
BINARY
SEARCH
TREE
Start

WHAT IS BINARY SEARCH TREE

This project explores the application of Data Structures and Algorithms (DSA) in creating an efficient online shopping cart system. Efficient data storage and retrieval are paramount. The solution leverages Binary Search Tree (BST) properties.

The goal is to design a BST-based shopping cart system for DSA implementation. Optimizing search, insertion, and deletion operations is crucial. Performance and scalability are top priorities.

Binary Search Tree

Stores product inventory for efficient searching

Linked List

Manages cart items for flexible operations

C Implementation

Built using standard C libraries

Shopping Features

Browse, add, remove, and checkout functionality

DATA STRUCTURE USED

Product Structure (BST Node)

- Product ID (key for BST)
- Name, price, quantity
- Left and right pointers

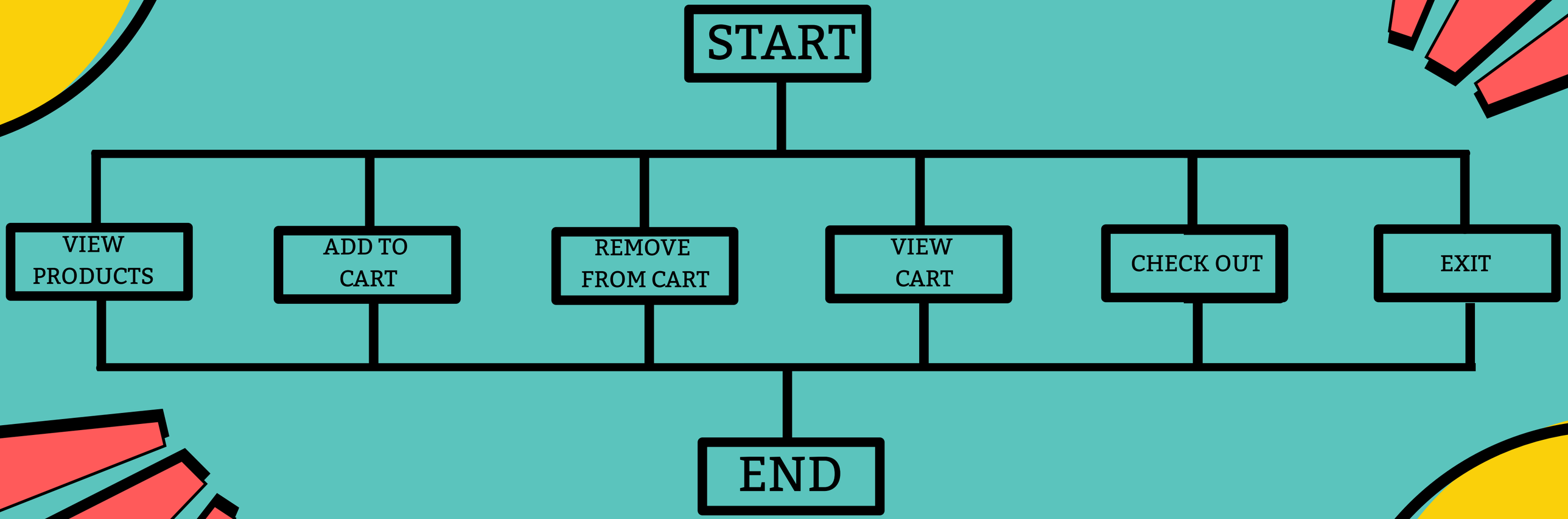
Enables O(log n) search operations

Cart Item Structure (Linked List)

