National University of Computer and Emerging Sciences

Lahore Campus

OOP-Lab (CL1004)

Final Exam

Date: June 8th 2024

Course Instructor(s)

All Instructors

All Section(s)

Total Time (Hrs):	**2:30**
Total Marks:	**100**
Total Questions:	**5**

[redacted] Roll No

[redacted] Section

[redacted] Student Signature

Do not write below this line

Attempt all the questions.

- This is an individual Exam and you are supposed to complete it in 02 hours 30 Minutes. Please adhere to the following guidelines:-
- You are in exam conditions, not communication is allowed. If will cancel your paper and mark your absent in case of any problems
- **Understanding is part of this exam, do not ask any questions, if you have confusions, assume things, and write your assumptions, No quires, means no quires. Asking for teacher is not allowed.**
- No extra time will be awarded.
- Submission of exam in the correct folder is your responsibility, if you submit in the wrong folder or submit the wrong file, only you will be responsible and no excuses will be accommodated.
- **Submit a single .cpp file with your role number. Do not submit multiple files, make sure you combine all of your code in a single file and submit only1 cpp file.**
- Please Submit your exam in following folder//cactus1/xeon/Spring 2024/Aqib Zeeshan / yourclass/Section.
- No help from internet is allowed.
- Cheating cases will be reported to DC.

Good luck.

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Q1: **[Marks: 50]**

Declare and implement the *abstract* class **Media**. This class will have a protected member variable **title** (of char * type) to store the title of the media item. Apart from the overloaded constructor, Media class will have a *pure virtual function* **display ()**.

Inherit three classes from the Media class, namely: **Book, Magazine**, and **CD**.

1. The Book class will have ***authorName*** *(char *)* and ***ISBN*** *(char *)* of the book.
2. The Magazine class will have ***monthName*** *(char *)* and ***year*** *(int)* of publication of the magazine.
3. The CD class will have an integer member variable to store its ***capacity*** in MBs.

Add a **Shelf** class to store a list of **Media** items. So, **Shelf** class has ***Items*** *(Media **)*, ***currSize*** *(int)*, ***maxSize*** *(int)* data members. It will have the following functions:

- void insert (Media*);
- void displayContents ();

The overloaded constructor will take an integer value as argument and initialize the **maxSize** to that value, and initialize **currSize** to 0. Constructor will also dynamically allocate an array of **Media*** through the member variable **items**.

Now, implement a main function which should ask the user how many Media items the user wants to create, and declares a **Shelf** object to store those many items. Create a menu on screen on which the user should be asked to enter 1 if he/she wants to create a Book and 2 if he/she wants to create a Magazine, 3 if he/she wants to create a CD, and 4 if he/she wants to print details of objects in the shelf.

1. If choice 1, 2, or 3 has been entered, your program should ask the user for all the attributes necessary for creating that item (Book, Magazine, or CD). Then, that item should be dynamically allocated and passed to insert method of shelf.
2. If the user has entered 4, then details of media items should be displayed by calling the **displayContents ()** function.

Note: Use OOP Concepts carefully.

Q2: **[Marks: 50]**

We have to write C++ implementation of a game "ABC_Game".

The **Game** has one player and enemies (0 to 10).

A **Player** has (x, y) coordinates on screen and a life limit.

An **Enemy** has some (x, y) coordinates on screen and it can Attack the Player.

A **Monster** is an Enemy. If its distance from player is **more than 10 units**, he can attack the player with Gun. After the attack of Monster, the player's life will reduce by 2 and a message "Monster attacked with a Gun" will be displayed.

A **Ninja** is also an Enemy. If its distance from player is **less than 10 units**, he can attack the player with knife. After the attack of Ninja, the player's life will reduce by 1 and a message "Ninja attacked with a knife" will be displayed.

Consider the given UML diagram. Where empty diamonds and triangles represent aggregation and inheritance, respectively. **Your task is to write a C++ program using concepts of Object Oriented Programming, while satisfying the above description of classes. Your program do not have any memory leakage, runtime exceptions and extra memory consumption.**

Note: Use OOP Concepts carefully.