

String replace(old char, new char)

```
class StringDemo
{
    public static void main (String[] args)
    {
        String s1="GunGun";
        String s2=s1.replace('u','i');
        System.out.println(s1);
        System.out.println(s2);
    }
}
```

Output

GunGun
GinGin

String substring(int)

String substring(int, int)

```
class StringDemo
{
    public static void main (String[] args) {
        String s1="Ramlal";
        String s2=s1.substring(4);
        System.out.println(s2);
        System.out.println(s1.substring(2));
        System.out.println(s1.substring(0));
        System.out.println(s1.substring(2,4));
        System.out.println(s1.substring(2,5));
    }
}
```

Output

al
mlal
Ramlal
ml
mla

byte[] getBytes()

What is the Output?

```
class StringDemo
{
    public static void main (String[] args)
    {
        String s="ABCD";
        byte b[]=s.getBytes();
        for(int i=0;i<b.length;i++) {
            System.out.println(b[i]);
        }
    }
}
```

Output

65
66
67
68

String trim()

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s=" I Love Java";
        String s1=s.trim();
        System.out.println(s);
        System.out.println(s1);
    }
}
```

Output

I Love Java
I Love Java

Boolean equalsIgnoreCase()

What is the Output?

```
class StringDemo
```

```
{
```

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

```
        String s1="Ashish";
```

```
        boolean b=s1.equalsIgnoreCase("ashish");
```

```
        System.out.println(b);
```

```
        System.out.println(s1.equalsIgnoreCase("Ashish"));
```

```
        String s2="Prashant";
```

```
        boolean b1=s1.equalsIgnoreCase(s2);
```

```
        System.out.println(b1);
```

```
    }
```

Output

true

true

false

boolean equals()

What is the Output?

```
class StringDemo
{
    public static void main(String[] args) {
        String s1="Ashish";
        boolean b=s1.equals("ashish");
        System.out.println(b);
        System.out.println(s1.equals("Ashish"));
        String s2="Prashant";
        boolean b1=s1.equals(s2);
        System.out.println(b1);
    }
}
```

Output

false

true

false

boolean endsWith(String str)

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s="Babulal";
        System.out.println(s.endsWith("B"));
        System.out.println(s.endsWith("Babu"));
        System.out.println(s.endsWith("Babulal"));
        System.out.println(s.endsWith("babulal"));
        System.out.println(s.endsWith("lal"));
    }
}
```

Output

false

false

true

false

true

Boolean equalsIgnoreCase()

What is the Output?

```
class StringDemo
{
    public static void main(String[] args) {
        String s1="Ashish";
        boolean b=s1.equalsIgnoreCase("ashish");
        System.out.println(b);
        System.out.println(s1.equalsIgnoreCase("Ashish"));
        String s2="Prashant";
        boolean b1=s1.equalsIgnoreCase(s2);
        System.out.println(b1);
    }
```


boolean startsWith(String str)

What is the Output?

```
class StringDemo
{
    public static void main( String[] args)
    {
        String s="Babulal";
        System.out.println(s.startsWith("B"));
        System.out.println(s.startsWith("Babu"));
        System.out.println(s.startsWith("Babulal"));
        System.out.println(s.startsWith("babulal"));
        System.out.println(s.startsWith("lal"));
    }
}
```

Output

true

true

true

false

false

int lastIndexOf(char ch)

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s="Babulal";
        int i=s.lastIndexOf('B');
        int j=s.lastIndexOf('l');
        System.out.println(i);
        System.out.println(j);
        System.out.println(s.lastIndexOf('p'));
    }
}
```

Output

0

6

-1

int length()

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s="Babulal";
        int i=s.length();
        System.out.println("lenght= "+i);
        System.out.println("lenght= "+s.length());
    }
}
```

Output

lenght= 7
lenght= 7

int indexOf(char ch)

What is the Output?

```
class StringDemo
```

```
{
```

```
    public static void main(String[] args)
```

```
    {
```

```
        String s="Babulal";
```

```
        int i=s.indexOf('B');
```

```
        int j=s.indexOf('l');
```

```
        System.out.println(i);
```

```
        System.out.println(j);
```

```
        System.out.println(s.indexOf('l'));
```

```
    }
```

```
}
```

Output

0

4

4

char charAt(int Index)

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s="Ramlal";
        char ch=s.charAt(3);
        System.out.println(s.charAt(0));
        System.out.println(ch);
        System.out.println(s.charAt(4));
    }
}
```

Output

R
l
a

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String str="I Love Java";
        System.out.println(str);
        str=str+2;
        System.out.println(str);
    }
}
```

Output

I Love Java
I Love Java2

char charAt(int Index)

What is the Output?

```
class StringDemo
{
    public static void main(String[] args)
    {
        String s="Ramlal";
        char ch=s.charAt(3);
        System.out.println(s.charAt(0));
        System.out.println(ch);
        System.out.println(s.charAt(4));
    }
}
```

