BCS231025

QUESTION:1

PART:b

```
#include<iostream>
using namespace std;
class Shape
{
public:
    virtual double calculateArea() const = 0;
    virtual ~Shape() {}
};
class Circle : public Shape
{
private:
    double radius;
public:
    Circle(double r) : radius(r) {}
    double calculateArea() const override
    {
        return 3.14 * radius * radius;
    }
};
class Rectangle : public Shape
{
private:
    double length;
    double width;

public:
    Rectangle(double l, double w) : length(l), width(w) {}

    double calculateArea() const override
    {
        return length * width;
    }
};
```

QUESTION:2

```
#include<iostream>
#include<string>
using namespace std;
class Product
{
public:
    int productid;
    string productname;
    double productprice;
    Product(int id, string name, double price)
    {
        productid = id;
        productname = name;
        productprice = price;
    }

    void display_product_details()
```

```
    {
        cout << "Id of product is: " << productid << endl;
        cout << "Name of the product is: " << productname << endl;
        cout << "Price of the product is $: " << productprice << endl;
    }
};
class Shopping_cart
{
private:
    Product** products;
    int capacity;
    int size;

public:
    Shopping_cart(int capacity) : capacity(capacity), size(0)
    {
        products = new Product * [capacity];
    }
    ~Shopping_cart()
    {
        delete[] products;
    }
    void add_product(Product* product)
    {
        if (size < capacity)
        {
            products[size++] = product;
        }
        else
        {
            cout << "You cannot add more items because  shopping cart is full." <<
endl;
        }
    }
    void displayallproducts()
    {
        cout << "Products in your cart are" << endl;
        for (int i = 0; i < size; ++i)
        {
            products[i]->display_product_details();
        }
    }
    double calculate_total_cost()
    {
        double totalCost = 0.0;
        for (int i = 0; i < size; ++i)
        {
            totalCost += products[i]->productprice;
        }
        return totalCost;
    }
};
class User
{
public:
    int userId;
    Shopping_cart* shopping_cart;
```

```
    User(int id) : userId(id), shopping_cart(nullptr) {}

    void display_user_details()
    {
        cout << "Id is used by the user : " << userId << endl;
        if (shopping_cart)
        {
            cout << "Shopping carts details:" << endl;
            shopping_cart->displayallproducts();
            cout << "Total cost of products is : $" << shopping_cart-
>calculate_total_cost() << endl;
        }
        else
        {
            cout << "Shopping cart is not associated with this id...." << endl;
        }
    }
};

int main()
{
    Product product1(1, "Glasses", 144.76);
    Product product2(2, "Bags", 298.36);
    User user1(594);
    Shopping_cart cart(2);
    cart.add_product(&product1);
    cart.add_product(&product2);
    user1.shopping_cart = &cart;
    user1.display_user_details();
    return 0;
}
```