Higher Diploma in Information Technology

Introduction to Programming (C++)

Year 1 Semester 1 – 2023

Worksheet 11 – Object Oriented Programming Concepts in C++

Question 01

Write a program to provide a simple inventory system for a cloth shop.

a) Include the following private data members (attributes) in your **cloth class.**

Attribute	Data type
ClothNo	integer
Description	char []
NoofClothsAvailable	integer
Price	double

b) Implement a constructor which will accept the **ClothNo, Description, NoofClothsAvailable and price as parameters.**

c) Implement a member function (method) called **makeorder(),** which will accept the **ClothNo and Quantity as parameters**. It should check the availability of the cloths and print a proper message as follows:

```
If the NoofClothsAvailable is less than the Quantity then print
        "Sorry not enough available. Please wait! "
Else
      Reduce the no of cloths ordered from the
NoofClothsAvailable
                Print " Order Placed! "
                Print total price (price * Quantity)
Also check,
          If NoofClothsAvailable is zero then
                  Print "Out of Stock. Cannot Order! "
```

d) Implement a method called **print()** to print the details of a clothes.

e) Write a main program to do the followings.

- Create 3 Objects to store the following details:

Attribute	cloth_1	cloth_2	cloth_3
ClothNo	01	02	03
Description	T Shirt	Shirt	Trouser
NoofClothsAvailable	15	10	0
Price	1250.00	2200.00	3180.00

- Place the following orders by using **makeorder ()** method.

Attribute	cloth_1	cloth_2	cloth_3
Quantity	1	5	2

- Print the details of all the meals using **print ()** method after making the orders.

```
-------Cloth No 01-------
Order Placed!
Total Price: $1250
Cloth No: 1
Description: T Shirt
Number of Cloths Available: 14
-------Cloth No 02-------
Order Placed!
Total Price: $11000
Cloth No: 2
Description: Shirt
Number of Cloths Available: 5
-------Cloth No 03-------
Out of Stock. Cannot Order!
Cloth No: 3
Description: Trouser
Number of Cloths Available: 0
```

Question 02

Design and Implement a Student Management System

Problem Statement:

Create a program to manage student information. The program should include the following features:

a) Define a Student class:

The Student class should have the following private data members (attributes):

Attribute	**Data Type**
StudentID	Integer
StudentName	Character array
EnrollmentYear	Integer
Course	Character array
Semester	Integer
CGPA	Float

b) Implement the Student constructor:

The Student constructor should accept StudentID, StudentName, EnrollmentYear, Course, Semester, and CGPA as arguments and initialize the corresponding data members.

c) Implement the following methods:

- `changeCourse(newCourse)`: This method should allow the student to change their course.
- `updateSemester()`: This method should increment the student's semester by one.
- `ChangeCGPA()` : This method should calculate the student's cumulative GPA based on their semester grades.
- `printDetails()`: This method should print all the details of the student, including StudentID, StudentName, EnrollmentYear, Course, Semester, and CGPA.

d) Write a main program:

- Create two Student objects to store the following information:

Attribute	**Student_1**	**Student_2**
StudentID	1234	5678
StudentName	Alice Smith	Bob Jones
EnrollmentYear	2020	2021
Course	Computer Science	Mathematics
Semester	1	2
CGPA	3.8	3.5

- Change the course of Student_2 to Physics.
- Increment the semester of both students.
- Calculate the CGPA of both students.
- Print the details of both students.

Sample output:

```
Details of Student_1:
StudentID: 1234
StudentName: Alice Smith
EnrollmentYear: 2020
Course: Computer Science
Semester: 2
CGPA: 3.9

Details of Student_2:
StudentID: 5678
StudentName: Bob Jones
EnrollmentYear: 2021
Course: Physics
Semester: 3
CGPA: 3.6
```