- 1 Create a user define exception
- 2 InvalidUsernamePasswordException
- 3 and check username or password is


```
1 pass exception as method parameter
2 import java.io.*;
3 class ExceptionDemo
4 {
5     void method1(ArithmeticException ae)
6     {
7         System.out.println(ae);
8     }
9     void method1(IOException ae)
10    {
11        System.out.println(ae);
12    }
13    public static void main(String[] args) {
14        ExceptionDemo e=new ExceptionDemo();
15        e.method1(new ArithmeticException());
16        e.method1(new IOException());
17    }
18 }
```

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```
1 user define exception, throw keyword
2 import java.util.*;
3 class ExceptionDemo2
4 {
5     static void checkAge(int age)
6     {
7         if (age>18) {
8             System.out.println("Eligible for Marry");
9         }
10        else{
11            throw new ArithmeticException("Not Eligible for Marry");
12        }
13    }
14    public static void main(String[] args) {
15        Scanner sc=new Scanner(System.in);
16        System.out.println("Enter age ");
17        int a=sc.nextInt();
18        ExceptionDemo2.checkAge(a);
19    }
20 }
```

```

1 //Creating user define exception by parameterised constructor
2 import java.util.*;
3 class InvalidAgeException1 extends Exception
4 {
5     public InvalidAgeException1(String str) {
6         System.out.println(str);
7     }
8 }
9 class UserException1 {
10     static void status(int age) throws InvalidAgeException1
11     {
12         if (age > 18) {
13             System.out.println("Eligible for Marry");
14         }
15         else {
16             throw new InvalidAgeException1("Not able to Marry try after some time");
17         }
18     }
19     public static void main(String[] args) throws InvalidAgeException1 {
20         Scanner sc = new Scanner(System.in);
21         System.out.println("Enter age : ");
22         int age = sc.nextInt();
23         UserException1.status(age);
24     }

```

```
//user define exception, throw keyword
import java.util.*;
class ExceptionDemo2
{
    static void checkAge(int age)
    {
        if (age>18) {
            System.out.println("Eligible for Marry");
        }
        else{
            throw new ArithmeticException("Not Eligible for
Marry");
        }
    }
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter age ");
        int a=sc.nextInt();
        ExceptionDemo2.checkAge(a);
    }
}
```

```
1 //creating user define exception and check eligible for marry or not
2 import java.util.*;
3 class InvalidAgeException extends Exception
4 {
5     public InvalidAgeException()
6     {
7         System.out.println("Not eligible try after some time");
8     }
9 }
10 class UserException
11 {
12     static void status(int age) throws InvalidAgeException
13     {
14         if (age>18) {
15             System.out.println("Eligible for Marry");
16         }
17         else{
18             throw new InvalidAgeException();
19         }
20     }
21     public static void main(String[] args) throws InvalidAgeException{
22         Scanner sc=new Scanner(System.in);
23         System.out.println("Enter age : ");
24         int age=sc.nextInt();
25         UserException.status(age);
26     }
27 }
```



```

1 pass exception as method parameter
2 import java.io.*;
3 class ExceptionDemo
4 {
5     void method1(ArithmeticException ae)
6     {
7         System.out.println(ae);
8     }
9     void method1(IOException ae)
10    {
11        System.out.println(ae);
12    }
13    public static void main(String[] args) {
14        ExceptionDemo e=new ExceptionDemo();
15        e.method1(new ArithmeticException());
16        e.method1(new IOException());
17    }
18 }

```

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File Edit Selection Find View Settings Tools Project Preferences Help
MyJava.java
1 user define exception, throw keyword
2 import java.util.*;
3 class ExceptionDemo2
4 {
5 static void checkAge(int age)
6 {
7 if (age>18) {
8 System.out.println("Eligible for Marry");
9 }
10 else{
11 throw new ArithmeticException("Not Eligible for Marry");
12 }
13 }
14 public static void main(String[] args) {
15 Scanner sc=new Scanner(System.in);
16 System.out.println("Enter age ");
17 int a=sc.nextInt();
18 ExceptionDemo2.checkAge(a);
19 }
20 }

```
1 //creating user define exception and check eligible for marry or not
2 import java.util.*;
3 class InvalidAgeException extends Exception
4 {
5     public InvalidAgeException()
6     {
7         System.out.println("Not eligible try after some time");
8     }
9 }
10 class UserException
11 {
12     static void status(int age) throws InvalidAgeException
13     {
14         if (age>18) {
15             System.out.println("Eligible for Marry");
16         }
17         else{
18             throw new InvalidAgeException();
19         }
20     }
21     public static void main(String[] args) throws InvalidAgeException{
22         Scanner sc=new Scanner(System.in);
23         System.out.println("Enter age : ");
24         int age=sc.nextInt();
25         UserException.status(age);
26     }
}
```


}

class UserException

{

static void status(int age) throws InvalidAgeException

{

if (age>18) {

System.out.println("Eligible for Marry");

}

else{

throw new InvalidAgeException();

}

}

public static void main(String[] args) throws
InvalidAgeException{

Scanner sc=new Scanner(System.in);

System.out.println("Enter age : ");

int age=sc.nextInt();

UserException.status(age);

