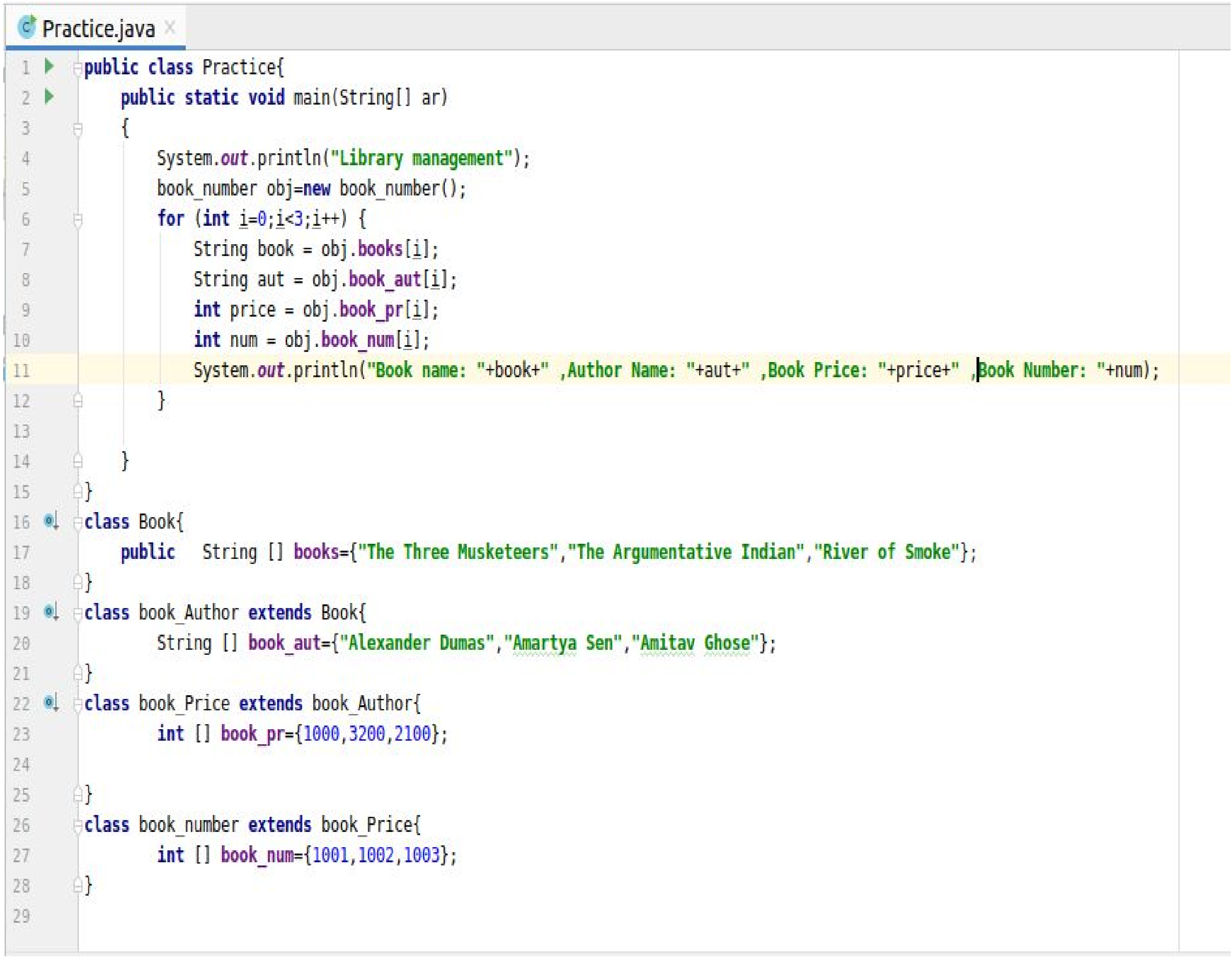
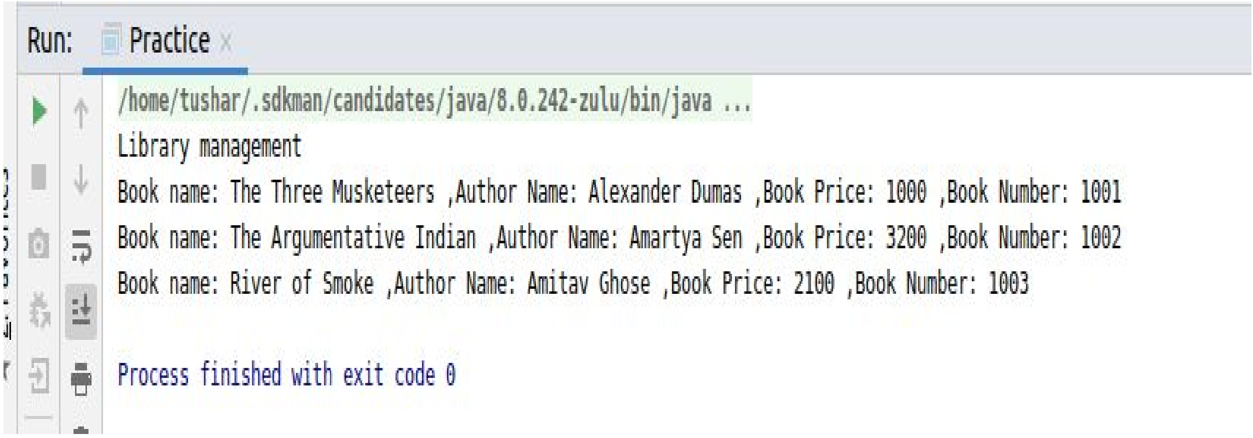
**Q1. Create Java classes having suitable attributes for Library management system.Use OOPs concepts in your design.**
**Answer:**