- Product details
- Quantity in cart
- Next pointer

Allows dynamic addition and removal

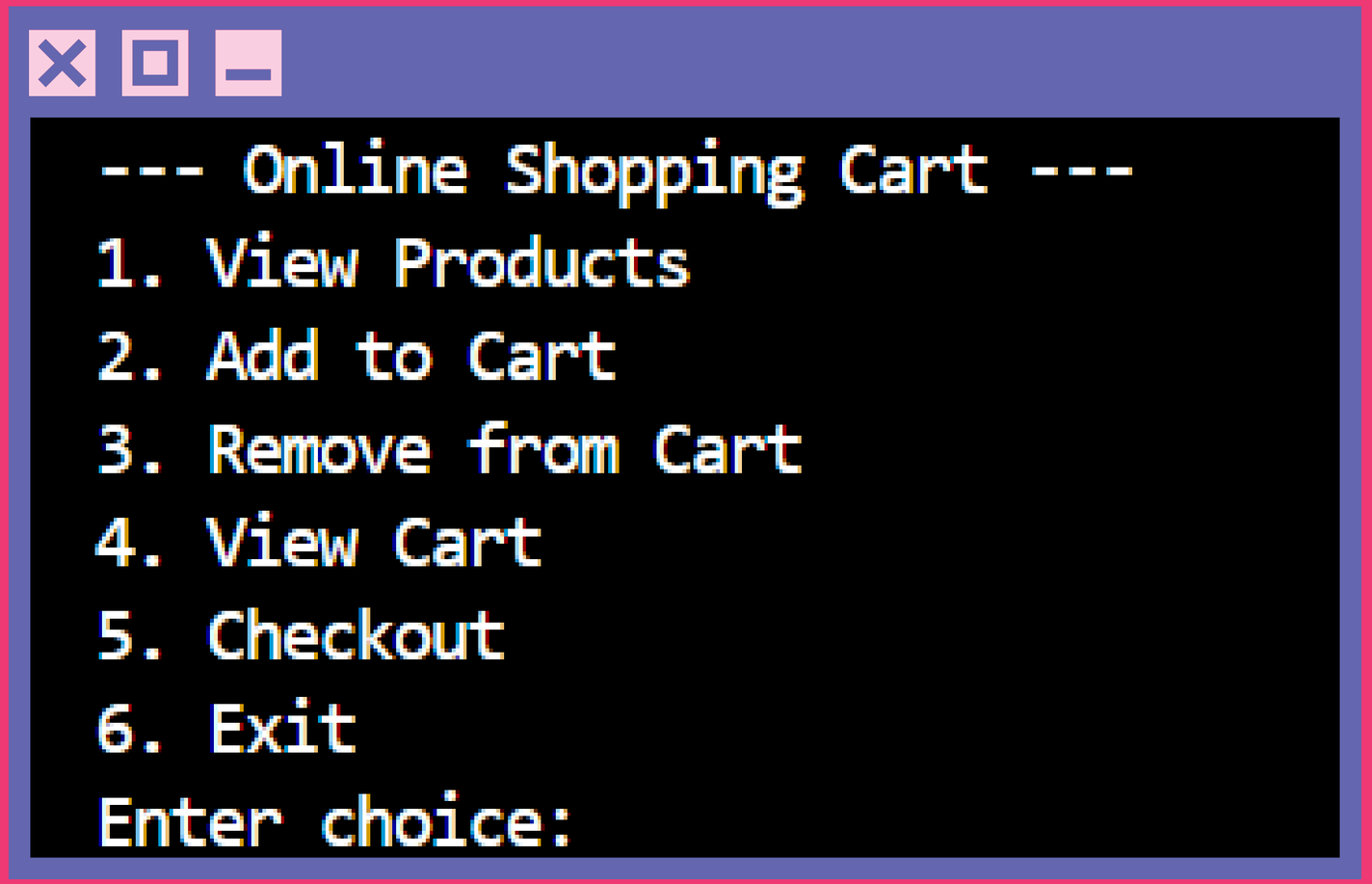
FLOWCHART DIAGRAM



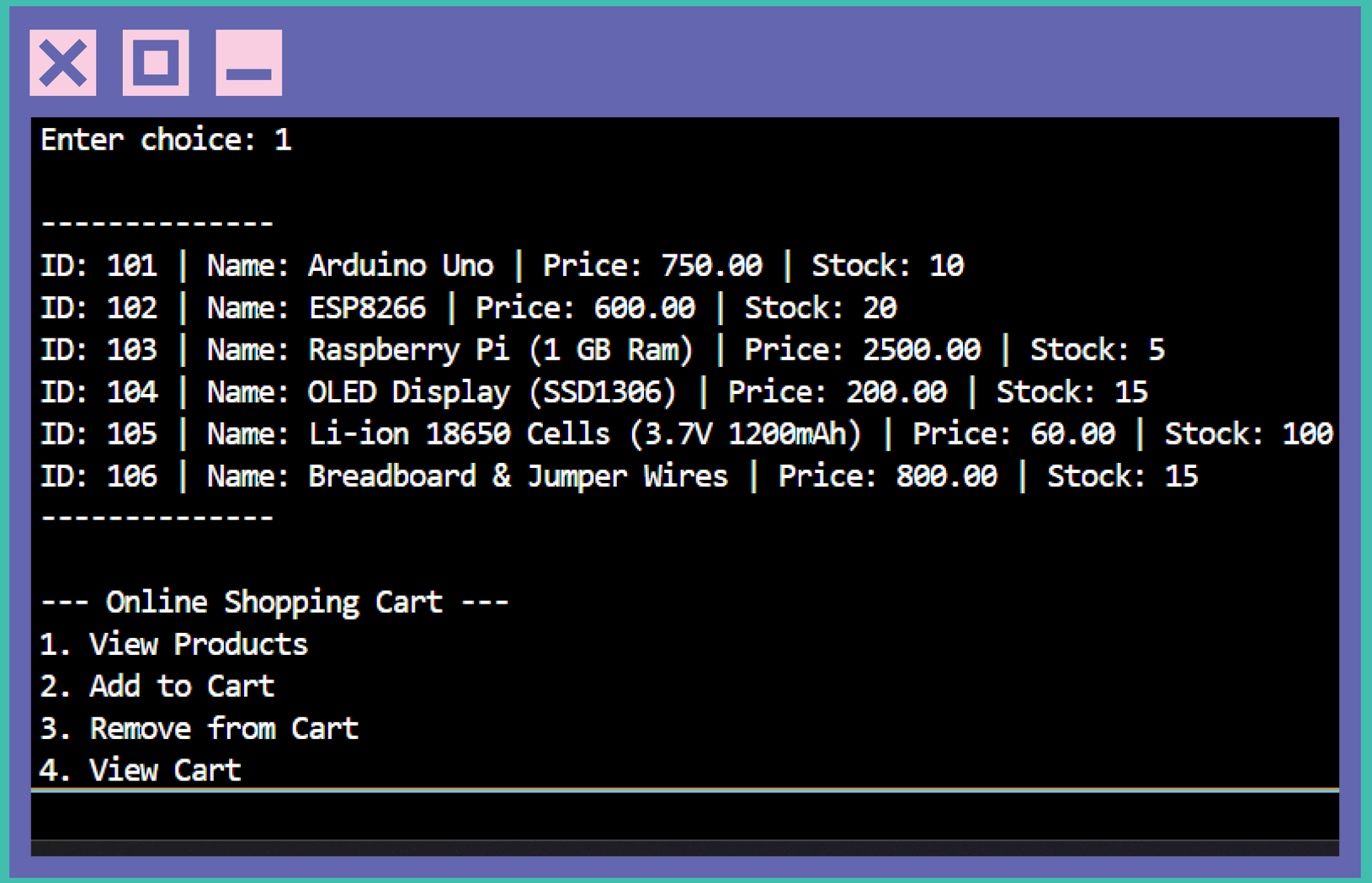
CART OPERATIONS

Operation	Time Complexity	Description
Add Item	O(log n + m)	Search BST + traverse cart
Remove Item	O(log n + m)	Search BST + traverse cart
View Cart	O(m)	Traverse cart linked list
Checkout	O(m)	Process all cart items

SAMPLE OUTPUT



CHOICE-1



```
Enter choice: 1

-------------
ID: 101 | Name: Arduino Uno | Price: 750.00 | Stock: 10
ID: 102 | Name: ESP8266 | Price: 600.00 | Stock: 20
ID: 103 | Name: Raspberry Pi (1 GB Ram) | Price: 2500.00 | Stock: 5
ID: 104 | Name: OLED Display (SSD1306) | Price: 200.00 | Stock: 15
ID: 105 | Name: Li-ion 18650 Cells (3.7V 1200mAh) | Price: 60.00 | Stock: 100
ID: 106 | Name: Breadboard & Jumper Wires | Price: 800.00 | Stock: 15
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--- Online Shopping Cart ---
1. View Products
2. Add to Cart
3. Remove from Cart
4. View Cart
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CHOICE-2

