EC4070: Data Structures and Algorithms

LAB 05

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2021/E/075

SEMESTER 4

EC4070

01.11.2023

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);
  }
}
```

```java
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;
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        }
    }

    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);
    }
}
```

```
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));


   }
}
```

```java
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);

```

```java
    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));

    }
}
```

```
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>
```