

### **A Sample Java Problem & Solution:**

Create a program to manage a shopping cart for an online store. There are **five** types of operations:

1. **"ADD ItemName quantity price"** : Adds an item to the shopping cart. The item has a name, quantity, and price.
2. **"REMOVE ItemName"** : Removes an item from the shopping cart by its name. If the item doesn't exist in the cart, the program should output an error message.
3. **"UPDATE ItemName ItemQuantity"** : Updates the quantity of an item in the cart. If the item doesn't exist in the cart, the program should output an error message.
4. **"VIEW"** : Displays the items in the cart, including their names, quantities, and prices, sorted alphabetically by item name using heap sort. It also calculates and displays the total cost of the items in the cart.
5. **"CHECKOUT"** : Displays the final total cost and clears the cart for a new transaction.

**NOTE:** Implement the function Heap Sort from scratch.

#### **Input Format:**

The first line will have the operation of **"ADD ItemName ItemQuantity ItemPrice"**

There would be various operations till the last operation of **"CHECKOUT"**.

#### **Constraints:**

- An item name can be up to 100 characters long.
- Quantity and price must be positive numbers.
- The program should handle an unknown operation gracefully by printing **"Unknown operation"**.

#### **Output Format:**

- When an item is added or updated, the program should print **"ItemName added"** or **"ItemName updated"**. If the quantity of an item is updated to 0 or less, the item is removed from the cart.
- When an item is removed, the program should print **"ItemName removed"**.
- If an operation fails (e.g., trying to remove a non-existent item), the program should print **"Error: itemName not found"**.
- For the **"VIEW"** operation, the program should print the details of the cart sorted alphabetically by item name, item quantity and the total cost.
- For the Checkout operation, the program should print the final total cost and **"Checkout complete"**, and then exit the program.
- Irrespective of user input, the item name should be displayed in the proper case. The proper case of apple, CAT are Apple, Cat (capitalizing the first letter and making the rest lowercase).