**Exercise 29:** *Create a package called shapes. Create some classes in the package representing some*

*common geometric shapes like Square, Triangle, Circle and so on. Create a class called*

*TestShapes and create objects for all the shapes and print corresponding messages.*

*Execute the TestShapes class.*

**Solution 29:**

**package** shapes;

**public** **class** Square {

//Default constructor

**public** Square() {

System.***out***.println("Square class");

}

}

**package** shapes;

**public** **class** Triangle {

//Default Constructor

**public** Triangle() {

System.***out***.println("Triangle class");

}

}

**package** shapes;

**public** **class** Circle {

//Default Constructor

**public** Circle() {

System.***out***.println("Circle class");

}

}

**package** shapes;

/\*Create a package called shapes. Create some classes in the package representing some

common geometric shapes like Square, Triangle, Circle and so on. Create a class called

TestShapes and create objects for all the shapes and print corresponding messages.

Execute the TestShapes class.\*/

**public** **class** TestShapes {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

//creating different objects.

Square s=**new** Square();

Triangle t=**new** Triangle();

Circle c=**new** Circle();

}

}

**Output:**

Square class

Triangle class

Circle class

**Exercise30:**

1. *Create a new project in which create a package named org.animals. In that create various classes like Lion, Tiger, Deer, Monkey, Elephant and Giraffe. In each class create data members like color, weight,age etc. Create methods like isVegetarian, canClimb, sound etc*
2. *Create another project and in that create a package called zoo and create a class called VandalurZooand create objects for the animals that are existing in zoo and print the characteristic of each animal.*

**Solution30:**

//package that will be converted into a Jar file.

**package** org.animals;

**public** **class** Lion {

**private** String color;

**private** **int** weight;

**private** **int** age;

**public** String getColor() {

**return** color;

}

**public** **void** setColor(String color) {

**this**.color = color;

}

**public** **int** getWeight() {

**return** weight;

}

**public** **void** setWeight(**int** weight) {

**this**.weight = weight;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** Lion(String color, **int** weight, **int** age) {

**super**();

**this**.color = color;

**this**.weight = weight;

**this**.age = age;

}

**public** **void** isVegetarian() {

System.***out***.println("Lion is non-vegetarian");

}

**public** **void** canClimb() {

System.***out***.println("Lion cannot climb");

}

}

//package that will be converted into a Jar file.

**package** org.animals;

**public** **class** Tiger {

**private** String color;

**private** **int** weight;

**private** **int** age;

**public** String getColor() {

**return** color;

}

**public** **void** setColor(String color) {

**this**.color = color;

}

**public** **int** getWeight() {

**return** weight;

}

**public** **void** setWeight(**int** weight) {

**this**.weight = weight;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** Tiger(String color, **int** weight, **int** age) {

**super**();

**this**.color = color;

**this**.weight = weight;

**this**.age = age;

}

**public** **void** isVegetarian() {

System.***out***.println("Tiger is non-vegetarian");

}

**public** **void** canClimb() {

System.***out***.println("Tiger cannot climb");

}

}

//package that will be converted into a Jar file.

**package** org.animals;

**public** **class** Monkey {

**private** String color;

**private** **int** weight;

**private** **int** age;

**public** String getColor() {

**return** color;

}

**public** **void** setColor(String color) {

**this**.color = color;

}

**public** **int** getWeight() {

**return** weight;

}

**public** **void** setWeight(**int** weight) {

**this**.weight = weight;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** Monkey(String color, **int** weight, **int** age) {

**super**();

**this**.color = color;

**this**.weight = weight;

**this**.age = age;

}

**public** **void** isVegetarian() {

System.***out***.println("Monkey is vegetarian");

}

**public** **void** canClimb() {

System.***out***.println("Monkey can climb");

}

}

//package that will be converted into a Jar file.

**package** org.animals;

**public** **class** Elephant {

**private** String color;

**private** **int** weight;

**private** **int** age;

**public** String getColor() {

**return** color;

}

**public** **void** setColor(String color) {

**this**.color = color;

}

**public** **int** getWeight() {

**return** weight;

}

**public** **void** setWeight(**int** weight) {

**this**.weight = weight;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** Elephant(String color, **int** weight, **int** age) {

**super**();

**this**.color = color;

**this**.weight = weight;

**this**.age = age;

}

**public** **void** isVegetarian() {

System.***out***.println("Elephant is vegetarian");

}

**public** **void** canClimb() {

System.***out***.println("Elephant cannot climb");

}

}

//package that will be converted into a Jar file.

