using System;

// ---------------- Part 1: Abstraction ----------------

public abstract class Product

{

public int ProductId { get; set; }

public string Name { get; set; }

public decimal Price { get; set; }

public Product(int productId, string name, decimal price)

{

ProductId = productId;

Name = name;

Price = price;

}

public abstract void DisplayInfo();

}

// Derived class: ElectronicProduct

public class ElectronicProduct : Product

{

public int WarrantyPeriod { get; set; }

public ElectronicProduct(int productId, string name, decimal price, int warrantyPeriod)

: base(productId, name, price)

{

WarrantyPeriod = warrantyPeriod;

}

public override void DisplayInfo()

{

Console.WriteLine($"[Electronic Product] ID: {ProductId}, Name: {Name}, Price: {Price:C}, Warranty: {WarrantyPeriod} months");

}

}

// Derived class: GroceryProduct

public class GroceryProduct : Product

{

public DateTime ExpirationDate { get; set; }

public GroceryProduct(int productId, string name, decimal price, DateTime expirationDate)

: base(productId, name, price)

{

ExpirationDate = expirationDate;

}

public override void DisplayInfo()

{

Console.WriteLine($"[Grocery Product] ID: {ProductId}, Name: {Name}, Price: {Price:C}, Expiration: {ExpirationDate.ToShortDateString()}");

}

}

// ---------------- Part 2: Inheritance ----------------

public class ShoppingCart

{

private Product[] products;

private int count;

public ShoppingCart(int capacity)

{

products = new Product[capacity];

count = 0;

}

public void AddProduct(Product product)

{

if (count < products.Length)

{

products[count] = product;

count++;

Console.WriteLine($"Product '{product.Name}' added to cart.");

}

else

{

Console.WriteLine("Cart is full! Cannot add more products.");

}

}

public void RemoveProduct(int productId)

{

bool found = false;

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

{

if (products[i].ProductId == productId)

{

Console.WriteLine($"Product '{products[i].Name}' removed from cart.");

// Shift items left

for (int j = i; j < count - 1; j++)

{

products[j] = products[j + 1];

}

products[count - 1] = null;

count--;

found = true;

break;

}

}

if (!found)

{

Console.WriteLine("Product not found in cart.");

}

}

public decimal CalculateTotalPrice()

{

decimal total = 0;

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

{

total += products[i].Price;

}

return total;

}

public void DisplayCartContents()

{

Console.WriteLine("\n--- Shopping Cart Contents ---");

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

{

products[i].DisplayInfo();

}

Console.WriteLine($"Total Price: {CalculateTotalPrice():C}");

Console.WriteLine("-------------------------------\n");

}

}

// ---------------- Main Program ----------------

public class Program

{

public static void Main()

{

// Create products

ElectronicProduct laptop = new ElectronicProduct(101, "Laptop", 50000m, 24);

GroceryProduct milk = new GroceryProduct(201, "Milk", 45.50m, DateTime.Now.AddDays(10));

GroceryProduct bread = new GroceryProduct(202, "Bread", 30m, DateTime.Now.AddDays(3));

// Create shopping cart with capacity 5

ShoppingCart cart = new ShoppingCart(5);

// Add products

cart.AddProduct(laptop);

cart.AddProduct(milk);

cart.AddProduct(bread);

// Display cart

cart.DisplayCartContents();

// Remove product by ID

cart.RemoveProduct(201);

// Display cart after removal

cart.DisplayCartContents();

}

}