**Assignment number:15**

**Subject: ADVANCED DATA STRUCTURES LAB**

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**PROBLEM STATEMENT:**

Write a Java program for the implementation of different data structures using JAVA collection libraries (Standard toolkit library): at least 5 data structures are used to design a suitable application

**Code:**

import java.io.\*;

import java.util.\*; //stack ,queue ,hash map ,arraylist ,link list

public class Types

{

public void func()

{

Scanner sc=new Scanner(System.in);

Stack<Integer> stk=new Stack<>();

PriorityQueue<Integer> que=new PriorityQueue<>();

LinkedList<Integer> ll=new LinkedList<>();

ArrayList<Integer> al=new ArrayList<>();

HashMap<String, Integer> hm=new HashMap<>();

char ans,y;

int choice,ch;

do{

System.out.println("1.)Stack\n2.)Queue\n3.)Linked List\n4.)Array List\n5.)HashMap\n6.)Exit");

choice=sc.nextInt();

switch(choice)

{

case 1:

System.out.println("-----Stack-----");

do

{

System.out.println("1. Push\n2.Pop\n3.Display Top of the stack\n4.Exit");

ch=sc.nextInt();

switch(ch)

{

case 1:

System.out.println("\nEnter total numbers you will enter : ");

int count=sc.nextInt();

for(int i=0;i<count;i++)

{

System.out.println("\nEnter Number: ");

int num=sc.nextInt();

stk.push(num);

}

break;

case 2:

System.out.println("Popping the top of the stack ");

stk.pop();

break;

case 3:

System.out.println("\nThe top of the stack is "+stk.peek());

break;

case 4:

break;

default:System.out.println("invalid entry...try again");

}

System.out.println("do you want to continue?(y/n)");

ans=sc.next().charAt(0);

}while(ans=='y' || ans=='Y');

break;

case 2:

System.out.println("-----Queue-----");

do

{

System.out.println("1. Enqueue\n2.Dequeue\n3.Display\n4.Exit");

ch=sc.nextInt();

switch(ch)

{

case 1:

System.out.println("\nEnter total numbers you will enter : ");

int count=sc.nextInt();

for(int i=0;i<count;i++)

{

System.out.println("\nEnter Number: ");

int num=sc.nextInt();

que.add(num);

}

break;

case 2:

if(que.isEmpty())

{

System.out.println("que is empty");

}

else

{

System.out.println("removing the front element ");

que.remove();

}

break;

case 3:

while(!que.isEmpty())

{

System.out.println(que.peek());

que.remove();

}

break;

case 4:

break;

default:System.out.println("invalid entry...try again");

}

System.out.println("do you want to continue?(y/n)");

ans=sc.next().charAt(0);

}while(ans=='y' || ans=='Y');

break;

case 3:

System.out.println("-----Linked List-----");

do

{

System.out.println("1. Insert\n2.Delete\n3.Display first and last element\n4.Exit");

ch=sc.nextInt();

switch(ch)

{

case 1:

System.out.println("\nEnter total numbers you will enter : ");

int count=sc.nextInt();

for(int i=0;i<count;i++)

{

System.out.println("\nEnter Number: ");

int num=sc.nextInt();

ll.add(num);

}

break;

case 2:

System.out.println("removing an element");

ll.remove();

break;

case 3:

System.out.println("the first element is : "+ll.getFirst());

System.out.println("the last element is : "+ll.getLast());

break;

case 4:

break;

default:

}

System.out.println("do you want to continue?(y/n)");

ans=sc.next().charAt(0);

}while(ans=='y' || ans=='Y');

break;

case 4:

System.out.println("-----Array List-----");

System.out.println("10 added\n20added");

al.add(new Integer(10));

al.add(new Integer(20));

System.out.println("Removed element at index 0 from arrayList: "+al.remove(0));

System.out.println("\nSize: "+al.size());

break;

case 5:

System.out.println("-----Hash Map-----");

do{

System.out.println("\nEnter Key");

sc.next();

String key=sc.nextLine();

System.out.println("\nEnter Value: ");

int value=sc.nextInt();

hm.put(key, value);

System.out.println("\nRecord Insserted");

hm.put("roll",2464);

hm.put("Div", 4);