**package** org.animals;

**public** **class** Giraffe {

**private** String color;

**private** **int** weight;

**private** **int** age;

**public** String getColor() {

**return** color;

}

**public** **void** setColor(String color) {

**this**.color = color;

}

**public** **int** getWeight() {

**return** weight;

}

**public** **void** setWeight(**int** weight) {

**this**.weight = weight;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** Giraffe(String color, **int** weight, **int** age) {

**super**();

**this**.color = color;

**this**.weight = weight;

**this**.age = age;

}

**public** **void** isVegetarian() {

System.***out***.println("Giraffe is vegetarian");

}

**public** **void** canClimb() {

System.***out***.println("Giraffe cannot climb");

}

}

**package** zoo;

//importing the package from the jar file.

**import** org.animals.\*;

//Creating the objects of the classes from the Jar file and calling their functions.

**public** **class** VandalurZoo {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

//classes from the jar file.

Elephant e=**new** Elephant("grey",200,13);

Giraffe g=**new** Giraffe("Brown",250,12);

Lion l=**new** Lion("Brown",150,10);

Monkey m=**new** Monkey("Dark Brown",50,19);

Tiger t=**new** Tiger("Orange",100,12);

//calling the functions.

e.canClimb();

e.isVegetarian();

g.canClimb();

g.isVegetarian();

l.canClimb();

l.isVegetarian();

m.canClimb();

m.isVegetarian();

t.canClimb();

t.isVegetarian();

}

}

**Exercise 31:** *Create a class which displays the following about the JVM.*

1. *Version of Java*
2. *Vendor for Java*
3. *Class Path*
4. *Installed home directory*
5. *OS name on which it is installed with version*

**Solution 31:**

**package** com.hsbc.day3;

//To display some information about JVM

**public** **class** Information {

**public** **static** **void** main(String[] args) {

**double** version = Double.*parseDouble*(System.*getProperty*("java.specification.version"));

//JAVA version

System.***out***.println("The version of java is: "+version);

//JVM vendor

System.***out***.println ("JVM Vendor : " + System.*getProperty*("java.vendor") );

//Class Path

System.***out***.println("ClassPath: "+System.*getProperty*("java.class.path"));

//Installed Home Diectory

System.***out***.println("The installed home directory: "+System.*getProperty*("user.dir"));

//OS Name and version

System.***out***.println("OS Name: "+System.*getProperty*("os.name"));

//System.getProperties().list(System.out);

}

}

**Output:**

The version of java is: 1.8

JVM Vendor : Oracle Corporation

ClassPath: C:\Users\Sunrise\Documents\workspace-spring-tool-suite-4-4.2.0.RELEASE\day 3\bin;C:\Users\Sunrise\Desktop\SampleLib1.jar

The installed home directory: C:\Users\Sunrise\Documents\workspace-spring-tool-suite-4-4.2.0.RELEASE\day 3

Windows 10

**package** com.hsbc.day3;

**import** java.util.Scanner;

/\*Create a class called Student. Get the details like name, degree, age, total marks and

percentage from the user and display the same.\*/

**Exercise 32:** *Create a class called Student. Get the details like name, degree, age, total marks and*

*percentage from the user and display the same.*

**Solution 32:**

**public** **class** Student {

**private** String name,degree;

**private** **int** age,totalMarks;

**private** **float** percentage;

**public** String getName() {

**return** name;

}

**public** **void** setName(String name) {

**this**.name = name;

}

**public** String getDegree() {

**return** degree;

}

**public** **void** setDegree(String degree) {

**this**.degree = degree;

}

**public** **int** getAge() {

**return** age;

}

**public** **void** setAge(**int** age) {

**this**.age = age;

}

**public** **int** getTotalMarks() {

**return** totalMarks;

}

**public** **void** setTotalMarks(**int** totalMarks) {

**this**.totalMarks = totalMarks;

}

**public** **float** getPercentage() {

**return** percentage;

}

**public** **void** setPercentage(**float** percentage) {

**this**.percentage = percentage;

}

**public** **static** **void** main(String[] args) {

Scanner sc=**new** Scanner(System.***in***);

Student s=**new** Student();

System.***out***.println("Enter name,degree,age,total marks,percentage");

s.setName(sc.nextLine());

s.setDegree(sc.next());

s.setAge(sc.nextInt());

s.setTotalMarks(sc.nextInt());

s.setPercentage(sc.nextFloat());

sc.close();

//Displaying the details.