```
Enter choice: 2
Enter Product ID to add to cart: 101
Enter quantity to add: 3

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Added to cart: Arduino Uno x3
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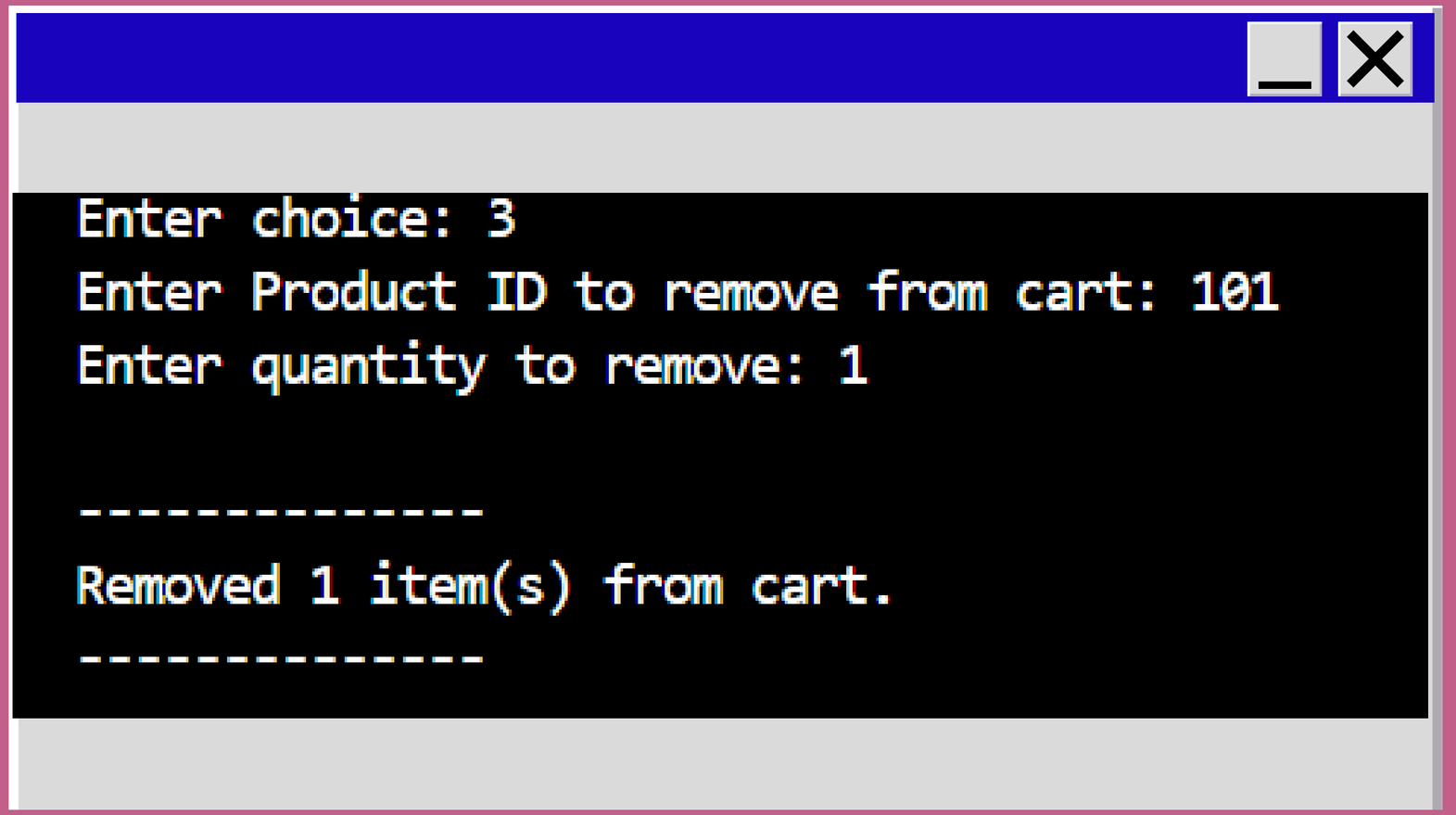
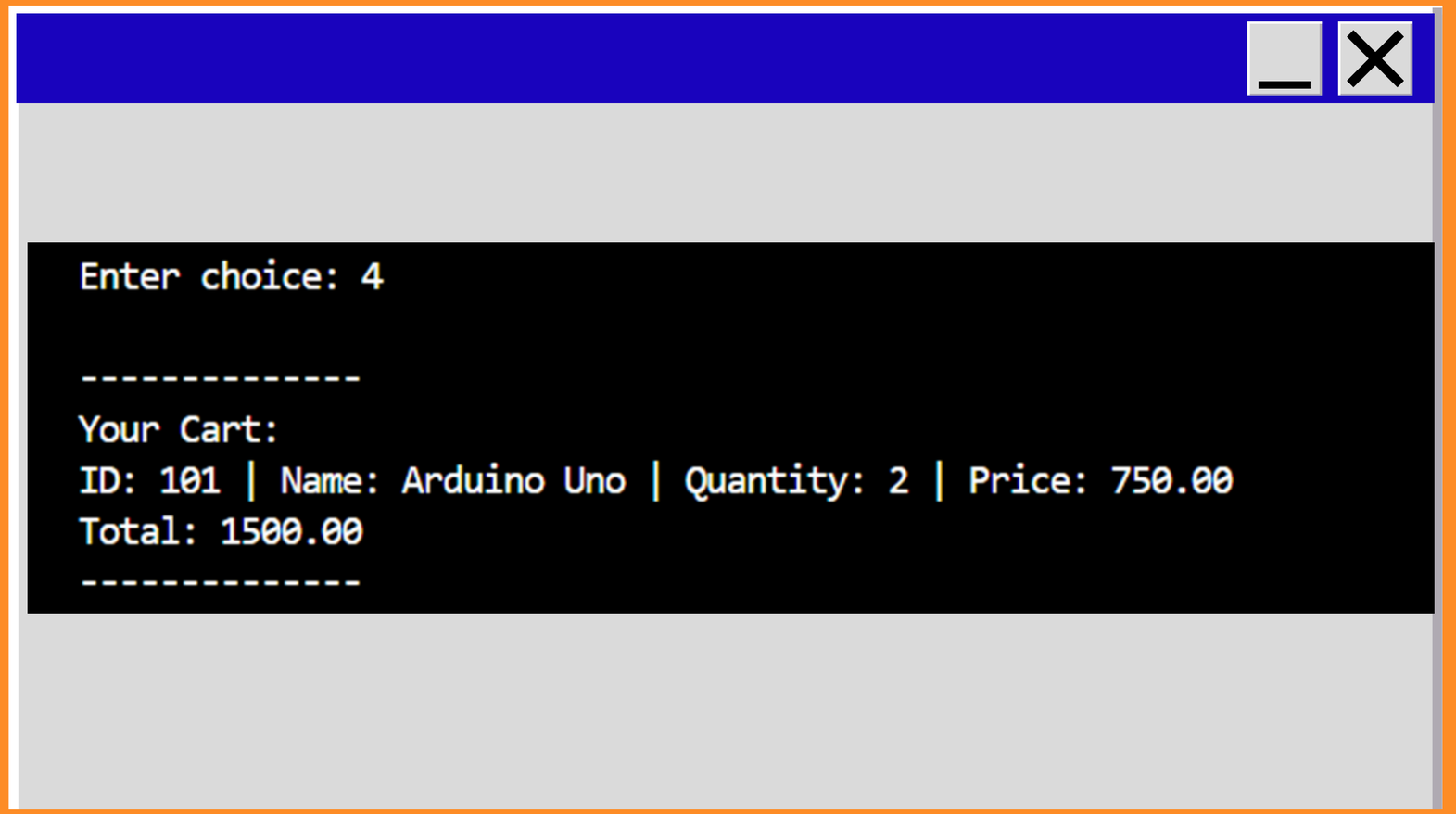
```

CHOICE-3


