Assignment No 1

Important Note:

- You will create one word document (doc/docx) file which will contain all of the pseudocodes and flowcharts for each question. The document will have your student id i.e., 1373101.docx.
- Each code file will contain only one question and the file name should be "Problem7.c", "Problem8.c" and so on.
- Place all of your code files and word document in one folder which should be named as your student id i.e., 1373101.
- Zip the folder and upload on google classroom before the deadline i.e., one zipped file per student.
- Last Date for Submission: **December 2, 2022 (11:59 PM)**
- Assignment will be marked as 0 if:
  - Submitted late.
  - The submitted assignment does not open or file is corrupted or cannot be compiled.
  - Assignments submitted via any medium except for Google Classroom.
  - Copied amongst students or from another source.

Problem-1 **(2 Points)**

Write a pseudocode and draw flowchart for a problem which takes an integer from the user and prints its factors series and the sum of that series.

Sample Input: 10

Sample Output:
Factors of 10 are: 1, 2, 5, 10
Sum of series is: 18

Problem-2 **(2 Points)**

An integer is said to be perfect if its aliquot sum equals the number itself. An aliquot sum is the total of a number's appropriate divisors other than itself. For instance, the perfect number is 6, which has the divisors 1, 2, and 3. The total of the aliquots is 1 + 2 + 3 = 6.
Write a pseudocode in which user takes an integer and checks whether this number is perfect or not and displays the message accordingly.

Sample run:
Enter a number
5
"5 is not a perfect number."
Enter a number
6
"6 is a perfect number".

Problem-3 **(2 Points)**

A steel company hires you to find their product efficiency. They have set certain conditions on which you have to define a Grade. A certain grade of steel is graded according to the following conditions:

a) Hardness must be greater than 50
b) Carbon content must be less than 0.7
c) Tensile strength must be greater than 5600

The grades are as follows:

- Grade is A if all three conditions are met
- Grade is A- if conditions (a) and (b) are met
- Grade is B if conditions (b) and (c) are met
- Grade is B- if conditions (a) and (c) are met
- Grade is C if only one condition is met
- Grade is C- if none of the conditions are met

Draw a flowchart, which will ask the user to provide hardness, carbon content and tensile strength of the steel under consideration and then display the grade of the steel.

Sample input:
Hardness is: 60
Carbon content is: 0.9
Tensile strength is: 6000

Sample output:
Grade is B-

Problem: 4 **(2 Points)**

Draw a flowchart of a system that reads temperature in Centigrade and display a suitable message according to temperature state below:

- Temp < 0 then Freezing weather
- Temp 0-10 then Very Cold weather
- Temp 10-20 then Cold weather
- Temp 20-30 then Normal in Temp
- Temp 30-40 then It's Hot
- Temp >=40 then Its Very Hot