System.***out***.println("Name: "+s.getName());

System.***out***.println("Age: "+s.getAge());

System.***out***.println("Degree: "+s.getDegree());

System.***out***.println("Total Marks: "+s.getTotalMarks());

System.***out***.println("Percentage: "+s.getPercentage());

}

}

**Output:**

Enter name,degree,age,total marks,percentage

Ram

M.A.

20

426

89

Name: Ram

Age: 20

Degree: M.A.

Total Marks: 426

Percentage: 89.0

**Exercise 50:** *In the Lab Exercise 14, change the code such that the numbers are taken as input from the*

*user. Handle the appropriate exceptions.*

**Solution 50:**

**package** com.hsbc.day4;

**import** java.util.Scanner;

//package for exception

**import** java.io.\*;

**import** java.util.InputMismatchException;

//demonstrating the arithmetic exception and input mismatch exception

**public** **class** Calculator {

//throwing the exception that might occcur

**public** **void** add(**int** a, **int** b) **throws** InputMismatchException

{

**int** sum=a+b;

System.***out***.println("The numbers are a: "+a+" b: "+b);

System.***out***.println("The sum is: "+sum);

}

**public** **void** diff(**double** a, **double** b) **throws** InputMismatchException

{

**double** diff=a-b;

System.***out***.println("The numbers are a: "+a+" b: "+b);

System.***out***.println("The difference is: "+diff);

}

**public** **void** mul(**int** a, **int** b) **throws** InputMismatchException

{

**int** mul=a\*b;

System.***out***.println("The numbers are a: "+a+" b: "+b);

System.***out***.println("The product is: "+mul);

}

**public** **void** division(**int** a, **int** b) **throws** InputMismatchException,ArithmeticException

{

**float** div=a/b;

System.***out***.println("The numbers are a: "+a+" b: "+b);

System.***out***.println("The division is: "+div);

}

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

Calculator c=**new** Calculator(); //creation of object

Scanner sc=**new** Scanner(System.***in***);

**int** a=0,b=0;

System.***out***.println("Enter the values of a and b");

//try block for input mismatch exception

**try** {

a=sc.nextInt();

b=sc.nextInt();

}

//catch block

**catch**(InputMismatchException i)

{

i.printStackTrace();

}

c.add(a, b);

c.diff(a, b);

c.mul(a, b);

//try block for arithmetic exception

**try** {

c.division(a, b);

}

//catch block

**catch**(ArithmeticException e)

{

e.printStackTrace();

}

}

}

**Output:**

Enter the values of a and b

4.5

java.util.InputMismatchException

at java.util.Scanner.throwFor(Unknown Source)

at java.util.Scanner.next(Unknown Source)

at java.util.Scanner.nextInt(Unknown Source)

at java.util.Scanner.nextInt(Unknown Source)

at com.hsbc.day4.Calculator.main(Calculator.java:44)

Enter the values of a and b

5

0

The numbers are a: 5 b: 0

The sum is: 5

The numbers are a: 5.0 b: 0.0

The difference is: 5.0

The numbers are a: 5 b: 0

The product is: 0

java.lang.ArithmeticException: / by zero

at com.hsbc.day4.Calculator.division(Calculator.java:32)

at com.hsbc.day4.Calculator.main(Calculator.java:59)

**Exercise51:** *In the Lab Exercise 17, handle the scenarios if the String variable is not initialized.*

**Solution:**

**package** com.hsbc.pack.day2;

/\*To demonstrate the operations performed on string and check

the exception when the string is not initialised.\*/

**public** **class** Solution\_17 {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

StringBuffer sb=**new** StringBuffer("The quick brown fox jumps over the lazy dog");

//try block uninitialise string

**try** {

String st;

System.***out***.println(st);

}

//catch block

**catch**(NullPointerException e)

{

e.printStackTrace();

}

//Print the character at the 12th index.

System.***out***.println("The character at 12th index is: "+sb.charAt(12));

//Check whether the String contains the word “is”

String str=sb.toString();

**if**(str.contains("is"))

System.***out***.println("The string contains is");

**else**

System.***out***.println("The string does not contains is");

//Add the string “and killed it” to the existing string

System.***out***.println("The apended string is: ");

System.***out***.println(sb.append(" and killed it."));

//Check whether the String ends with the word “dogs”.

