

Introduction to Programming

(CS200)

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Inheritance

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# THE INHERITANCE





## CS 200 Lab 10 Spring 2018

### Lab Guidelines

1. Make sure you get your work graded before the lab time ends.
2. You put all your work onto the LMS folder designated for the lab (i.e. "Lab10") before the time of the lab ends.
3. Talking to each other is NOT permitted. If you have a question, ask the lab assistants.
4. The object is not simply to get the job done, but to get it done in the way that is asked for in the lab.
5. Any cheating case will be reported to Disciplinary Committee without any delay.

**NOTE: Define a class interface separately and its methods separately. Do not write inline code.**

Marks: \_\_\_\_\_ Name: \_\_\_\_\_ Roll #: \_\_\_\_\_

Task 1	1	2	3	4	5			Total
	10	20	10	10	20			70

Task 2	1	2						Total
	20	10						30

Let's Begin.....

Total marks Obtained

/100

## Task 1:

(70)

### ROCK-PAPER-SCISSOR

A: Implement a class called **Tool**.

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1. It should have an integer field called **strength** and a *char* field called **type**. You may make them either private or protected.
2. It should also contain the constructor(s), destructor as well as getters and setters for **strength** and **type** and a virtual function **fight**.
3. The default value of

B: Create 3 more classes called **Rock**, **Paper**, and **Scissor**, which inherit from class **Tool**. 20

1. The default constructor will initialize the **strength** to 1.
2. Each of these classes will need a parametric constructor which will take in an *int* that is used to initialize the **strength** field.
3. The constructor should also initialize the **type** field using 'r' for Rock, 'p' for Paper, and 's' for Scissors.

C: These classes will also need to define the function **bool fight(Tool)** that compares their strengths in the following way:

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1. Rock's strength is doubled (temporarily) when fighting scissors, but halved (temporarily) when fighting paper.
2. In the same way, paper has the advantage against rock, and scissors against paper.
3. The function **bool fight()** returns true if the original class wins in strength and false otherwise.

D: Write a test function to create objects (dynamic) of derived classes using the pointers of base class and verify the results.

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You can set the strengths as follow:

Scissors:	5
Paper:	7
Rock:	15

E: Create a class called RPSPlay, which allows a human to play the game against the computer.

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1. Your RPSPlay shall have two **Tool \***, one for human and the other for the computer respectively, because it is not known at the start of the game which tool will be selected.
2. The RPSPlay game shall also have three *int* fields to keep track of the number of **human\_sins**, **computer\_wins**, and **ties**.

#### NOTE:

- You may also include any extra auxiliary functions and/or fields in any of these classes.
- Provide overloaded assignment operator for each class.

#### HINT:

- You may need to use random number generator to implement some of the functionality in E.

**STOP AND SHOW YOUR WORK TO THE TA**



### Task 2:

(30)

#### APPOINTMENT BOOK

A: Implement a base class ***Appointment*** and derived classes ***Onetime***, ***Daily***, ***Weekly***, and ***Monthly***.  
(4+4+4+4+4) 20

1. An appointment has a description (for example, “see the dentist”) and a date and time.
2. Create a separate class ***Date*** to store Date and Time.
3. Write getters and setters for the base class.
4. Write appropriate constructors and destructors for all the classes.

B: Write a virtual function ***occurs\_on(int year, int month, int day)*** that checks whether the appointment occurs on that date. 10

1. For example, for a monthly appointment, you must check whether the day of the month matches.
2. Write a test function to fill an array of Appointment\* with a mixture of appointments.
3. Have the user enter a date and print out all appointments that happen on that date.

**STOP AND SHOW YOUR WORK TO THE TA**



## CS 200 Lab 10 Spring 2018

Zip your tasks into one folder with format:

YourRollNo-Lab10

example "**2001001-Lab10**" and upload on LMS before the tab is closed. You will not be given extra time.