter the year and the first day of the year (0 for Sunday, 1 for Monday, ... , 6 for Saturday). Display the calendar for May and August.

5. Write a simple two players dice game. Each player will take turns to roll a dice. The first players that reach more than 100 points win the game. If the player rolls a 6, the player will score 6 points and has the chance to roll again.

6. Write a program that generates a non-negative random integer. Display the number of digits in the integer.

7. Write a program that used to calculate mortgage loan. The program will create the amortization table with equal total payment plan. The following are the formula and the sample output.

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

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

M

```
Enter principal amount: 10000
Enter interest in %: 4
Enter total number of month(s): 12
Month     Monthly Payment     Principal     Interest     Unpaid Balance     Total Interest
1                  851.50        818.17        33.33             9181.83              33.33
2                  851.50        820.89        30.61             8360.94              63.94
3                  851.50        823.63        27.87             7537.31              91.81
4                  851.50        826.37        25.12             6710.94             116.93
5                  851.50        829.13        22.37             5881.81             139.30
6                  851.50        831.89        19.61             5049.92             158.91
7                  851.50        834.67        16.83             4215.25             175.74
8                  851.50        837.45        14.05             3377.80             189.79
9                  851.50        840.24        11.26             2537.56             201.05
10                 851.50        843.04         8.46             1694.52             209.51
11                 851.50        845.85         5.65              848.67             215.16
12                 851.50        848.67         2.83                0.00             217.99
```

C   L   R

8. Write a program that generates the first n prime number. n is an random integer within 0 to 100.