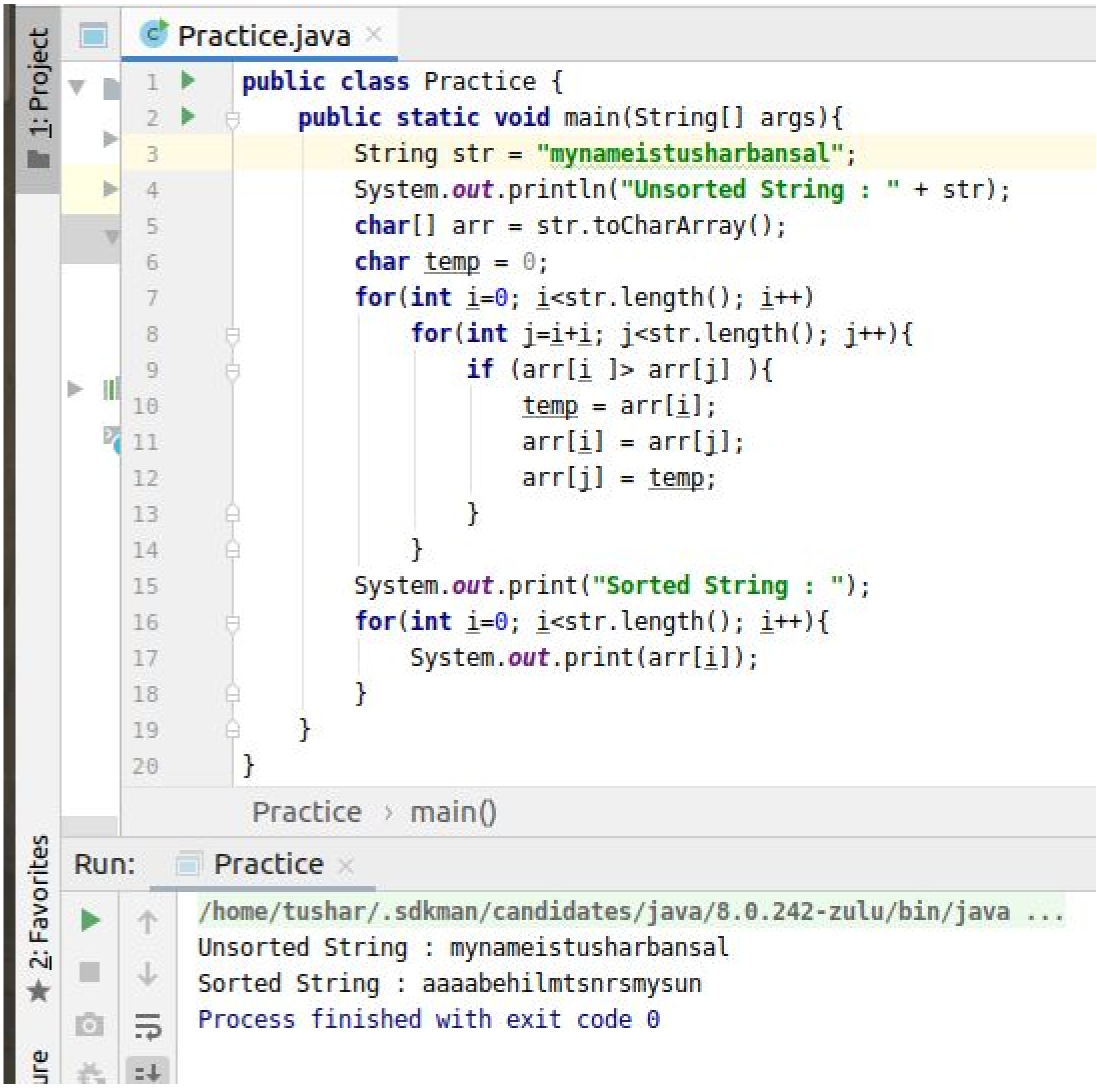
```java
public class Practice{
    public static void main(String[] ar)
    {
        System.out.println("Library management");
        book_number obj=new book_number();
        for (int i=0;i<3;i++) {
            String book = obj.books[i];
            String aut = obj.book_aut[i];
            int price = obj.book_pr[i];
            int num = obj.book_num[i];
            System.out.println("Book name: "+book+" ,Author Name: "+aut+" ,Book Price: "+price+" ,Book Number: "+num);
        }

    }
}
class Book{
    public   String [] books={"The Three Musketeers","The Argumentative Indian","River of Smoke"};
}
class book_Author extends Book{
        String [] book_aut={"Alexander Dumas","Amartya Sen","Amitav Ghose"};
}
class book_Price extends book_Author{
        int [] book_pr={1000,3200,2100};

}
class book_number extends book_Price{
        int [] book_num={1001,1002,1003};
}

```



```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
Library management
Book name: The Three Musketeers ,Author Name: Alexander Dumas ,Book Price: 1000 ,Book Number: 1001
Book name: The Argumentative Indian ,Author Name: Amartya Sen ,Book Price: 3200 ,Book Number: 1002
Book name: River of Smoke ,Author Name: Amitav Ghose ,Book Price: 2100 ,Book Number: 1003

Process finished with exit code 0
```

**Q2. WAP for sorting string without using string Methods?.**

Answer:



