Practice 04 (25-11-2020)

Inheritance

Note: Bold yellow highlighted words represent classes and bold italic words represent data members; whereas; bold blue highlighted words represent member functions. Use appropriate function for string input to handle string with multiple words (having spaces in between)

1. Create a base class named **Book**. Data fields include ***title*** and ***author***; functions include those that can **set** and **display the fields**. Derive two classes from the Book class: **Fiction**, which also contains a numeric ***grade reading level***, and **Non_Fiction**, which contains a variable to hold the ***number of pages.*** The functions that **set and display data field** values for the sub classes should call the appropriate parent class functions to **set and display the common fields**, and include **specific code pertaining** to the new sub class fields. Write a main() function that demonstrates the use of the classes and their functions.

2. A **College Course** class includes fields representing ***department***, ***course number***, ***credit hours***, and ***tuition fee***. Its child, **LabCourse**, includes one more field that holds a ***lab fee*** charged in addition to the tuition. Create **appropriate functions for these classes**, and write a main() function that instantiates and uses objects of each class.

3. Create a **Painting** class that holds the ***painting title***, ***artist name***, and ***value***. All Paintings are valued at $400 unless they are **Famous_Paintings**. Include a **display function** that displays all fields. The Famous_Painting subclass overrides the Painting value and sets each Painting's value to $25,000. Write a main() function that declares an array of 10 Painting objects. Store Paintings data in a text file and read title and artist for each of the 10 Paintings. Consider the Painting to be a Famous Painting if the artist is one of the following: Degas, Monet, Picasso, or Rembrandt. Display the 10 Paintings. Place this data in file and read

Title	**Name**
The Desperate Man	Gustave
The Long Winter	Degas
Old Wind From the North	Larson
The Gatekeepers	Rembrandt
Silent Watchers	Picasso
Ray of Hope	Melcher
The still souls	Ritson
Another Day Gone	Linda
Looking Beyond the Present	Monet

4. A point in the x-y plane is represented by its x-coordinate and y-coordinate. Design a class, **Point**, that can store and process a point in the ***x-y plane***. You should then perform operations on the point, such as **setting the coordinates of the point, printing the coordinates of the point, returning the x-coordinate, and returning the y-coordinate**. Also, write a program to test various operations on the point.

5. Every circle has a ***center*** and a ***radius***. Given the radius, we can **determine the circle's area and circumference**. Given the center, we can **determine its position in the x-y plane**. The center of the circle is a point in the x-y plane. Design a class, **Circle**, that can store the radius and center of the

circle. Because the center is a point in the x-y plane and you have designed the class to capture the properties of a point in previous exercise. You must aggregate the class Point. You should be able to perform the usual operations on the circle, such **as setting the radius, printing the radius, calculating and printing the area and circumference, and carrying out the usual operations on the center**. Also, write a program to test various operations on a circle.

6. Every cylinder has a base and height, wherein the base is a circle. Design a class, **Cylinder**, that can capture the properties of a cylinder and perform the usual operations on the cylinder. Derive this class from the class Circle designed in previous problem. Some of the operations that can be performed on a cylinder are as follows: **calculate and print the volume, calculate and print the surface area, set the height, set the radius of the base, and set the center of the base**. Also, write a program to test various operations on a cylinder.