String arr[]=str.split(" ",str.length());

**if**(arr[arr.length-1].equals("dogs"))

System.***out***.println("Yes, the string ends with dogs.");

**else**

System.***out***.println("No, It doesn't ends with dogs.");

//Check whether the String is equal to “The quick brown Fox jumps over the lazy Dog”.

StringBuffer sb1=**new** StringBuffer("The quick brown Fox jumps over the lazy Dog");

System.***out***.println(sb1);

**if**(sb.equals(sb1))

System.***out***.println("Both the strings are equal.");

**else**

System.***out***.println("Both the strings are not equal.");

//Check whether the String is equal to “THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG”.

String s1=sb1.toString().toUpperCase();

System.***out***.println(s1);

**if**(sb.equals(s1))

System.***out***.println("Both the strings are equal.");

**else**

System.***out***.println("Both the strings are not equal.");

//Find the index position of the character “a”.

System.***out***.println("The index position of the character a is: "+sb.indexOf("a"));

//Find the last index position of the character “e”.

System.***out***.println("The last index position of the character e is: "+sb.lastIndexOf("e"));

//Find the length of the String.

System.***out***.println("The length of the string is: "+sb.length());

//Check whether the String matches to “The quick brown Fox jumps over the lazy Dog”.

**if**(str.compareTo("The quick brown Fox jumps over the lazy Dog")==0)

System.***out***.println("Equal");

**else**

System.***out***.println("Not Equal");

//Replace the word “The” with the word “A”.

//String s2= sb.replace(0,3,"A").toString();

//System.out.println("The replaced string is: "+s2);

String word="";

String t="";

**for**(**int** i=0;i<str.length();i++)

{

**char** ch=str.charAt(i);

**if**(Character.*isLetter*(ch))

{

word=word+ch;

}

**else**

{

**if**(word.equals("The")||word.equals("the"))

{

t=t+" A";

word="";

}

**else**

{

t=t+" "+word;

word="";

}

}

}

System.***out***.println("After replacing "+ t);

//Split the above string into two such that two animal names do not come together.

StringBuilder first=**new** StringBuilder();

StringBuilder second=**new** StringBuilder();

System.***out***.println("After splitting");

**int** count=0;

**for**(**int** i=0;i<arr.length;i++)

{

**if**(arr[i].equals("fox")) {

first.append(arr[i]+" ");

count=1;

}

**else** **if**(count==0)

{

first.append(arr[i]+" ");

}

**else**

{

second.append(arr[i]+" ");

}

}

System.***out***.println("First Part: "+first);

System.***out***.println("Second Part: "+second);

//Print the animal names alone separately from the above string.

System.***out***.println("The name of animals:");

**for**(**int** i=0;i<arr.length;i++)

{

**if**(arr[i].equals("fox")||(arr[i].equals("dog")))

System.***out***.println(arr[i]);

}

//Print the above string in completely upper case.

System.***out***.println("The string in upper case: "+str.toUpperCase());

//Print the above string in completely lower case.

System.***out***.println("The string in lower case: "+str.toLowerCase());

}

}

**Output:**

Exception in thread "main" java.lang.Error: Unresolved compilation problem:

The local variable st may not have been initialized

at com.hsbc.pack.day2.Solution\_17.main(Solution\_17.java:14)

**Exercise 52:** *Using Lab Exercise 17, catch and demonstrate the required exceptions.*

**Solution 52:**

**package** com.hsbc.day4;

**import** java.io.\*;

//Demonstrating StringIndexOutOfBoundsException

**public** **class** StringException {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

String str = "Hello World.";

//Try block

**try** {

System.***out***.println("Length of the String is: " + str.length());

//Exception occurs here.

System.***out***.println("Length of the substring is: " + str.substring(28));

}

//Catch block

**catch**(StringIndexOutOfBoundsException e)

{

e.printStackTrace();

System.***out***.println("String Index is out of bounds");

}

}

}

**Output:**

Length of the String is: 12java.lang.StringIndexOutOfBoundsException: String index out of range: -16

at java.lang.String.substring(Unknown Source)

at com.hsbc.day4.StringException.main(StringException.java:14)

String Index is out of bounds

**Exercise 54 :***By using multiple catch blocks, write a class to demonstrate the order of the execution of the*

*catch blocks usingNegativeArraySizeException,ArrayIndexOutOfBoundsException,*

*StringIndexOutOfBoundsException, IndexOutOfBoundsException, NullPointerException,*