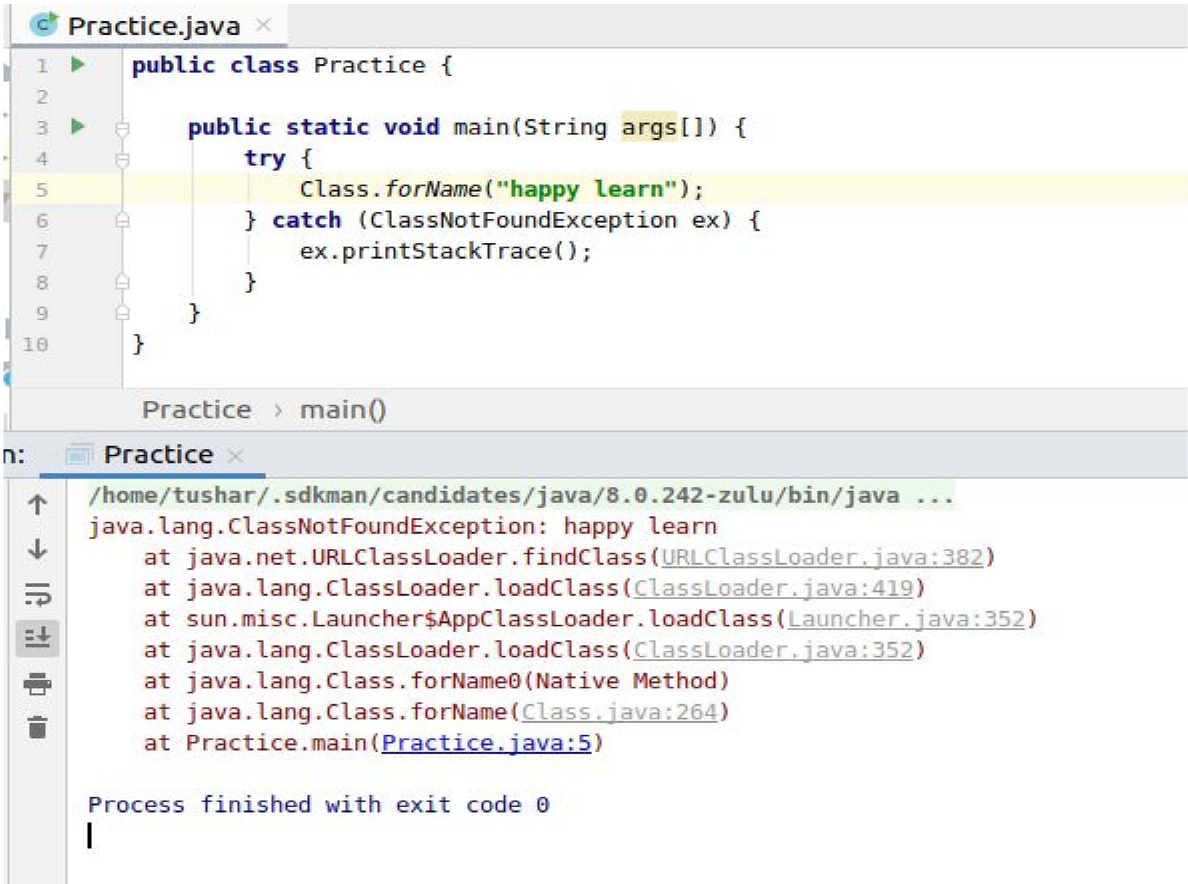
```java
public class Practice {
    public static void main(String[] args){
        String str = "mynameistusharbansal";
        System.out.println("Unsorted String : " + str);
        char[] arr = str.toCharArray();
        char temp = 0;
        for(int i=0; i<str.length(); i++)
            for(int j=i+i; j<str.length(); j++){
                if (arr[i ]> arr[j] ){
                    temp = arr[i];
                    arr[i] = arr[j];
                    arr[j] = temp;
                }
            }
        System.out.print("Sorted String : ");
        for(int i=0; i<str.length(); i++){
            System.out.print(arr[i]);
        }
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
Unsorted String : mynameistusharbansal
Sorted String : aaaabehilmtsnrsmysun
Process finished with exit code 0
```

**Q3. WAP to produce NoClassDefFoundError and ClassNotFoundException exception.**

**Answer:**

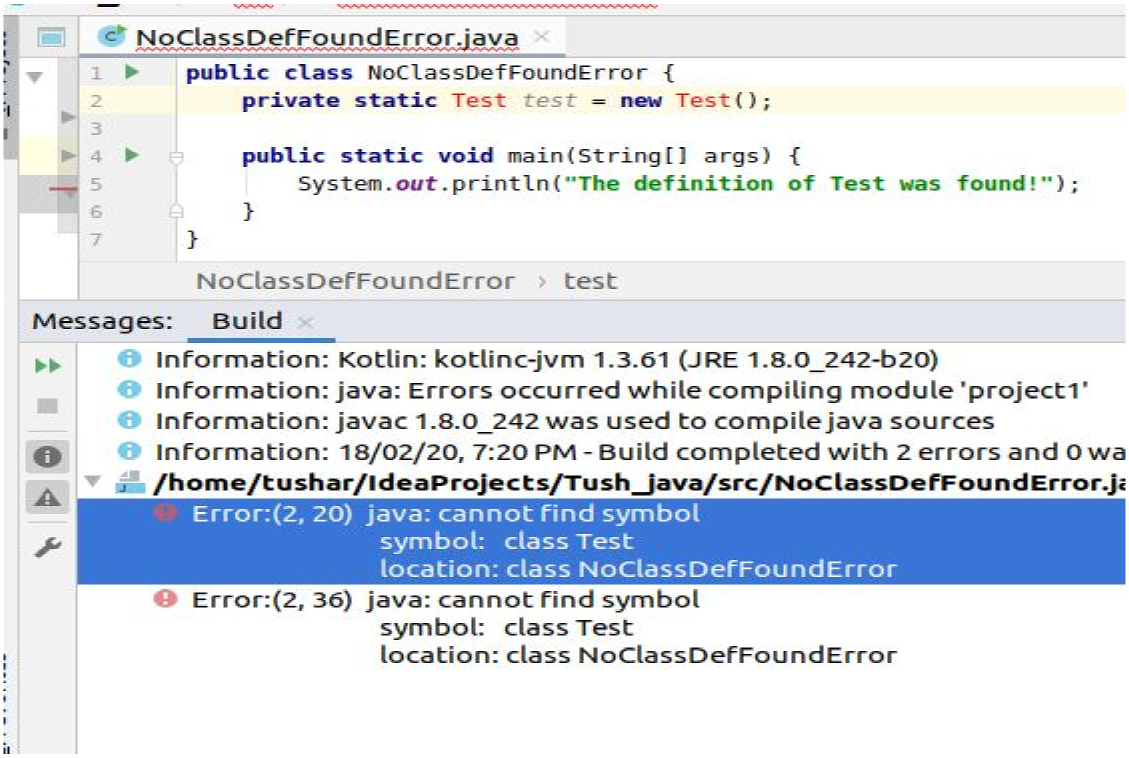
**----ClassNotFoundException:**



```java
public class Practice {

    public static void main(String args[]) {
        try {
            Class.forName("happy learn");
        } catch (ClassNotFoundException ex) {
            ex.printStackTrace();
        }
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
java.lang.ClassNotFoundException: happy learn
    at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:419)
    at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:352)
    at java.lang.ClassLoader.loadClass(ClassLoader.java:352)
    at java.lang.Class.forName0(Native Method)
    at java.lang.Class.forName(Class.java:264)
    at Practice.main(Practice.java:5)

Process finished with exit code 0
```

