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Week 10 – Extra Programs:

1. Implement Interfaces – QUEUE OPERATIONS

```
import java.util.*;
interface IntQueue {
   void insert_rear(int item);
   int delete_front();
   void displayQ();
   }
 class Queue implements IntQueue {
 private int q[];
 private int rear;
 private int front;

 Queue(int size) {
 q = new int[size];
 rear = -1;
 front = 0;
 }

 public void insert_rear(int a) {
 if(rear==q.length-1)
 System.out.println("Queue is full.");
 else
 q[++rear] = a;
 }
```

```
 public int delete_front() {
 if(front>rear)
   {
      front=0;
      rear=-1;
      return -1;
   }
   return q[front++];
 }
public void displayQ()
{
   int i;
   if(front>rear)
   {
      System.out.println("Queue is empty\n");
      return ;
   }
   System.out.println("Contents of queue\n");
   for(i=front;i<=rear;i++)
   {
      System.out.println(q[i]);
   }
}
   }

class QueueInter {
 public static void main(String args[]) {
Scanner ss=new Scanner(System.in);
```

```
Queue myqueue = new Queue(3);
int choice;
   for(;;)
   {
      System.out.println("\n1:Insert rear\n2:Delete front\n3:Display\n4:exit\n");
      System.out.println("Enter the choice");
      choice=ss.nextInt();
      switch(choice)
      {
         case 1:System.out.println("Enter the item to be inserted");
         int item=ss.nextInt();
         myqueue.insert_rear(item);
         break;
         case 2:item=myqueue.delete_front();
         if(item==-1)
            System.out.println("Queue is empty\n");
         else
            System.out.println("Item deleted="+item);
         break;
         case 3:myqueue.displayQ();
         break;
         default:System.exit(0);
      }
   }
 }
}
```

OUTPUT:

```
D:\Kusum\III SEMESTER\OOJ2020>java QueueInter

1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
2
Queue is empty


1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
1
Enter the item to be inserted
1

1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
1
Enter the item to be inserted
2

1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
1
Enter the item to be inserted
3
```

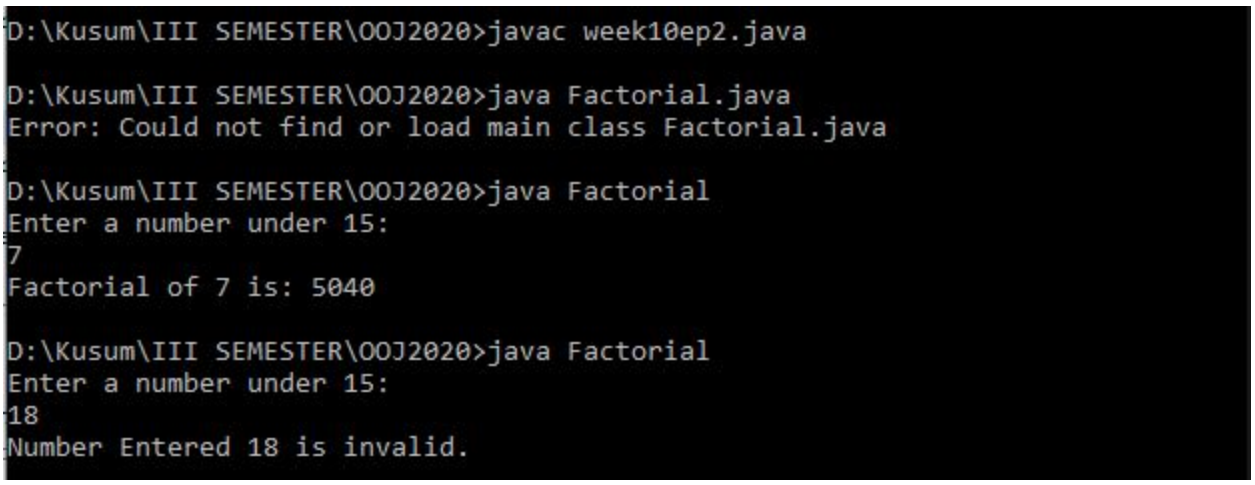
```
1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
1
Enter the item to be inserted
4
Queue is full.

1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
3
Contents of queue

1
2
3

1:Insert rear
2:Delete front
3:Display
4:exit

Enter the choice
4

D:\Kusum\III SEMESTER\OOJ2020>
```

