

# EC4070: Data Structures and Algorithms

## LAB 05

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SEMESTER 4

EC4070

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Q1.

```
import java.util.Scanner;

public class CustomHT {
    private static final int TABLE_SIZE = 256;

    private CharacterFrequency[] table;

    public CustomHT() {
        table = new CharacterFrequency[TABLE_SIZE];
    }

    public void put(char key) {
        int index = key;
        if (table[index] == null) {
            table[index] = new CharacterFrequency(key);
        } else {
            table[index].frequency++;
        }
    }

    public CharacterFrequency get(char key) {
        int index = key;
        return table[index];
    }

    public static class CharacterFrequency {
        char character;
        int frequency;
    }
}
```

```

public CharacterFrequency(char character) {
    this.character = character;
    this.frequency = 1;
}
}

public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);

    System.out.print("Enter a string: ");
    String input = scanner.nextLine();
    scanner.close();

    CustomHT CustomHT = new CustomHT();

    for (char c : input.toCharArray()) {
        if (Character.isLetterOrDigit(c) || c == ' ' || c == '-' || c == '_' || c == '?') {
            CustomHT.put(c);
        }
    }

    char maxChar = ' ';
    int maxCount = 0;

    for (int i = 0; i < CustomHT.TABLE_SIZE; i++) {
        CustomHT.CharacterFrequency cf = CustomHT.table[i];
        if (cf != null) {
            if (cf.frequency > maxCount || (cf.frequency == maxCount && cf.character <
maxChar)) {
                maxChar = cf.character;
                maxCount = cf.frequency;
            }
        }
    }
}

```

```
    }  
    }  
}  
  
System.out.println(maxChar + " " + maxCount);  
}  
}
```

```

1  import java.util.Scanner;
2
3  public class CustomHT {
4      private static final int TABLE_SIZE = 256;
5
6      private CharacterFrequency[] table;
7
8      public CustomHT() {
9          table = new CharacterFrequency[TABLE_SIZE];
10     }
11
12     public void put(char key) {
13         int index = key;
14         if (table[index] == null) {
15             table[index] = new CharacterFrequency(key);
16         } else {
17             table[index].frequency++;
18         }
19     }
20
21     public CharacterFrequency get(char key) {
22         int index = key;
23         return table[index];
24     }
25
26     public static class CharacterFrequency {
27         char character;
28         int frequency;
29
30         public CharacterFrequency(char character) {
31             this.character = character;
32             this.frequency = 1;
33         }
34     }
35
36     public static void main(String[] args) {
37         Scanner scanner = new Scanner(System.in);
38         System.out.print("Enter a string: ");
39         String input = scanner.nextLine();
40         scanner.close();
41
42         CustomHT CustomHT = new CustomHT();
43
44         for (char c : input.toCharArray()) {
45             if (Character.isLetterOrDigit(c) || c == ' ' || c == '-' || c == '_' || c == '?') {
46                 CustomHT.put(c);
47             }
48         }
49
50         char maxChar = ' ';
51         int maxCount = 0;
52
53         for (int i = 0; i < CustomHT.TABLE_SIZE; i++) {
54             CustomHT.CharacterFrequency cf = CustomHT.table[i];
55             if (cf != null) {
56                 if (cf.frequency > maxCount || (cf.frequency == maxCount && cf.character < maxChar)) {
57                     maxChar = cf.character;
58                     maxCount = cf.frequency;
59                 }
60             }
61         }
62
63         System.out.println(maxChar + " " + maxCount);
64     }
65 }

```

```
C:\Users\2021E075\OneDrive - University of Jaffna\lab5>javac CustomHT.java
C:\Users\2021E075\OneDrive - University of Jaffna\lab5>java
C:\Users\2021E075\OneDrive - University of Jaffna\lab5>java CustomHT
Enter a string: Pulkit is a dog???????
? 8
```

```
C:\Users\2021E075\OneDrive - University of Jaffna\lab5>java CustomHT
Enter a string: aaAAAAAAAArrrrrEE
A 8
C:\Users\2021E075\OneDrive - University of Jaffna\lab5>
```