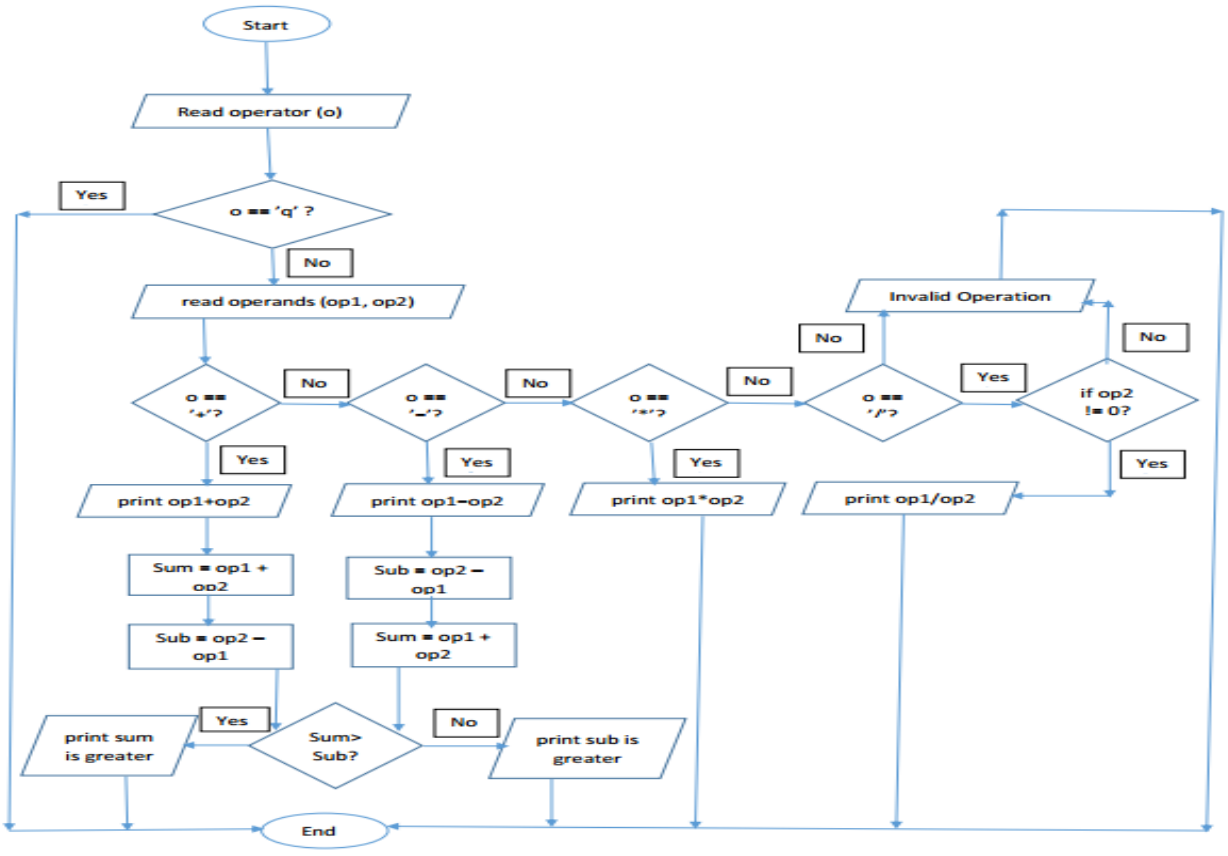
Problem: 5 **(2 Points)**

Draw a flowchart of the following pseudocode:

```
Pseudocode
If Purchase < 1000 Then
        If LastPayment < 30 Then
                If Balance < 1000
                        Print "Credit Ok"
                Else
                        Print "Refer to
                        Credit Dept"
                Endif
        Else
                If Balance < 1000 Then
                        Print "Credit Ok"
                Else
                        Print "Credit
                        Denied"
                Endif
        Endif
Else
        If Balance < 1000 Then
                Print "Refer to Credit
                Dept"
        Else
                Print "Credit Denied"
        Endif
Endif
```

Problem: 6 **(2 Points)**

Convert the below flow chart into Pseudocode



Problem: 7 **(2 Points)**

Covid'19 vaccination has become a mandatory requirement for many things such as traveling, bank account opening, admissions in higher educational universities, and many more. Develop a C - program that facilitates the hospital in determining which person needs to be vaccinated based on age and underlying disease. The program should run for N persons and perform the followings: (N should be taken as a user input).

I. if age is greater than or equal to 18 and person belongs to the Urban area of a city then program should display the following message:

Eligible for the vaccine. Kindly proceed for the vaccination

II. if age is less than 18 and person to the Rural area of a city then program should display the following message:

Not Eligible for the vaccine. Kindly wait for the vaccination

Problem: 8 **(2 Points)**

Alice and Bob want to exchange the n- digits message on the internet, but they want to ensure the security. They went to a cyber security specialist Edwin for the solution. Edwin listened to the requirement of the clients and proposed a scheme for cryptography, which is mentioned in following points

1. The algorithm would reverse the message
2. After reverting the message, it would determine an alphabetic character against the digit. For example, for 0 it would be A, for 1 it would be B, for 2 it would be C, for Z it would be 25.

Write a C - program for the above cryptographic algorithm using loops in C for Edwin.
The samples are like:

Input String	Cypher Text
1546	GEFB
7777	HHHH
5555	FFFF
1234	EDCB

Also provide the solution for decryption the message. (System should ask user for encryption and decryption at the start of the program)

Problem: 9 **(2 Points)**

Write a C - program which takes an input from user and prints a diamond of the equivalent value.

Input:

5

Output:

```
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *
```

Input:

3

Output:

```
  *
 ***
*****
 ***
  *
```

Problem: 10 **(2 Points)**

Write a C - program to print the first 10 Fibonacci numbers. Each Fibonacci number is the sum of the two preceding ones. The sequence starts out 0, 1, 1, 2, 3, 5, 8, ...