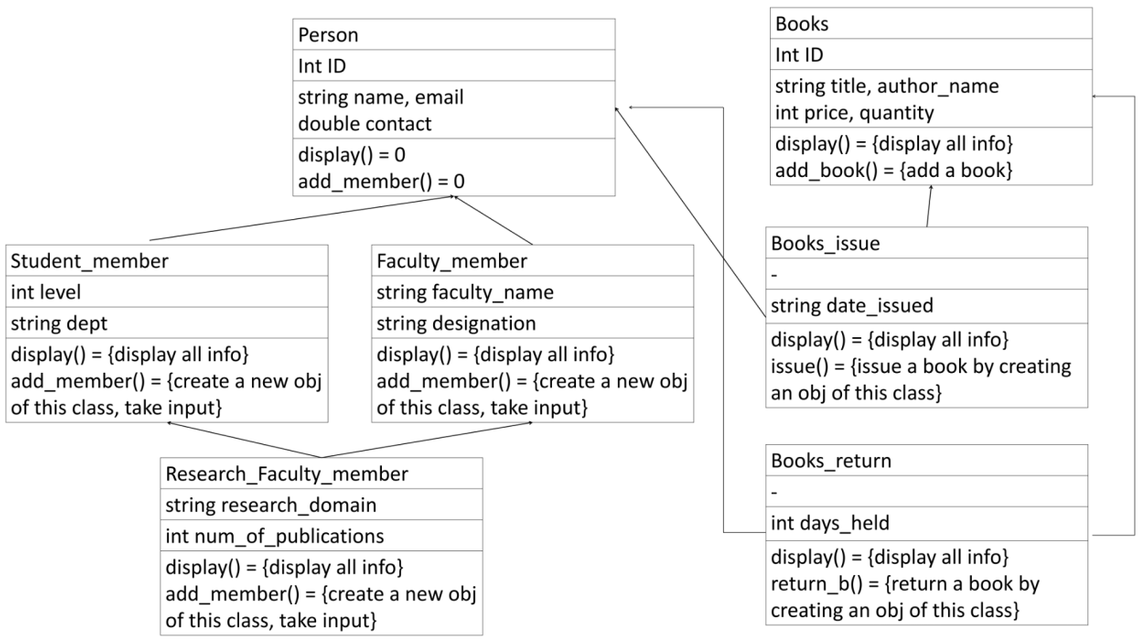
MILITARY INSTITUTE OF SCIENCE AND TECHNOLOGY
Department of Computer Science and Engineering (CSE)
CSE 206: Object-Oriented Programming Language Sessional I

Online 2

Time: 1 Hr 30 min	**Full marks: 35**

Create a file yourID_online2_CSE206.cpp.

Suppose that you are making a library management system. However, due to lack of time, you decided to make it quite simplified. Here's the class structure you came up with for C++ implementation:



Take a look at the inheritance scenario given above. Note that all inheritances are public inheritance unless stated otherwise. The first row is the class name. **The second, third, and fourth rows denote the private, protected, and public members of the class respectively.**

Now, answer the following questions:

1	Implement the scenario depicted above in C++. Remember to write a parameterized constructor and destructor for each base and derived class. The constructor sets values for ALL the member variables. Also, implement methods (class functions) as described in the box.	10
2	Identify **pure virtual functions, abstract class, and diamond problem** in the above scenario. Address them accordingly when you implement the classes.	6

3	Now, write the necessary code so that the appropriate display() function is called when the following code is added to your program.
	`void show_mem_info(Person *p)`
	`{`
	`  p->display();`
	`}`
	`int main()`
	`{`
	`  Faculty_member f;`
	`  f.add_member();`
	`  show_mem_info(&f);`
	`  Student_member s;`
	`  s.add_member();`
	`  show_mem_info(&s);`
	`}`
		4

3	Now, **overload** the following **operators** based on the details in the table given below. **Note that book is an object of Books and book_returned is an object of Books_return.** **Operator** | **Sample Operation** | **Description** **++** | book++ | Increases the quantity of the book by 1. **+=** | book+=5; | Increases the quantity of the book by 5. **-** | book = 5 - book; | decreases the quantity of the book by 5. **N/A** | int fine = book_returned; | if days_held > 30 then fine = (days_held-30) * 3 else fine = 0;	8
7	Now, create a menu in the main function the has the following features. Menu Option | Feature Description 1 Add Member | Asks the user what type of member it is. Then takes input accordingly to create an object of that class. Then appends the info in a file named “member_log.txt” 2 Add Book | Adds a book by taking necessary input from the user. Creates an object and appends the info in a file named “book_log.txt” 3 Issue book | Calls the issue() function of Books_issue to create an object. 4 Return book | Calls the return_b() function of Books_return to create an object. 5 Exit | Closes the program	7