```
//creating user define exception and check eligible for marry or not
import java.util.*;
class InvalidAgeException extends Exception
{
    public InvalidAgeException()
    {
        System.out.println("Not eligible try after some time");
    }
}

class UserException
{
    static void status(int age) throws InvalidAgeException
    {
        if (age>18) {
            System.out.println("Eligible for Marry");
        }
        else{
            throw new InvalidAgeException();
        }
    }
}
```

```
1 user define exception, throw keyword
2 import java.util.*;
3 class ExceptionDemo2
4 {
5     static void checkAge(int age)
6     {
7         if (age < 18) {
8             System.out.println("Eligible for Harry");
9         }
10        else{
11            throw new ArithmeticException("Not Eligible for Harry");
12        }
13    }
14    public static void main(String[] args) {
15        Scanner sc = new Scanner(System.in);
16        System.out.println("Enter age ");
17        int a = sc.nextInt();
18        ExceptionDemo2.checkAge(a);
19    }
20 }
```

```
//user define exception, throw keyword
import java.util.*;
class ExceptionDemo2
{
    static void checkAge(int age)
    {
        if (age>18) {
            System.out.println("Eligible for Marry");
        }
        else{
            throw new ArithmeticException("Not Eligible for
Marry");
        }
    }
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter age ");
        int a=sc.nextInt();
        ExceptionDemo2.checkAge(a);
    }
}
```

```
1 //pass exception as method parameter
2 import java.io.*;
3 class ExceptionDemo
4 {
5     void method1(ArithmeticException ae)
6     {
7         System.out.println(ae);
8     }
9     void method1(IOException ae)
10    {
11        System.out.println(ae);
12    }
13    public static void main(String[] args) {
14        ExceptionDemo e = new ExceptionDemo();
15        e.method1(ArithmeticException ae);
16        e.method1(IOException ae);
17    }
18 }
```

Definition of ExceptionDemo

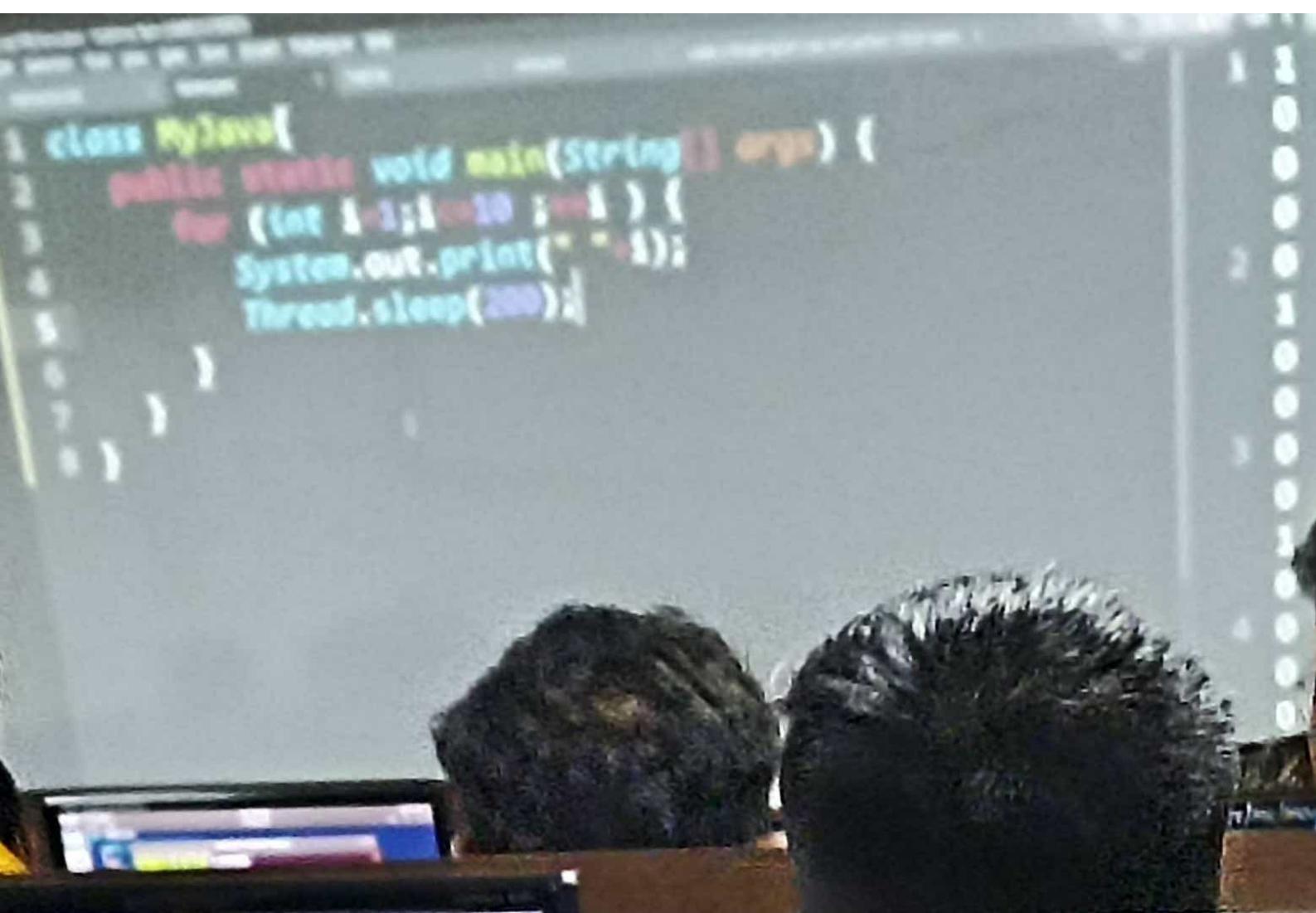
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```
//pass exception as method parameter
import java.io.*;
class ExceptionDemo
{
    void method1(ArithmeticException ae)
    {
        System.out.println(ae);
    }
    void method1(IOException ae)
    {
        System.out.println(ae);
    }
    public static void main(String[] args) {
        ExceptionDemo e=new ExceptionDemo();
        e.method1(new ArithmeticException());
        e.method1(new IOException());
    }
}
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```