*ArithmeticException and print the stack trace for each exception.*

**Solution 54:**

**package** com.hsbc.day4;

**import** java.util.Scanner;

/\*By using multiple catch blocks, write a class to demonstrate the order of the execution of the

catch blocks usingNegativeArraySizeException,ArrayIndexOutOfBoundsException,

StringIndexOutOfBoundsException, IndexOutOfBoundsException, NullPointerException,

ArithmeticException and print the stack trace for each exception.\*/

**public** **class** MultipleException {

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

Scanner sc=**new** Scanner(System.***in***);

String str = "Hello World.";

System.***out***.println("enter size of array:");

**int** s=sc.nextInt();

MultipleException ref = **null**;

System.***out***.println("Enter a and b");

**int** a=sc.nextInt();

**int** b=sc.nextInt();

//Try block

**try** {

System.***out***.println("Length of the String is: " + str.length());

//Exception occurs here.

System.***out***.println("Length of the substring is: " + str.substring(28));

//This will throw NegativeArraySizeException

**int**[] arr=**new** **int**[s];

//This will throw ArrayIndexOutOfBound exception

arr[17]=9;

//This will throw a NullPointerException

ref.toString();

//This will throw Arithmetic exception

**int** c=a/b;

}

//Catch block

**catch**(StringIndexOutOfBoundsException e)

{

e.printStackTrace();

}

**catch**(ArrayIndexOutOfBoundsException e)

{

e.printStackTrace();

}

**catch**(NullPointerException e)

{

e.printStackTrace();

}

**catch**(NegativeArraySizeException e)

{

e.printStackTrace();

}

**catch**(ArithmeticException e)

{

e.printStackTrace();

}

}

}

**Output:**

enter size of array:

-8

Enter a and b

2

5

Length of the String is: 12

java.lang.StringIndexOutOfBoundsException: String index out of range: -16

at java.lang.String.substring(Unknown Source)

at com.hsbc.day4.MultipleException.main(MultipleException.java:20)

enter size of array:

-4

Enter a and b

2

3

Length of the String is: 12

java.lang.NegativeArraySizeException

at com.hsbc.day4.MultipleException.main(MultipleException.java:26)

**Exercise 55:** *In the Lab Exercise 46, handle the expected exceptions by writing custom defined exceptions.*

**Exercise 56:** *Create a class such that it resets the value of the objects it used to null after its usage in all*

*cases.*

**Solution 56:**

**package** com.hsbc.day4;

**import** java.util.Scanner;

/\*Create a class such that it resets the value of the

\* objects it used to null after its usage in all

cases.\*/

**public** **class** ObjectNull {

**public** **double** divide(**int** a,**int** b){

**double** res=a/b;

**return** res;

}

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

ObjectNull o=**new** ObjectNull();

Scanner sc=**new** Scanner(System.***in***);

**int** a=0,b=0;

System.***out***.println("Enter values: ");

**try** {

a=sc.nextInt();

b=sc.nextInt();

**double** res=o.divide(a, b);

}

**catch** (ArithmeticException e)

{

e.printStackTrace();

System.***out***.println("Arithmetic Exception.");

}

**finally** {

o=**null**;

System.***out***.println(o);

sc.close();

}

}

}

**Output:**

Enter values:

4

0

java.lang.ArithmeticException: / by zero

Arithmetic Exception.

null

at com.hsbc.day4.ObjectNull.divide(ObjectNull.java:6)

at com.hsbc.day4.ObjectNull.main(ObjectNull.java:19)

**Exercise 57:** *Create a class such that a method uses the try catch block with the return type of String*

**Solution 57:**

**package** com.hsbc.day4;

//Create a class such that a method uses the try catch block with the return type of String.

**public** **class** Solution57 {

**public** String test(String s){

**try** {

**if**(s==**null**)

**throw** **new** Exception("Null Exception");

**return** s;

}

**catch**(Exception e) {

System.***out***.println("Exception!");

}

**return** s;

}

**public** **static** **void** main(String[] args) {

// **TODO** Auto-generated method stub

Solution57 s1=**new** Solution57();

s1.test("");

}

}

**Output:**

**Exercise 58:** *Create a class called Employee which asks the user to input the name and the age of a*

*employee. Raise a custom defined exception when the user enters an employee name*

*that has been already entered and raise another exception if the age is negative or less*

*than 18 or greater than 60.*