Q2.

```
import java.util.*;
```

```
public class FavoriteGame {
```

```
    private HashMap<String, LinkedList<String>> map;
```

```
    public FavoriteGame() {
```

```
        map = new HashMap<String, LinkedList<String>>();
```

```
    }
```

```
    public void put(String key, String value) {
```

```
        if (!map.containsKey(key)) {
```

```
            map.put(key, new LinkedList<String>());
```

```
        }
```

```
        map.get(key).add(value);
```

```
    }
```

```
    public int size(String key) {
```

```
        LinkedList<String> list = map.get(key);
```

```
        return list != null ? list.size() : 0;
```

```

}

    int maxElements = 0;

public String getKeyWithMaxElements() {

    String keyWithMaxElements = null;

    for (Map.Entry<String, LinkedList<String>> entry : map.entrySet()) {
        int currentSize = entry.getValue().size();
        if (currentSize > maxElements) {
            maxElements = currentSize;
            keyWithMaxElements = entry.getKey();
        }
    }

    return keyWithMaxElements;
}

public static void main(String[] args) {
    FavoriteGame FavoriteGame = new FavoriteGame();

    Scanner sc=new Scanner(System.in);
        int n;

        do{
            System.out.println("enter the number");
            n=sc.nextInt();
        }while(n>=10000 && n<=1);

    String name;

```

```
String game;

int l;

int i=0;


while(i<n){

    do{

        System.out.println("enter the name and game");
        name=sc.next();
        game=sc.next();
        l=name.length()+game.length();
    }while(l>12);

    FavoriteGame.put(game,name);
    i++;

}

System.out.println("football "+FavoriteGame.size("football"));

System.out.print(FavoriteGame.getKeyWithMaxElements()+"
"+String.valueOf(FavoriteGame.maxElements));

}

}
```



```

1  import java.util.*;
2
3
4  public class FavoriteGame {
5      private HashMap<String, LinkedList<String>> map;
6
7      public FavoriteGame() {
8          map = new HashMap<String, LinkedList<String>>();
9      }
10
11     public void put(String key, String value) {
12         if (!map.containsKey(key)) {
13             map.put(key, new LinkedList<String>());
14         }
15
16         map.get(key).add(value);
17     }
18
19     public int size(String key) {
20         LinkedList<String> list = map.get(key);
21         return list != null ? list.size() : 0;
22     }
23
24     int maxElements = 0;
25
26     public String getKeyWithMaxElements() {
27         String keyWithMaxElements = null;
28
29         for (Map.Entry<String, LinkedList<String>> entry : map.entrySet()) {
30             int currentSize = entry.getValue().size();
31             if (currentSize > maxElements) {
32                 maxElements = currentSize;
33                 keyWithMaxElements = entry.getKey();
34             }
35         }
36
37         return keyWithMaxElements;
38     }
39
40     public static void main(String[] args) {
41         FavoriteGame FavoriteGame = new FavoriteGame();
42
43         Scanner sc=new Scanner(System.in);
44         int n;
45
46         do{
47             System.out.println("enter the number");
48             n=sc.nextInt();
49         }while(n>=10000 && n<=1);
50
51     }
52
53     public static void main(String[] args) {
54         FavoriteGame FavoriteGame = new FavoriteGame();
55
56         Scanner sc=new Scanner(System.in);
57         int n;
58
59         do{
60             System.out.println("enter the number");
61             n=sc.nextInt();
62         }while(n>=10000 && n<=1);
63
64         String name;
65         String game;
66         int l;
67         int i=0;
68
69         while(i<n){
70             do{
71                 System.out.println("enter the name and game");
72                 name=sc.next();
73                 game=sc.next();
74                 l=name.length()+game.length();
75             }while(l>12);
76             FavoriteGame.put(game,name);
77             i++;
78         }
79         System.out.println("football "+FavoriteGame.size("football"));
80         System.out.print(FavoriteGame.getKeyWithMaxElements()+" "+String.valueOf(FavoriteGame.maxElements));
81     }
82 }

```

```
C:\Users\erand\OneDrive\Desktop>javac FavoriteGame.java
```

```
C:\Users\erand\OneDrive\Desktop>java FavoriteGame
```

```
enter the number
```

```
7
```

```
enter the name and game
```

```
A cricket
```

```
enter the name and game
```

```
B football
```

```
enter the name and game
```

```
C cricket
```

```
enter the name and game
```

```
D cricket
```

```
enter the name and game
```

```
E chess
```

```
enter the name and game
```

```
F chess
```

```
enter the name and game
```

```
G chess
```

```
football 1
```

```
chess 3
```

```
C:\Users\erand\OneDrive\Desktop>
```