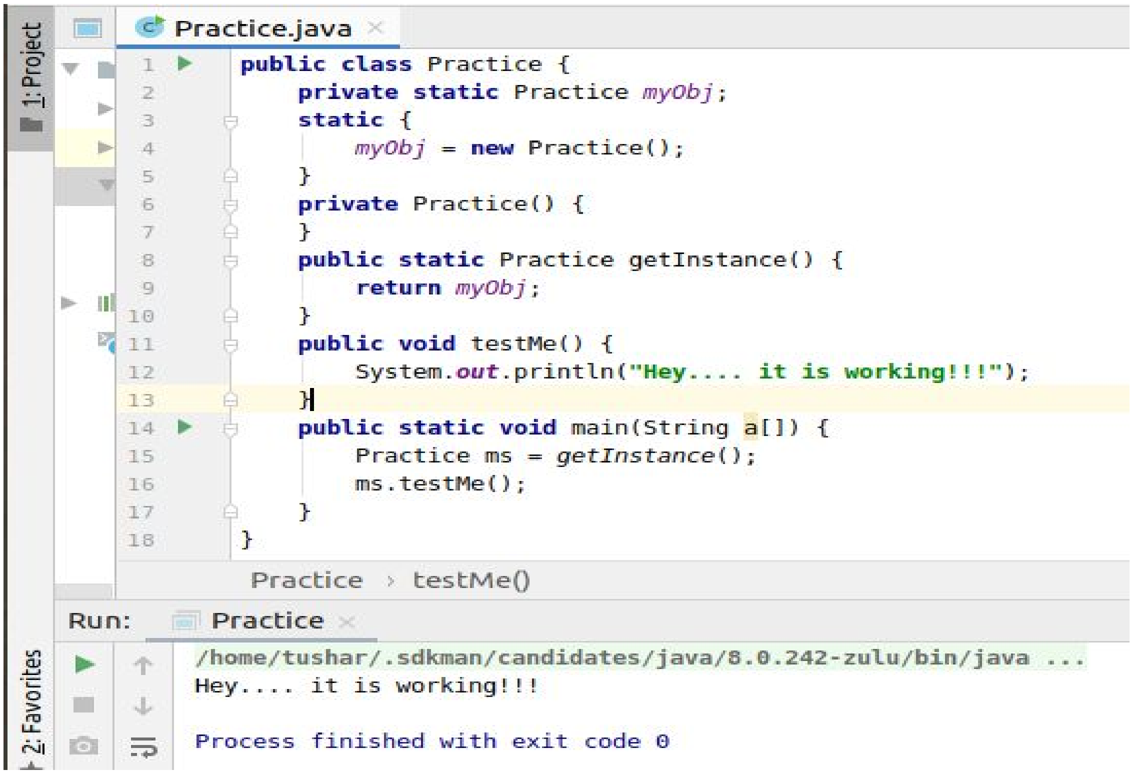
**------ NoClassDefFoundError:**



```java
public class NoClassDefFoundError {
    private static Test test = new Test();

    public static void main(String[] args) {
        System.out.println("The definition of Test was found!");
    }
}
```

```
Information: Kotlin: kotlinc-jvm 1.3.61 (JRE 1.8.0_242-b20)
Information: java: Errors occurred while compiling module 'project1'
Information: javac 1.8.0_242 was used to compile java sources
Information: 18/02/20, 7:20 PM - Build completed with 2 errors and 0 wa
/home/tushar/IdeaProjects/Tush_java/src/NoClassDefFoundError.ja
    Error:(2, 20)  java: cannot find symbol
                   symbol:   class Test
                   location: class NoClassDefFoundError
    Error:(2, 36)  java: cannot find symbol
                   symbol:   class Test
                   location: class NoClassDefFoundError
```

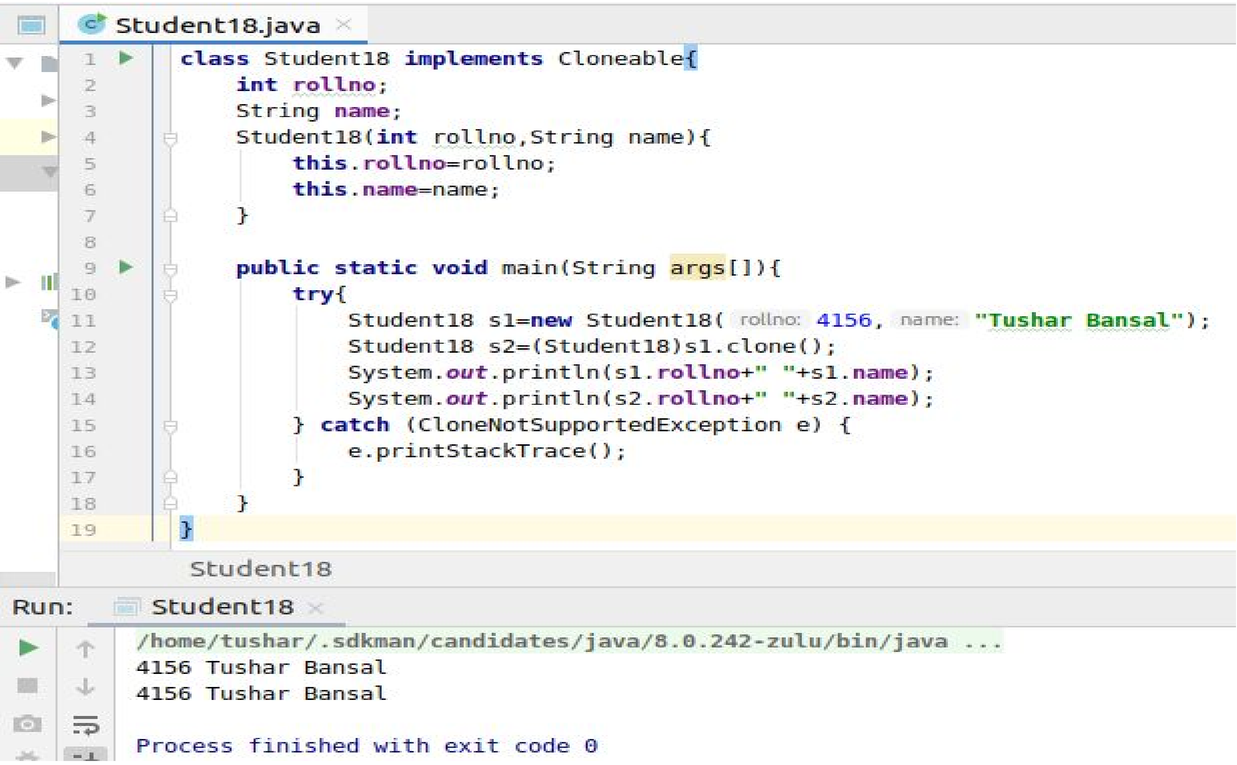
**Q4. WAP to create singleton class.**
**Answer:**



```java
public class Practice {
    private static Practice myObj;
    static {
        myObj = new Practice();
    }
    private Practice() {
    }
    public static Practice getInstance() {
        return myObj;
    }
    public void testMe() {
        System.out.println("Hey.... it is working!!!");
    }
    public static void main(String a[]) {
        Practice ms = getInstance();
        ms.testMe();
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
Hey.... it is working!!!

Process finished with exit code 0
```

