#include <iostream>

#include <string>

using namespace std;

class Product

{

public:

int productCode;

string productName;

double cost;

Product() : productCode(0), productName(""), cost(0.0) {}

Product(int code, const string& name, double price)

: productCode(code), productName(name), cost(price) {}

void displayProductDetails()

{

cout << "Product Code: " << productCode << ", Name: " << productName << ", Cost: $" << cost << endl;

}

};

class ShoppingCart

{

private:

Product\* products;

int productCount;

double totalCost;

public:

ShoppingCart() : products(nullptr), productCount(0), totalCost(0.0) {}

void addProduct(const Product& product)

{

Product\* newProducts = new Product[productCount + 1];

for (int i = 0; i < productCount; ++i)

{

newProducts[i] = products[i];

}

newProducts[productCount] = product;

productCount++;

delete[] products;

products = newProducts;

totalCost += product.cost;

}

void displayAllProducts()

{

for (int i = 0; i < productCount; ++i)

{

products[i].displayProductDetails();

}

}

double calculateTotalCost()

{

return totalCost;

}

~ShoppingCart()

{

delete[] products;

}

};

class User

{

public:

int userID;

ShoppingCart\* shoppingCart;

User(int id) : userID(id), shoppingCart(nullptr) {}

void displayUserDetails()

{

cout << "User ID: " << userID << endl;

if (shoppingCart != nullptr)

{

cout << "Shopping Cart Details:" << endl;

shoppingCart->displayAllProducts();

cout << "Total Cost: $" << shoppingCart->calculateTotalCost() << endl;

}

else

{

cout << "User does not have a shopping cart." << endl;

}

}

~User()

{

delete shoppingCart;

}

};

int main()

{

Product smartphone(1, "Smartphone", 1099);

Product television(2, "Television", 1500);

User user1(5862);

user1.displayUserDetails();

ShoppingCart cart1;

cart1.addProduct(smartphone);

cart1.addProduct(television);

user1.shoppingCart = &cart1;

user1.displayUserDetails();

return 0;

}