



CL-1002

Programming Fundamentals

Objectives:

1. Understanding Visual Studio 2015
2. Practicing user defined function
3. Pass by value
4. Semester Project

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.

- Create separate header files for your functions.

```
headerfile.cpp  headerfile.hpp  main.cpp  [X]
Project4  (Global Scope)
1  #include<iostream>
2  #include "headerfile.hpp"
3  using namespace std;
4
5  int main() {
6      int a = 5;
7      cout << square(a) << endl;
8      system("pause");
9      return 0;
10 }
```

```
headerfile.cpp  headerfile.hpp  [X]  main.cpp
Project4  (Global Scope)
1  #ifndef headerfile
2  #define headerfile
3  int square(int a);
4
5
6  #endif
```

```
headerfile.cpp  [X]  headerfile.hpp  main.cpp
Project4  (Global Scope)
1  #include "headerfile.hpp"
2
3  int square(int a) {
4      int sqr;
5      sqr = a * a;
6      return sqr;
7  }
8
```



Problems

1. Write a value-returning function, `isVowel`, that returns the value `true` if a given character is a vowel and otherwise returns `false`. (2 Marks)
2. Write a C++ program that input marks from students and pass marks to function, then function should return the grade s as per below mentioned criteria:
80-100 Grade A
70-80 Grade B
60-70 Grade C
55-60 Grade D
50-55 Grade E
Otherwise Grade F (2 Marks)
3. Write a C++ function that accept two numbers and swap them. Display numbers before and after swapping in `main()`. (3 Marks)
4. Write a C++ program that convert decimal number to binary using function. (3 Marks)
5. Write some user-defined functions in C++ for each separate tasks, `reverseDigit`, `countDigit` and `largestDigit` that takes an integer as a parameter and returns the required output.
 - `reverseDigit` returns the input digit in reverse order. For example, the value of `reverseDigit(12345)` is 54321; the value of `reverseDigit(5600)` is 65; the value of `reverseDigit(7008)` is 8007; and the value of `reverseDigit(-532)` is -235.
 - `countDigit` return the total number of digits presents init. For example, the value of `countDigit(12345)` is 5. Total count 5.
 - `largestDigit` returns the largest digit present in it. For example, the value of `largestDigit(1258)` is 8. (3 Marks)
6. During the tax season, every Friday, the J&J accounting firm provides assistance to people who prepare their own tax returns. Their charges are as follows:
 - a. If a person has low income (≤ 25000) and the consulting time is less than or equal to 30 minutes, there are no charges; otherwise, the service charges are 40% of the regular hourly rate for the time over 30 minutes.
 - b. For others, if the consulting time is less than or equal to 20 minutes, there are no service charges; otherwise, service charges are 70% of the regular hourly rate for the time over 20 minutes.(For example, suppose that a person has low income and spent 1 hour and 15 minutes, and the hourly rate is \$70.00. Then the billing amount is $70.00 \times 0.40 \times (45 / 60) = \21.00 .) Write a program that prompts the user to enter the hourly rate, the total consulting time, and whether the person has low income. The program should output the billing amount. Your program must contain a function that takes as input the hourly rate, the total consulting time, and a value indicating whether the person has low income. The function should return



the billing amount. Your program may prompt the user to enter the consulting time in minutes. (4

Marks)

7. During winter when it is very cold, typically, everyone would like to know the windchill factor, especially, before going out. Meteorologists use the following formula to compute the windchill factor, W:

$$W = 35.74 + 0.6215 * T - 35.75 * V^{0.16} + 0.4275 * T * V^{0.16},$$

where V is the wind speed in miles per hour and T is the temperature in degrees Fahrenheit. Write a program that prompts the user to input the wind speed, in miles per hour, and the temperature in degrees Fahrenheit. The program then outputs the windchill factor. Your program must contain at least two functions: one to get the user input and the other to determine the windchill factor.

(4 Marks)

“Programming is not about typing, it’s about thinking” – ...

• ~~Submission deadline for CS – 11:30 am~~

• ~~Submission deadline for SE – 04:30 pm~~

Best of Luck 😊