**Q5. WAP to show object cloning in java using cloneable and copy constructor both.**
**Answer:**

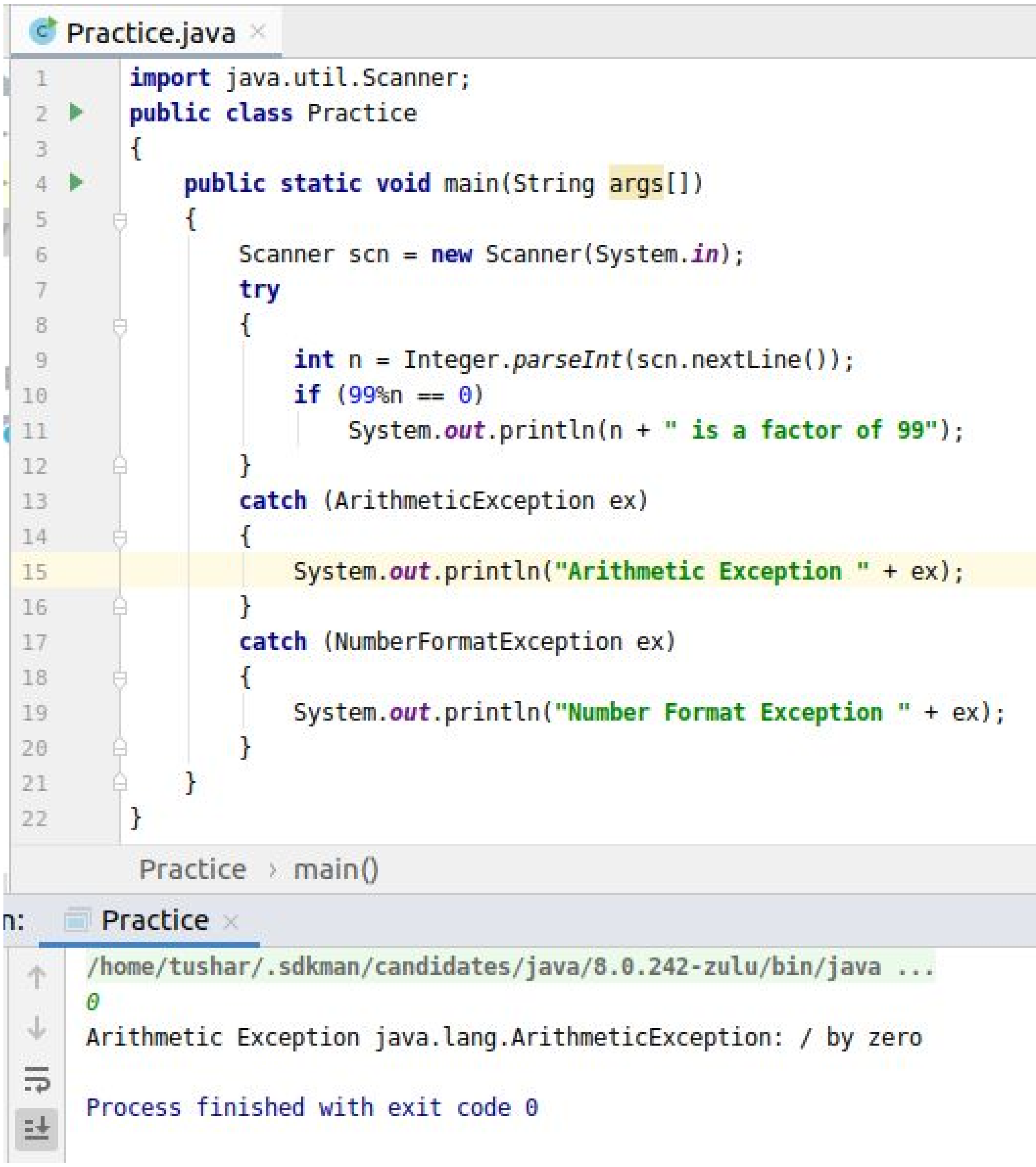


```java
class Student18 implements Cloneable{
    int rollno;
    String name;
    Student18(int rollno,String name){
        this.rollno=rollno;
        this.name=name;
    }

    public static void main(String args[]){
        try{
            Student18 s1=new Student18( rollno: 4156, name: "Tushar Bansal");
            Student18 s2=(Student18)s1.clone();
            System.out.println(s1.rollno+" "+s1.name);
            System.out.println(s2.rollno+" "+s2.name);
        } catch (CloneNotSupportedException e) {
            e.printStackTrace();
        }
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
4156 Tushar Bansal
4156 Tushar Bansal

Process finished with exit code 0
```

