



Programming for Engineers

Course ID: EE058IU

Lab 2

Looping

Full name + Student ID:

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Class:

Group:

Date:



I. Objectives

Use the while, for, do...while repetition statement to execute statements in a program repeatedly, identify between counter-controlled and sentinel-controlled repetition, learn structured programming, use increment, decrement, assignment operators.

II. Pre-Lab Preparation

Students are required to review theory of the topics before the lab time.

III. In-Lab Procedure

Exercise 1

Write a C program that reads 10 integers. The program should count the number of positive and negative values among 10 inputs. Print them on the screen. (Use iteration statements). Zero is neither a positive or a negative number.

Output:

Enter number 1: 16

Enter number 5: -21

Enter number 9: 42

Enter number 2: -7

Enter number 6: -15

Enter number 10: -37

Enter number 3: 23

Enter number 7: -33

Enter number 4: 49

Enter number 8: 54

Number of positive: 5

Number of negative: 5

Exercise 2

Write a C program that reads a student grade which is a character. The program should print the classification based on the grade as:



Grade	Classification
A	Excellent
B	Good
C	Fair
D	Average
F	Weak
Other characters	Invalid

After showing the Classification, the program should ask the user to continue to read another grade or not. by choosing yes ('y') or no ('n'). If yes, continues, otherwise, prints "Exit program..."

Hints: Use *switch* Multiple selection

Output:

Enter a grade: B

Good!

Do you want to continue? y

Enter a grade: Y

Invalid. Enter a grade: D

Average!

Do you want to continue? n

Exit program...

Exercise 3

Write a C program to calculate the sum of series:

$$x - x^3 + x^5 - x^7 \dots$$

The user should input the value for x and the number of terms

For Example

Output:

Input the value of x: 2

Input number of terms: 5

The sum of series: 410



Exercise 4

Write a C program to calculate the factorial of a positive number.

The factorial can be described: $n! = 1 \times 2 \times 3 \dots n$

Note: Do not use recursion function. Use iterations instead.

Output:

Enter a positive integer: 4

Factorial of 4= 24

Exercise 5

Write a C program to convert a Binary number to Decimal number using iterations.

Program should allow user to try again or to stop the program.

Output:

Enter binary value: 1010

Decimal value: 10

Exercise 6

Write a C program that Program to generate a “mystery” number by the computer, that is a random number from 1 to 100. Then, the user will guess this number by prompting a value.

There are three possible responses:

1. Excellent! You guessed the number!
2. Too low. Try again...
3. Too high. Try again...



The game ends when the user guesses the correct number. After that, let the user decide to replay or not by choosing yes ('y') or no ('n')

Hint: use `srand()` and `rand()` functions to generate a random number

Output:

I have a number between 1 and 100.

Can you guess my number?

Please type your first guess...

7

Too low. Try again...

50

Too high. Try again...

45

Too high. Try again...

42

Too high. Try again...

40

Excellent! You guessed the number!

Would you like to continue (y or n)?

n

Game ends here...

Exercise 7

Write a C program that Program to calculate the $\sin(x)$ which is described in series as belows:

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots \quad \text{where } x \text{ is angle in radian}$$

The user should input the value for x and the number of terms

Tips: take a reference from Exercise 3 and 4



For Example

Output:

Enter the value for x : 0.52

Enter the value for n : 5

The value of $\sin(0.52) = 0.4969$

THE END