Enter choice: 3
Enter Product ID to remove from cart: 101
Enter quantity to remove: 1

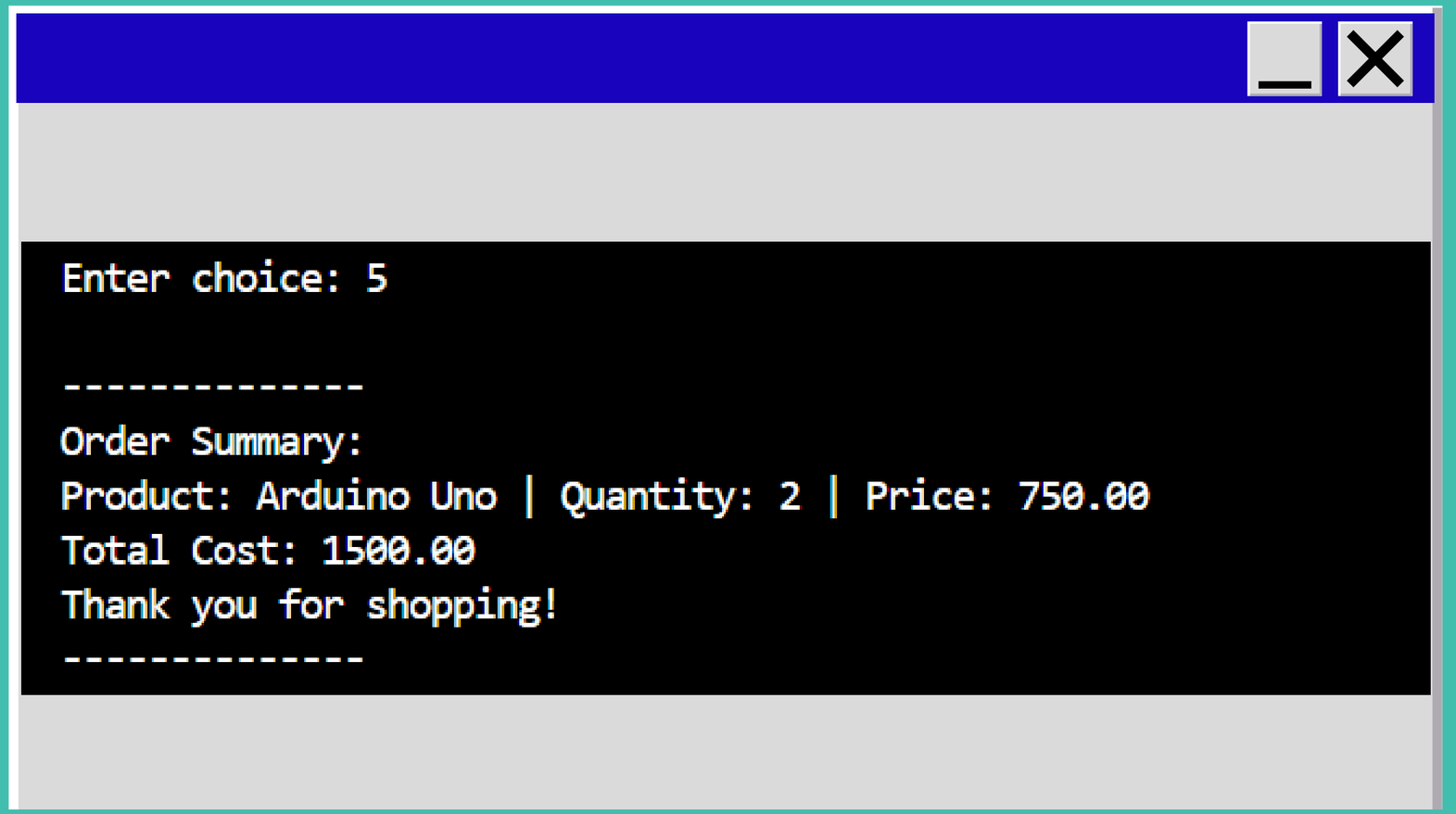
Removed 1 item(s) from cart.

CHOICE-4


Enter choice: 4

Your Cart:
ID: 101 | Name: Arduino Uno | Quantity: 2 | Price: 750.00
Total: 1500.00

CHOICE-5


Enter choice: 5

Order Summary:
Product: Arduino Uno | Quantity: 2 | Price: 750.00
Total Cost: 1500.00
Thank you for shopping!

CONCLUSION

The project effectively demonstrates DSA principles through BST. It enhances user experience with quick product management. Future scope includes AI integration for personalized recommendations.

THANK YOU