**Q6. WAP showing try, multi-catch and finally blocks.**

**Answer:**

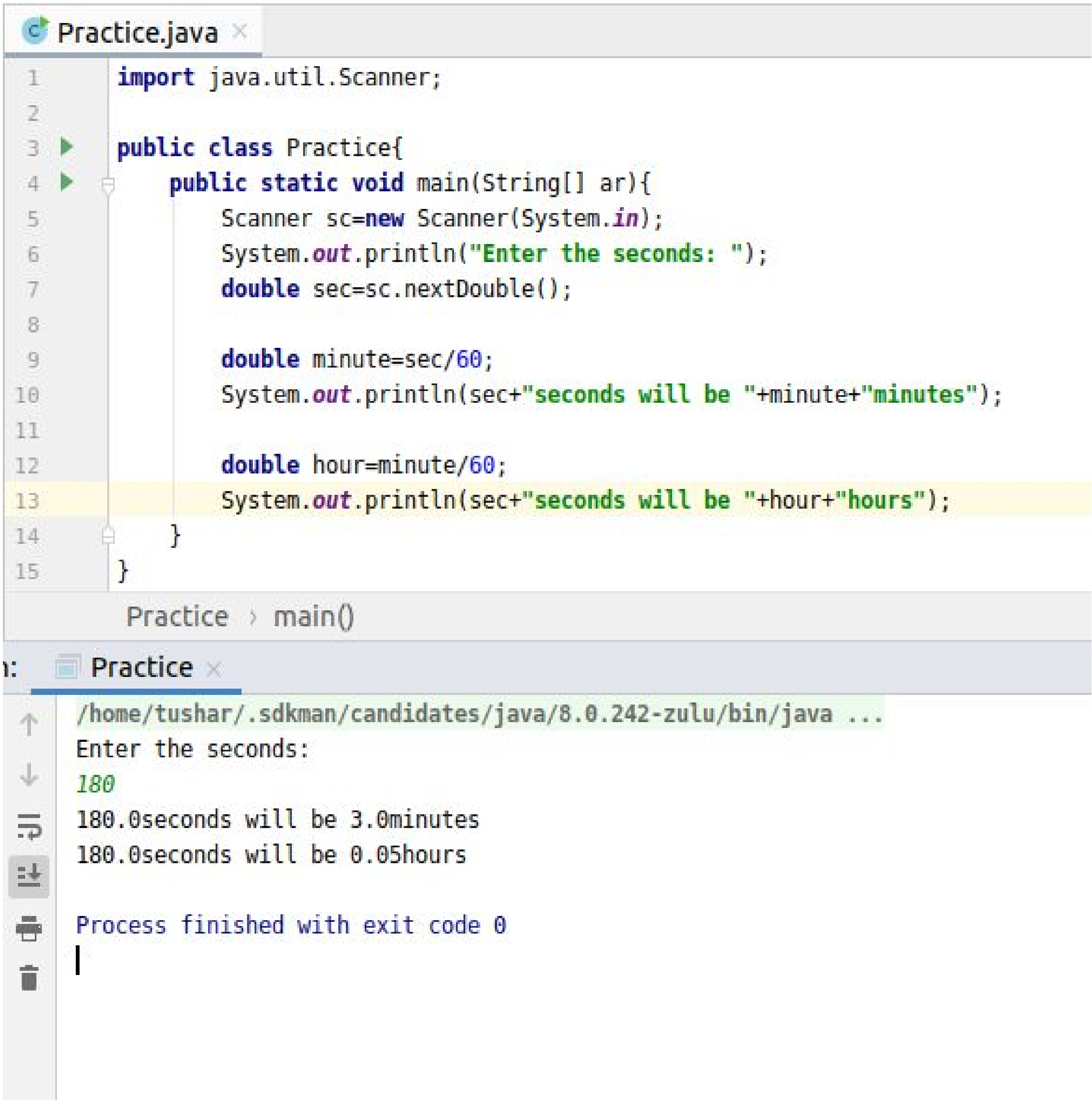


```java
import java.util.Scanner;
public class Practice
{
    public static void main(String args[])
    {
        Scanner scn = new Scanner(System.in);
        try
        {
            int n = Integer.parseInt(scn.nextLine());
            if (99%n == 0)
                System.out.println(n + " is a factor of 99");
        }
        catch (ArithmeticException ex)
        {
            System.out.println("Arithmetic Exception " + ex);
        }
        catch (NumberFormatException ex)
        {
            System.out.println("Number Format Exception " + ex);
        }
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
0
Arithmetic Exception java.lang.ArithmeticException: / by zero

Process finished with exit code 0
```

