National University of Computer and Emerging Sciences

Object-oriented Programming Sessional-I Exam

(CS1002)

Total Time: 1 hr
Total Marks: 30
Total Questions: 03

Date: September 20, 2024

Course Instructor(s)

Syed Zain Ul Hassan

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Roll No Section Student Signature

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Attempt all questions.

CLO # 1 *Discuss knowledge of underlying concepts of object-oriented paradigm like abstraction, encapsulation, polymorphism, inheritance etc.*

Question 1:

Write single-line short answers to the following questions: **[10 min, 1x6 = 6 Marks]**

a) If we add a parameterized constructor, then there is no need for a setter function. Do you agree with this? explain.
Even if we add a constructor, it can only be used once for initialization. For updating the values later, we need a setter function.

b) Why do we need to add a DEFAULT constructor, if it does nothing?
So that we can make object even without passing any values.

c) Why do we need separate setter functions for every data element, we can create a combined setter as well? Discuss.
A combined setter function will create needless dependencies. If we want to update one variable, we must needlessly pass arguments for other variables and must use conditions inside the function.

d) What happens if a constructor is declared private?
We cannot use this constructor for creating objects.

e) How is code hiding different from data hiding?
Code hiding refers to abstracting the function implementations by means of encapsulation while data hiding refers to providing conditional access to variables.

f) What is the size of a class with two int and one char member variables?
4+4+1 = 9 bytes.

CLO # 1: Discuss knowledge of underlying concepts of object-oriented paradigm like abstraction, encapsulation, polymorphism, inheritance etc.

Question 2: **[25 min, 12 Marks]**

Evento has centers in various cities and offers invitation cards printing service to its clients at a reasonable rate. They allow their clients to pick the background color, font color, texture, language to be printed on the card and allow the client to decide if the card has a ribbon or not.

To deliver printed cards to the client, Evento usually keeps track of client first name, contact#, age and address.

Perform the tasks give below:

a) Create classes Evento, Card and Client and declare appropriate variables in them.

```
class Evanto {
string city;
Client c;
};

class Client {
string firstName, contact, address;
int age;
};

class Card {
string bgColor, ftColor, texture, language;
bool hasRibbon;
};
```

b) Create parameterized constructors for Client and Card such that no client aged 18 and under is allowed to buy a card.

```
Client (string fName, string contact, string address, int age) {
if (age <= 18)
        cout << "Cannot purchase card";
else {
        string color, font, txt, lang;
        cin >> color >> font >> txt >> lang;
        Card myCard (color, font, txt, lang);
        }
}

Card (string bgColor, string ftColor, string texture, string language) {
cout << "Creating card";
this->bgColor = bgColor;
this->ftColor = ftColor;
this->texture = texture;
this->language = language;
}
```

CLO # 1: Discuss knowledge of underlying concepts of object-oriented paradigm like abstraction, encapsulation, polymorphism, inheritance etc.

Question 3: **[25 min, 12 Marks]**

Geass Corporation sells robots of various sizes (in ft) to its customers. In their sales records, each robot sold is maintained along with its unique product id, size, color and price.
The price for any type of robot is only PKR 5000.
To purchase the robot, each customer places his order by requesting the Geass Corp. for his desired color. The company then delivers the ordered robot to that customer.
Note that the relevant information about each customer is his first name, last name and address e.g., 'Lelouch', 'Vi Britannia', 'Street 2, Area 11'.

Perform the tasks give below:

a) Identify all entities in the given scenario, along with their attributes and setter getter functions.

Entities:
Geass Corporation (no attributes but a function "deliver order")
Customer (first name, last name, address)
Robot (color, id, size, prize)

b) Write code to implement the identified entities.

```
class GeassCorporation {
public:
Robot deliverOrder (string color) {
Robot rob("p100", 13, color, 5000);
return rob;
}
};
class Customer {
string firstName, lastName, address;
public:
Customer (string firstName, string lastName, string address) {
this->firstName = firstName; this->lastName = lastName; this->address = address;
}
void placeOrder (GeassCorporation o) {
string color;
cin >> color;
Robot r = o.deliverOrder(color);
} };
class Robot {
string productid, size, color, price;
public:
Robot (string productid, string size, string color, float price) {
this->productid = productid; this->size = size; this->color = color; this->price = price;
} };
```