2. Write a Java program to compute the factorial of a number. The input value must be tested for validity. If it is greater than 15, the method ComputeFactorial( ) should raise an Userdefined Exception MyException with appropriate messages.

```
import java.util.Scanner;

class MyException extends Exception {
   int num;

   MyException(int x) {
      num = x;
   }

   public String toString() {
      return "Number Entered " + num + " is invalid.";
   }
}

class Factorial {
   static int ComputeFactorial(int n) throws MyException {
      if(n > 15){
         throw new MyException(n);
      }
      else{
      if (n == 0)
         return 1;
      else
         return (n * ComputeFactorial(n - 1));
      }
   }

   public static void main(String args[]) {

      Scanner s = new Scanner(System.in);
      int i, fact = 1;
      System.out.println("Enter a number under 15:");
      int number = s.nextInt();
      try {
         fact = ComputeFactorial(number);
         System.out.println("Factorial of " + number + " is: " + fact);

      }
      catch (MyException e) {
         System.out.println(e);
```

```
    }

  }
}
```

OUTPUT:



3. Write a Java program to create an account class. Define appropriate constructor for this class. Implement a separate methods to display account balance and withdraw money. Raise a user defined exception if there is an attempt to withdraw money which is greater than the account balance. Make necessary assumptions required.

```
import java.util.Scanner;

 class Insufficient extends Exception {

    double amount;
    Insufficient(double amount) {
      this.amount = amount;
   }

   public String toString() {
    return "INSUFFICIENT BALANCE\nYOUR ACCOUNT BALANCE="+amount;
}
}

class ACCOUNT{
    Scanner s=new Scanner(System.in);
    double balance;
    int amt;
    long acc;
    ACCOUNT(double balance,long acc)
        {
          this.balance=balance;
          this.acc=acc;
        }
     double withdraw() throws Insufficient
     {
         System.out.println("ENTER THE AMOUNT TO BE WITHDRAWED");
         amt=s.nextInt();
         if(balance>=amt)
         {
             balance=balance-amt;
             return balance;
         }
         else
         throw new Insufficient(balance);
     }

   void display(){
    System.out.println("ACCOUNT BALANCE="+balance);
}
    }

    class accmain{
```

```
        public static void main(String args[])
        {
            Scanner s=new Scanner(System.in);
          System.out.println("ENTER THE INITIAL BALANCE");
         double b=s.nextDouble();
         System.out.println("ENTER THE ACCOUNT NUMBER");
         long l=s.nextLong();
         ACCOUNT acc= new ACCOUNT(b,l);
                        for(;;) {
         System.out.println("1-WITHDRAWAL\n2-DISPALY BALANCE\n3-EXIT");
         System.out.println("ENTER THE CHOICE");
         int c=s.nextInt();
         switch(c)
         {
            case 1:
            try{
               acc.withdraw();
            }catch(Insufficient e)
            {
               System.out.println(e);
            }
            break;
            case 2:
            acc.display();
                                break;
            case 3:
            System.exit(0);
            default:
            System.out.println("INVALID CHOICE");
         }
        }

}

 }
```

OUTPUT:

```
D:\Kusum\III SEMESTER\OOJ2020>javac week10ep3.java

D:\Kusum\III SEMESTER\OOJ2020>java accmain
ENTER THE INITIAL BALANCE
3000
ENTER THE ACCOUNT NUMBER
45789804
1-WITHDRAWAL
2-DISPALY BALANCE
3-EXIT
ENTER THE CHOICE
1
ENTER THE AMOUNT TO BE WITHDRAWED
600
1-WITHDRAWAL
2-DISPALY BALANCE
3-EXIT
ENTER THE CHOICE
2
ACCOUNT BALANCE=2400.0
1-WITHDRAWAL
2-DISPALY BALANCE
3-EXIT
ENTER THE CHOICE
1
ENTER THE AMOUNT TO BE WITHDRAWED
5000
INSUFFICIENT BALANCE
YOUR ACCOUNT BALANCE=2400.0
1-WITHDRAWAL
2-DISPALY BALANCE
3-EXIT
ENTER THE CHOICE
7
INVALID CHOICE
1-WITHDRAWAL
2-DISPALY BALANCE
3-EXIT
ENTER THE CHOICE
3

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```