**Q7.WAP to convert seconds into days, hours, minutes and seconds.**

**Answer:**



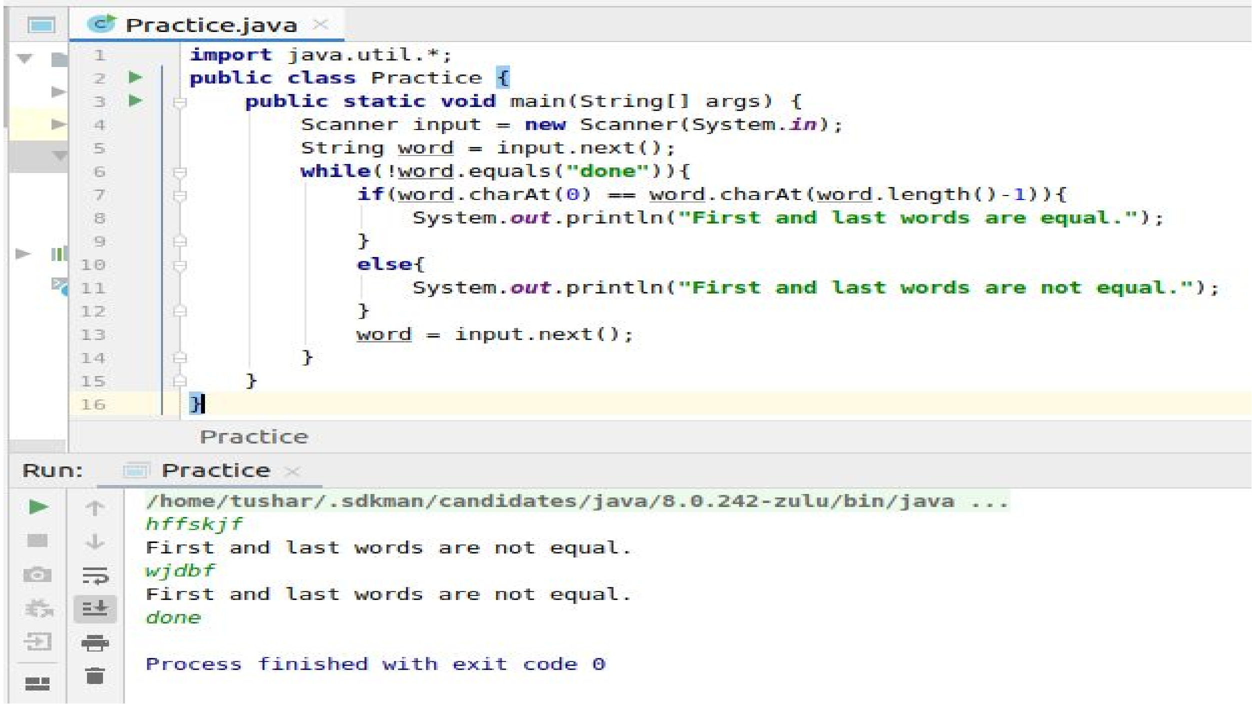
```java
import java.util.Scanner;

public class Practice{
    public static void main(String[] ar){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the seconds: ");
        double sec=sc.nextDouble();

        double minute=sec/60;
        System.out.println(sec+"seconds will be "+minute+"minutes");

        double hour=minute/60;
        System.out.println(sec+"seconds will be "+hour+"hours");
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
Enter the seconds:
180
180.0seconds will be 3.0minutes
180.0seconds will be 0.05hours

Process finished with exit code 0
```

**Q8.WAP to read words from the keyboard until the word done is entered. For each word except done, report whether its first character is equal to its last character. For the required loop.**

**Answer:**

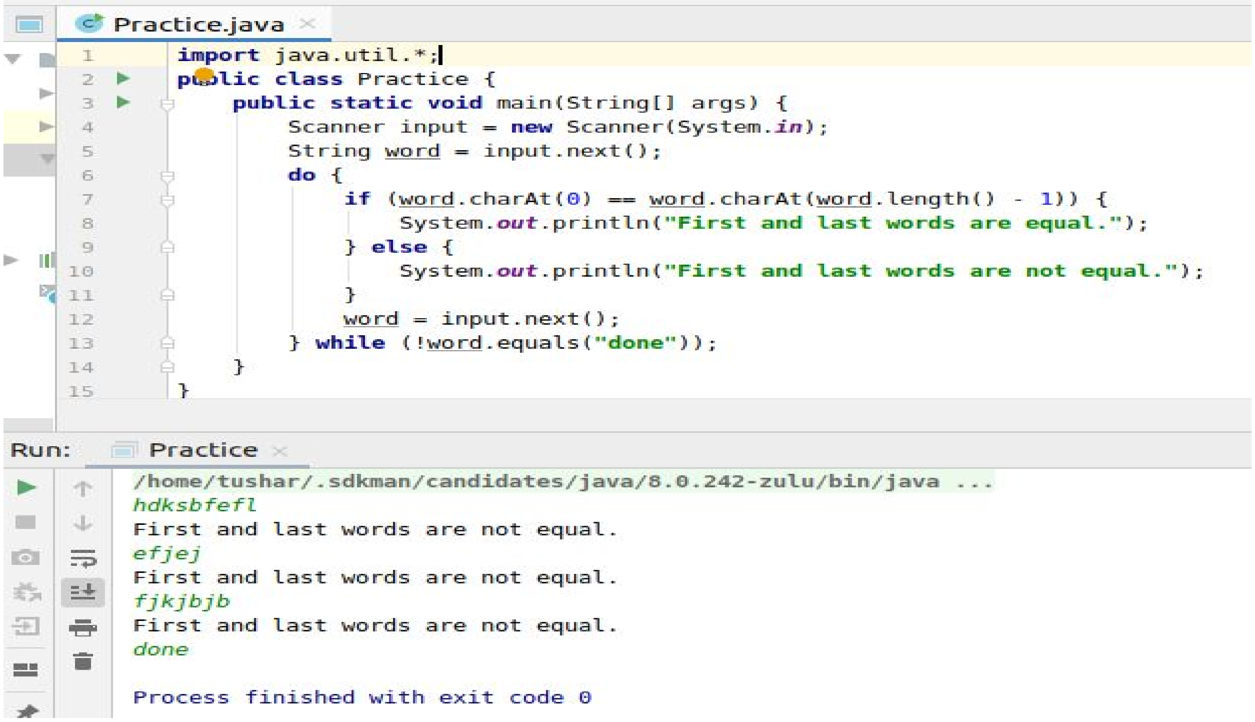
**Using while loop---->**



```
import java.util.*;
public class Practice {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        String word = input.next();
        while(!word.equals("done")){
            if(word.charAt(0) == word.charAt(word.length()-1)){
                System.out.println("First and last words are equal.");
            }
            else{
                System.out.println("First and last words are not equal.");
            }
            word = input.next();
        }
    }
}
```

```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
hffskjf
First and last words are not equal.
wjdbf
First and last words are not equal.
done

Process finished with exit code 0
```

**Using do-while ------>**



```
import java.util.*;
public class Practice {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        String word = input.next();
        do {
            if (word.charAt(0) == word.charAt(word.length() - 1)) {
                System.out.println("First and last words are equal.");
            } else {
                System.out.println("First and last words are not equal.");
            }
            word = input.next();
        } while (!word.equals("done"));
    }
}
```

