Experiment 4

Student Name: Abhishek Raj **UID: 22BCS10008**
Branch: BE-CSE **Section/Group: 639-B**
Semester:6th **Date of Performance:14/02/25**
Subject Name: PBLJ **Subject Code: 22CSH-359**

1. **Aim :** Write a program to collect and store all the cards to assist the users in finding all the cards in a given symbol.This cards game consist of N number of cards. Get N number of cards details from the user and store the values in Card object with the attributes symbol and Number. Store all the cards in a map with symbols as its key and list of cards as its value. Map is used here to easily group all the cards based on their symbol. Once all the details are captured print all the distinct symbols in alphabetical order from the Map.

2. **Objective :** This program collects and stores N cards, grouping them by symbol in a map for easy retrieval. It displays distinct symbols in alphabetical order along with their associated cards, total count, and sum of numbers, ensuring efficient organization and user-friendly output.

3. **Algorithm :**

   1. **Initialize Data Structures:**
      - Create a Card class with attributes symbol (String) and number (int).
      - Create a Map<String, List<Card>> to store cards, where the key is the card symbol and the value is a list of Card objects.
   2. **Input Number of Cards:**
      - Prompt the user to enter the number of cards, N.
   3. **Collect Card Details:**
      - For i from 0 to N-1:
      - Prompt the user to enter the card symbol.
      - Prompt the user to enter the card number.
      - Create a new Card object with the entered symbol and number.
      - Check if the symbol already exists in the map:
      - If it does not exist, create a new list for that symbol.
      - Add the Card object to the list associated with the symbol in the map.
   4. **Retrieve and Sort Distinct Symbols:**
      - Extract the keys (symbols) from the map into a list.
      - Sort the list of symbols in alphabetical order.

4. Code

```
import java.util.*;
class Card {
    private String symbol;
    private int number;

    public Card(String symbol, int number) {
        this.symbol = symbol;
        this.number = number;
    }

    public String getSymbol() {
        return symbol;
    }

    public int getNumber() {
        return number;
    }
    @Override
    public String toString() {
        return "Card{" +

                "symbol='" + symbol + '\'' +
                ", number=" + number +
                '}';
    }
}
public class CardGame {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Map<String, List<Card>> cardMap = new HashMap<>();
        System.out.print("Enter the number of cards (N): ");
        int N = scanner.nextInt();
        scanner.nextLine(); // Consume the newline character
        for (int i = 0; i < N; i++) {
            System.out.print("Enter card symbol: ");
            String symbol = scanner.nextLine();
```

```
            System.out.print("Enter card number: ");
            int number = scanner.nextInt();
            scanner.nextLine(); // Consume the newline character

            Card card = new Card(symbol, number);
            cardMap.putIfAbsent(symbol, new ArrayList<>());
            cardMap.get(symbol).add(card);
        }
        List<String> distinctSymbols = new ArrayList<>(cardMap.keySet());
        Collections.sort(distinctSymbols);
        System.out.println("Distinct symbols in alphabetical order along with their values:");
        for (String symbol : distinctSymbols) {
            List<Card> cards = cardMap.get(symbol);
            System.out.print("Symbol: " + symbol + " -> Values: ");
            for (Card card : cards) {
                System.out.print(card.getNumber() + " ");
            }
            System.out.println(); // New line for the next symbol
        }
        scanner.close();
    }
}
```

5. Output :

```
PROBLEMS 16  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS
PS D:\Code\JAVA CODE> cd "d:\Code\JAVA CODE\" ; if ($?) { javac CardGame.java } ; if ($?)
Enter the number of cards (N): 3
Enter card symbol: AB
Enter card number: 1
Enter card symbol: CD
Enter card number: 22
Enter card symbol: EF
Enter card number: 4
Distinct symbols in alphabetical order along with their values:
Symbol: AB -> Values: 1
Symbol: CD -> Values: 22
Symbol: EF -> Values: 4
PS D:\Code\JAVA CODE>
```

6. Learning Outcomes

- Understand how to use maps (dictionaries) for efficient data storage and retrieval.
- Learn to group and organize data based on a key attribute.
- Gain experience in handling user input and storing objects dynamically.
- Develop skills in sorting and displaying structured data in a meaningful