

Data Structures and Algorithms

Lab: Hashing Techniques

Input:

```
import java.util.*;
public class linearHashing{

    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Keys: ");
        int[] a=new int[10];
        ArrayList<Integer> l1 = new ArrayList<>();
        ArrayList<String> hm=new ArrayList<>();
        ArrayList<Integer> l2=new ArrayList<>();
        ArrayList<String> hm2=new ArrayList<>();
        for(int i=0;i<10;i++){
            a[i]=sc.nextInt();
            int flag=1;
            for(int j=0;j<10;j++){
                {
                    int loc=((2*a[i]+3)+j)%10;
                    if(l1.contains(loc)){
                        l1.add(loc);
                        flag++;
                    }
                    else{
                        l1.add(loc);
                        String s=a[i]+" -> "+loc+" -> "+flag;
                        hm.add(s);
                        break;
                    }
                }
            }
        }
    }
}
```

```
        flag=1;
        for(int j=0;j<10;j++){
            int loc=((2*a[i]+3)+(j*j))%10;
            if(l2.contains(loc)){
                l2.add(loc);
                flag++;
            }
            else{
                l2.add(loc);
                String s=a[i]+" -> "+loc+" -> "+flag;
                hm2.add(s);
                break;
            }
        }
    }
}

System.out.println("Linear Probing: ");
System.out.println("Key -> Location -> Probe:");
for(int i=0;i<hm.size();i++)
    System.out.println(hm.get(i));
System.out.println();
System.out.println("Quadratic Probing: ");
System.out.println("Key -> Location -> Probe");
for(int i=0;i<hm2.size();i++)
    System.out.println(hm2.get(i));
}
```

Output:

```
Enter Keys:
```

```
12
```

```
5
```

```
77
```

```
24
```

```
87
```

```
19
```

```
64
```

```
83
```

```
98
```

```
34
```

```
Linear Probing
```

```
Key -> Location -> Probe
```

```
12 -> 7 -> 1
```

```
5 -> 3 -> 1
```

```
77 -> 8 -> 2
```

```
24 -> 1 -> 1
```

```
87 -> 9 -> 3
```

```
19 -> 2 -> 2
```

```
64 -> 4 -> 4
```

```
83 -> 0 -> 2
```

```
98 -> 5 -> 7
```

```
34 -> 6 -> 6
```

```
Quadratic Probing
```

```
Key -> Location -> Probe
```

```
12 -> 7 -> 1
```

```
5 -> 3 -> 1
```

```
77 -> 8 -> 2
```

```
24 -> 1 -> 1
```

```
87 -> 6 -> 4
```

```
19 -> 2 -> 2
```

```
64 -> 5 -> 3
```

```
83 -> 9 -> 1
```

```
98 -> 0 -> 2
```

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