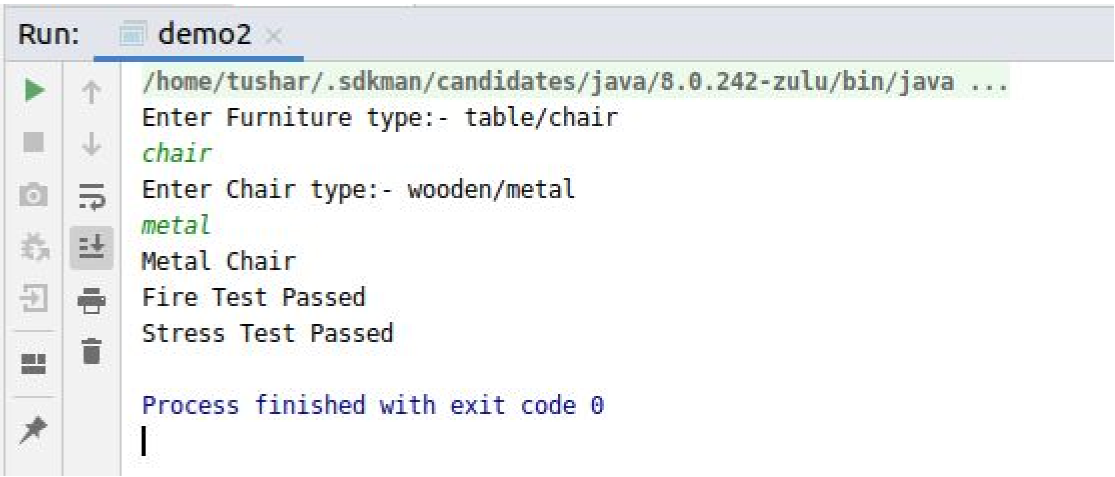
```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
hdksbfefl
First and last words are not equal.
efjej
First and last words are not equal.
fjkjbjb
First and last words are not equal.
done

Process finished with exit code 0
```

**Q9. Design classes having attributes for furniture where there are wooden chairs and tables, metal chairs and tables. There are stress and fire tests for each products.**

**Answer:**

```
import java.util.Scanner;

interface Furniture {
  public void stressTest();
  public void fireTest();
}

abstract class Table implements Furniture {
  public abstract String tableType();
}

abstract class Chair implements Furniture {
  public abstract String chairtype();
}

class MetalTable extends Table {
  public void stressTest() {
    System.out.println("Stress Test Passed....");
  }
  public void fireTest() {
    System.out.println("Fire Test Passed....");
  }
  public String tableType() {
    String s="Metal Table";
    return s;
  }
}

class WoodenTable extends Table {
  public void stressTest() {
    System.out.println("Stress Test Passed....");
  }
  public void fireTest() {
    System.out.println("Fire Test failed.... ");
  }
  public String tableType() {
    String s="Wooden Table";
    return s;
  }
}

class MetalChair extends Chair {
    public void stressTest(){
        System.out.println("Stress Test Passed");
    }
    public void fireTest() {
        System.out.println("Fire Test Passed");
    }
    public String chairtype() {
        String s="Metal Chair";
        return s;
    }
}

class WoodenChair extends Chair {
    public void stressTest() {
        System.out.println("Stress Test Failed");
    }
    public void fireTest() {
        System.out.println("Fire test Failed");
    }
    public String chairtype() {
        String s="Wooden Chair";
        return s;
    }
}

public class demo2 {
    public static void main(String[] args) {
        Chair chair = null;
        Table table = null;
        Scanner input = new Scanner(System.in);

        System.out.println("Enter Furniture type:- table/chair");
        String str1 = input.nextLine();

        if(str1.equals("chair")){
            System.out.println("Enter Chair type:- wooden/metal");
            String str = input.nextLine();
            if(str.equals("wooden")){
                chair = new WoodenChair();
                System.out.println(chair.chairtype());
                chair.fireTest();
                chair.stressTest();
            }
            else if (str.equals("metal")) {
                chair = new MetalChair();
                System.out.println(chair.chairtype());
                chair.fireTest();
                chair.stressTest();
            }
            else {
```

```
        System.out.println("Wrong input...");
      }

    }
    else if(str1.equals("table")) {
      System.out.println("Enter Table type:- wooden/metal");
      String str = input.nextLine();
      if(str.equals("wooden")){
        table = new WoodenTable();
        System.out.println(table.tableType());
        table.fireTest();
        table.stressTest();
      }
      else if(str.equals("metal")){
        table = new MetalTable();
        System.out.println(table.tableType());
        table.fireTest();
        table.stressTest();
      }
      else {
        System.out.println("Wrong input...");
      }

    }
    else {
      System.out.println("Wrong Input...");
    }

  }
}
```



```
/home/tushar/.sdkman/candidates/java/8.0.242-zulu/bin/java ...
Enter Furniture type:- table/chair
chair
Enter Chair type:- wooden/metal
metal
Metal Chair
Fire Test Passed
Stress Test Passed

Process finished with exit code 0
```

**11. Convert the following code so that it uses nested while statements instead of for statements:**

```
int s = 0;
int t = 1;
for (int i = 0; i < 10; i++)
{
s = s + i;
for (int j = i; j > 0; j−−)
{
t = t * (j - i);
}
s = s * t;
System.out.println("T is " + t);
}
System.out.println("S is " + s);
```

**Answer:**

```
int s = 0;
int t = 1;
Int i=0;
int j ;
 while(i<10)
{
s = s + i;
j=i;
while(j>0)
{
t = t * (j - i);
j--;
}
s = s * t;
System.out.println("T is " + t);
i++;
}
System.out.println("S is " + s);
```

**Q12.What will be the output on new Child(); ?**

```
class Parent extends Grandparent {

    {

        System.out.println("instance - parent");
    }
    public Parent() {

        System.out.println("constructor - parent");

    }

    static {
        System.out.println("static - parent");
    }
    }
    class Grandparent {
    static {
        System.out.println("static - grandparent");
    }
    {
        System.out.println("instance - grandparent");

    }
    public Grandparent() {
        System.out.println("constructor - grandparent");
    }
    }
    class Child extends Parent {

    public Child() {
        System.out.println("constructor - child");
    }
    static {
        System.out.println("static - child");
    }
    {
        System.out.println("instance - child");
    }
    }
```

**Output :-**

```
static - grandparent
static - parent
static - child
instance - grandparent
```

```
constructor - grandparent
instance - parent
constructor - parent
instance - child
constructor - child
```