System.out.println("\nRemoved element (roll):"+hm.remove("roll"));

System.out.println("\nSize: "+hm.size());

System.out.println("\nHashcode Value for this map: "+hm.hashCode());

System.out.println("do you want to continue?(y/n)");

ans=sc.next().charAt(0);

}while(ans=='y' || ans=='Y');

break;

case 6:break;

default:System.out.println("invalid input...try again");

}

System.out.println("another data structure?(y/n) : ");

y=sc.next().charAt(0);

}while(y=='y' || y=='Y');

}

public static void main(String args[]) throws IOException

{

Types obj=new Types();

obj.func();

}

}

**OUTPUT:**

1.)Stack

2.)Queue

3.)Linked List

4.)Array List

5.)HashMap

6.)Exit

1

-----Stack-----

1. Push

2.Pop

3.Display Top of the stack

4.Exit

1

Enter total numbers you will enter :

4

Enter Number:

1

Enter Number:

2

Enter Number:

4

Enter Number:

3

do you want to continue?(y/n)

y

1. Push

2.Pop

3.Display Top of the stack

4.Exit

2

Popping the top of the stack

do you want to continue?(y/n)

y

1. Push

2.Pop

3.Display Top of the stack

4.Exit

3

The top of the stack is 4

do you want to continue?(y/n)

y

1. Push

2.Pop

3.Display Top of the stack

4.Exit

4

do you want to continue?(y/n)

n

another data structure?(y/n) :

y

1.)Stack

2.)Queue

3.)Linked List

4.)Array List

5.)HashMap

6.)Exit

2

-----Queue-----

1. Enqueue

2.Dequeue

3.Display

4.Exit

1

Enter total numbers you will enter :

4

Enter Number:

7

Enter Number:

6

Enter Number:

5

Enter Number:

4

do you want to continue?(y/n)

y

1. Enqueue

2.Dequeue

3.Display

4.Exit

2

removing the front element

do you want to continue?(y/n)

y

1. Enqueue

2.Dequeue

3.Display

4.Exit

2

removing the front element

do you want to continue?(y/n)

y

1. Enqueue

2.Dequeue

3.Display

4.Exit

3

6

7

do you want to continue?(y/n)

y

1. Enqueue

2.Dequeue

3.Display

4.Exit

1

Enter total numbers you will enter :

2

Enter Number:

1

Enter Number:

2

do you want to continue?(y/n)

y

1. Enqueue

2.Dequeue

3.Display

4.Exit

3

1

2

do you want to continue?(y/n)

n

another data structure?(y/n) :

y

1.)Stack

2.)Queue

3.)Linked List

4.)Array List

5.)HashMap

6.)Exit

3

-----Linked List-----

1. Insert

2.Delete

3.Display first and last element

4.Exit

1

Enter total numbers you will enter :

5

Enter Number:

1

Enter Number:

6

Enter Number:

5

Enter Number:

2

Enter Number:

4

do you want to continue?(y/n)

y

1. Insert

2.Delete

3.Display first and last element

4.Exit

2

removing an element

do you want to continue?(y/n)

y

1. Insert

2.Delete

3.Display first and last element

4.Exit

3

the first element is : 6

the last element is : 4

do you want to continue?(y/n)

y

1. Insert

2.Delete

3.Display first and last element

4.Exit

4

do you want to continue?(y/n)

n

another data structure?(y/n) :

y

1.)Stack

2.)Queue

3.)Linked List

4.)Array List

5.)HashMap

6.)Exit

4

-----Array List-----

10 added

20added

Removed element at index 0 from arrayList: 10

Size: 1

another data structure?(y/n) :

y

1.)Stack

2.)Queue

3.)Linked List

4.)Array List

5.)HashMap

6.)Exit

5

-----Hash Map-----

Enter Key

1

Enter Value:

6

Record Insserted

Removed element (roll):2464

Size: 2

Hashcode Value for this map: 68731

do you want to continue?(y/n)

y

Enter Key

33

Enter Value:

65

Record Insserted

Removed element (roll):2464

Size: 2

Hashcode Value for this map: 68790

do you want to continue?(y/n)

n

another data structure?(y/n) :

n