CL-1002
Programming Fundamentals
Lab Assignment #1

Objectives:

1. Understanding IDE.
2. Practicing Basic Programming using if, else-if and nested if.
3. Practicing Basic Programming using switch-case, compound statement and ternary operator.
4. Practicing Basic Programming using while loop, do-while and for loop.

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. Solve your tasks in same sequence as given in lab manual.
2. First think about statement problems and then write your program.
3. Write Program in C compiler/IDE and save source file **for each program.**
4. Do not copy from any source otherwise your tasks will not accept.
5. Complete your lab **within given Time Slot**. Late submission only accepted with at least 20% deduction (even a single minute late).
   - Submission deadline for CS – 11:30 am
   - Submission deadline for SE – 04:30 pm
6. Add your source code in this **word document (take screen shots of code + output)** + Make one **ZIP file of your all source codes**.
7. Please submit your **Both files** with this naming convention ROLLNO_SECTION_LABNO.
8. Submit your lab on Google Classroom.

Sample codes:

```
#include <iostream>
using namespace std;

int main() {
 int a=1, b=1;
for (a=1; a<=5; a++)
       {
       for (b=1; b<=5; b++)
       {
       cout<<"*";
       }
       cout<<endl;
       }

return 0;
}
```

```
#include <iostream>
using namespace std;

int main() {

int a=1, b=1;
for (a=1; a<=6; a++)
       {
       for (b=1; b<=5; b++)
       {
       cout<<a*b<<"\t";
       }
       cout<<endl;
       }

    return 0;
```

Problems

1. Write a C++ code that display the following patterns (nested loop): (3)

a)

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

b)

```
5    10   15
20   25   30
35   40   45
50   55   60
```

c)

```
1  2  3  4  5
2  4  6  8  10
3  6  9  12 15
4  8  12 16 20
5  10 15 20 25
6  12 18 24 30
```

2. Write a C++ code that take a number from user and display its table in reverse order: (1)

```
Number = 8
8*10=80
8*9=72
…
…
8*2=16
8*1=8
```

3. Write a C++ that ask user to enter a positive integer and check whether it is prime or not and repeat this process until user enters any negative number. (1)

Prime number - a number that is divisible only by itself and 1 (e.g. 2, 3, 5, 7, 11)

4. Write a C++ code that display the perfect numbers between 1 to 500:

perfect number, a positive integer that is equal to the sum of its proper divisors

The perfect numbers between 1 to 500 are 6,28 and 496 (1)

5. Write a C++ program to find the sum of a digit of a given number, number is taken from user (using loop) number = 3124, output = 10 (1)

6. Write a C++ program that randomly generates an integer greater than or equal to 0 and less than 1000. The program then prompts the user to guess the number. If the user guesses the number correctly, the program outputs an appropriate message. Otherwise, the program checks whether the guessed number is less than the random number. If the guessed number is less than the random number generated by the program, the program outputs the message "Your guess is lower than the number. Guess again!"; otherwise, the program outputs the message "Your guess is higher than the number. Guess again!". The program then prompts the user to enter another number. The user is prompted to guess the random number until

the user enters the correct number. (2)

7. Write a C++ code that display the sum of the series:

$x + x^2 + x^3 + x^4 + x^5$ ……. n, where x and n are user defined numbers. (2)

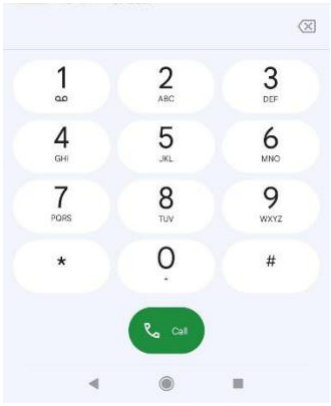
8. Alia is starting a new cosmetic and clothing business and would like to make a net profit of approximately 10% after paying all the expenses, which include merchandise cost, store rent, employees' salary, and electricity cost for the store. She would like to know how much the merchandise should be marked up so that after paying all the expenses at the end of the year she gets approximately 10% net profit on the merchandise cost. Note that after marking up the price of an item she would like to put the item on 15% sale. Write a program that prompts Alia to enter the total cost of the merchandise, the salary of the employees (including her own salary), the yearly rent, and the estimated electricity cost. The program then outputs how much the merchandise should be marked up so that Alia gets the desired profit. (2)

9. Write a program that mimics a calculator. The program should take as input two integers and the operation to be performed. It should then output the numbers, the operator, and the result. (For division, if the denominator is zero, output an appropriate message.) Some sample outputs follow: (2)

3+4=7
13 *5=65
25 /5=5
20 –10=10
20 / 0 = error (invalid input)

10. The following program reads the letter codes A to Z and prints the corresponding telephone digit (2-9). This program uses a sentinel-controlled while loop. To stop the program, the user is prompted for the sentinel, which is #. Suppose when user enter A or B or C then it corresponds to 2.

Note: Phone number exclude 1 and 0. (2)



11. Write a C++ code that shows the average, minimum and maximum marks of students in a class. Your program can take total number of students, total number of subjects. And at the end

marks of each subject. (3)

Total_students = 2 (user define)
Total_subjects = 5 (user define)

Student1	Student2
52	63
88	55
45	65
87	22
100	99
Average = 74.4	Average = 60.5
Maximum = 100	Maximum = 99
Minimum = 45	Minimum = 22

12. When you borrow money to buy a house, a car, or for some other purpose, you repay the loan by making periodic payments over a certain period of time. Of course, the lending company will charge interest on the loan. Every periodic payment consists of the interest on the loan and the payment toward the principal amount. To be specific, suppose that you borrow $1000 at the interest rate of 7.2% per year and the payments are monthly. Suppose that your monthly payment is $25. Now, the interest is 7.2% per year and the payments are monthly, so the interest rate per month is 7.2/12 = 0.6%. The first month's interest on $1000 is 1000 * 0.006 = 6. Because the payment is $25 and interest for the first month is $6, the payment toward the principal amount is 25 – 6 = 19. This means after making the first payment, the loan amount is 1000 – 19 = 981. For the second payment, the interest is calculated on $981. So, the interest for the second month is 981 * 0.006 = 5.886, that is, approximately $5.89. This implies that the payment toward the principal is 25 – 5.89 = 19.11 and the remaining balance after the second payment is 981 – 19.11 = 961.89. This process is repeated until the loan is paid. Write a program that accepts as input the loan amount, the interest rate per year, and the monthly payment. (Enter the interest rate as a percentage. For example, if the interest rate is 7.2% per year, then enter 7.2.) The program then outputs the number of months it would take to repay the loan. (Note that if the monthly payment is less than the first month's interest, then after each payment, the loan amount will increase. In this case, the program must warn the borrower that the monthly payment is too low, and with this monthly payment, the loan amount could not be repaid.) (4)

"First solve the problem, then write the code" – ...

- Submission deadline for CS – 11:30 am
- Submission deadline for SE – 04:30 pm

Best of Luck