University of Management and Technology

School of Systems and Technology, Department of Computer Science

Assignment 04– Spring 2024

Course Title:	Object Oriented Programming				Course Code:	CC1022	Credit Hours: 4(3,1)
Course Instructor:	Owais Khan				Program Name:	BSCS	
Semester:	2nd	Batch:	FA23-BCS	Section:	V12 & V8	Date:	10-06-2023
Due Date:	**11-06-2024, Tuesday**				Maximum Marks:	**30**	
Student's Name:					Reg. No.		

Important Instructions (To be followed very strictly)

- This is an individual assignment
- Attempt all questions
- Assignment must be handwritten you have to upload pdf on LMS before deadline with .cpp code file.
- The assignment must include all steps involved to solve given questions.
- Dry run each question.
- No submission is allowed after the aforementioned deadline.

Question No 1. [CLO-4] <Bloom Taxonomy – C4: Examine> **Marks [30]**

Examine the following C++ OOP problems and write a solution for a given problem.

Question 1: Templates (15 marks)

Write a C++ program that demonstrates the use of templates. Follow the instructions below:

a) Create a template function called maximum() that takes two parameters of the same type and returns the maximum value between them.
b) In the main() function, demonstrate the use of the maximum() function with different data types (e.g., integers, floating-point numbers, strings).
c) Provide a brief explanation of how templates allow for code reusability and flexibility in handling multiple data types.
d) Extend the program by creating a template class called Pair that represents a pair of values. The class should have two private data members of the same type and provide a member function called getMax() that returns the maximum value between the two data members.
e) In the main() function, create instances of the Pair class with different data types (e.g., integers, floating-point numbers, strings) and demonstrate the use of the getMax() function.

Question 2: Aggregation and Composition (15 marks)

Write a C++ program that demonstrates aggregation and composition. Follow the instructions below:

a. Create a class called Author with the following attributes: name (string), age (integer), country (string).
b. Create a class called Book with the following attributes and methods:
Attributes: title (string), year (integer)
Aggregation relationship: a pointer to an instance of the Author class
Method: getAuthorInfo() (prints the author's name, age, and country)

c. In your program, create an instance of the Author class and an instance of the Book class, demonstrating the aggregation relationship. Call the getAuthorInfo() method to display the author's information.
d. Modify your program to demonstrate a composition relationship, where the Book class has a composition relationship with an instance of the Author class. Update the program accordingly and provide a brief explanation of the changes made.

Guidelines:

Note: Remember to submit your code along with any necessary explanations or documentation.

- Submit a pdf file that will have your code along with the output screens.
- Provide a brief explanation of your approach for each question.
- Give your .cpp source files too.