



Lab-4 Manual

for

Introduction to Programming (CS200)

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LAB GUIDELINES

- **Make sure you submit the lab before 11:50 AM.** Any late submission will not be graded afterwards. In case of internet connectivity or electricity issues make sure to email your assigned TA before 2:00 PM. **You should email your assigned TA ONLY.**
- For every lab, there will be a folder created on LMS. You must submit your work in the respective folder during the lab time, you and only you are responsible for your submissions.
- You will be allowed to discuss the questions in the first half of the lab session for a few questions. After that, there will be a portion of lab where you cannot converse and must work for yourself. No discussion is allowed in later time period.
- You should do your work with utmost clarity and precision. Do not waste your time trying to do something you do not understand. Ask Lab instructors for help, that is what they are there for.

- Any legitimate cheating case can and will be reported to Disciplinary Committee without any leniency. Plagiarism Software make our task easier.
- Please follow the lab etiquettes and follow code of conduct in the session.
- Do not start Personal chat during your zoom meeting and raise your hands before asking questions.
- **Make separate .cpp files for each question. Naming convention for .cpp files is: YourRollNumber_TaskX.cpp. Before submission, copy all the .cpp files in a folder named LabX_AssignedTAName_YourRollNumber.zip. Submit the .zip file only! (no .rar file submissions). X should be replaced by appropriate number.** Failure to follow the naming convention may lead to deduction of marks.

OBJECTIVES

- Pointers
- Classes

LAB EXERCISES

Question # 1 [Marks: 20]

Est. Time: 30 mins

Create a class complex number which has two parts Real and Imaginary.

Your code should be able to take input of two complex numbers and then return the sum of two complex number.

Sample Output # 1

Sample input:

Input real part = 4

Input imaginary part =2

Input real part = 2

Input imaginary part =5

Output real part = 6

Output imaginary = 7

Marks' Distribution:

- Taking input & showing output in correct format (5)
- Implementing addition (5)
- Create class (10)

Question # 2 [Marks: 30]

Est. Time: 40 mins

Using the concept of Pointers to functions, you need to implement a Search string function. The program takes two char * input from user and searches the occurrences of the smaller word in the larger one.

The function's prototype is mentioned below:

- void compareWords(char *arr1, char*arr2,int start)
- void Search(char * arr1 , char * arr2 , void(*compareWords)(char*, char*,int))

Note: You are free to make helper functions if needed. There is no restriction on uppercase and lowercase letters, you can treat them same. You don't necessarily need to make functions inside classes or structures.

Sample Output # 1

Enter First word:

Abcddeabcahhaabc

Enter Second Word:

Abc

Occurrences:

3

Marks' distribution:

- Search Function properly implemented (15)
- Comparewords Function properly implemented (10)
- Output Format & Main (5)
- Question will carry no marks if Pointers are not implemented

Question # 3 [Marks: 50]

Est. Time: 50 mins

You will find this question to be of great social, medial and academic relevance. In this question, you will be dealing with 2 classes. 1st would be the “person” class with the following members

- status (can take only two value: “home” or “out”)
- verdict (can take only two value: “innocent” or “guilty”)
- faceMask
- handSanitizer
- socialDistancing

You have to decide the appropriate data types for these data members. Apart from these, you have to make a default constructor, parametrized constructor, setters/getters for all the data members as well as four other member functions which are:

- goingOut (sets status to “out” and sets faceMask, handSanitizer and socialDistancing to indicate that the person is out i.e. they have to have these three things “on”)
- comingIn (sets status to “home” and sets faceMask, handSanitizer and socialDistancing to indicate that the person is home i.e. they have to have these three things “off”)
- inTrouble (sets status to “out” and sets faceMask, handSanitizer and socialDistancing in such a manner that any one of them is “off”)
- print (prints the status and the verdict of the person)

NOTE: In these four functions, you have to access the data members ONLY using setters and getters

The 2nd class would be “policePerson” and it would have just one member function:

- setPersonVerdict (this will take a pointer to person class’ object as its parameter. For that person, it will see the status of the person if they are out or at home. If the person is out and from among faceMask, handSanitizer and socialDistancing even one is ‘off’, the policePerson would set the verdict of that person to “guilty”. Otherwise, the person must be declared “innocent”.

In int main(), you have to create an instance of policePerson and 3 instances of person. One person should be at home, one should be out and the third one should be set to be inTrouble. Pass these three persons to the policePerson and print out their status and verdict using the appropriate function

Sample Output # 1

Person 1:

The person is home and innocent

Person 2:

The person is out and innocent

Person 3:

The person is out and guilty

Marks' Distribution:

- Correct skeleton for both the classes: 20
- Accurate use of appropriate datatypes to indicate on/off status for variables: 10
- Fully functional member functions: 10
- Correct output with the right formatting: 10

Question # 3 [Marks: X]

Est. Time: 40 mins

Sample Output # 1

Marks' distribution:

Best of Luck! 😊