```
{  
    static void main(String[] args) throws InterruptedException  
    {  
        for (int i=1; i<=10; i++) {  
            System.out.print(" " + i);  
            Thread.sleep(400);  
        }  
    }  
}
```






```
1 class Addition{
2     public static void main(String[] args) {
3         try{
4             int a = Integer.parseInt(args[0]);
5             int b = Integer.parseInt(args[1]);
6             int c = a/b;
7             System.out.println("Result: "+(a+b));
8         }
9         catch(ArrayIndexOutOfBoundsException e)
10        {
11            System.out.println("Result: "+(5+6));
12        }
13        catch(NumberFormatException fe)
14        {
15            System.out.println("Result: "+(8+14));
16        }
17        catch(ArithmeticException e)
18        {
19            System.out.println("Result: "+(11+22));
20        }
21    }
```

```
class Addition{  
    public static void main(String[] args) {  
        try{  
            int a = Integer.parseInt(args[0]);  
            int b = Integer.parseInt(args[1]);  
            int c = a/b;  
            System.out.println("Result: "+(a+b));  
        }  
        catch(ArrayIndexOutOfBoundsException e)  
        {  
            System.out.println("Result: "+(5+6));  
        }  
        catch(NumberFormatException fe)  
        {  
            System.out.println("Result: "+(8+14));  
        }  
        catch(ArithmeticException e)  
        {  
            System.out.println("Result: "+(11+22));  
        }  
    }  
}
```

Multiple catch block

After the try block we can write multiple **catch** blocks to catch every exception thrown from its corresponding try block.

Can we catch all exceptions using single catch block?

- Yes we can catch all exceptions with single catch block with parameter "**java.lang.Exception**"

It is always recommended to write a catch block with an exception parameter even though we are writing multiple catch blocks. It acts as a backup catch block.

When should we write multiple catch blocks for a single try block?

- To print message specific to an exception
- To execute some logic specific to an exception

```
class Test
{
    public static void main(String[] args)
    {
        try{
            System.out.println("I am in try");
        }
        catch(ArithmeticException ae){
            System.out.println("I am in catch");
        }
        finally {
            System.out.println("I am in finally");
        }
        System.out.println("After try/catch/finally");
    }
}
```

Output

I am in try
I am in finally
After try/catch/finally

finally Block

finally block code is always executed irrespective of try and catch block code.

Need of finally in real time projects:

As per coding standards in **finally** block we should write resource releasing logic (or) clean up code. Resource releasing logic means unreferencing objects those are created in try block.

connection closing
streams closing
channel closing
... construction

```
connection.close();  
inputstream.close();  
scanner.close();  
Test t1 = new Test(); t1=null;
```



```
class Test
```

```
{
```

```
    public static void main(String[] args)
```

```
    {
```

```
        try{
```

```
            System.out.println(10/0);
```

```
        }
```

```
        catch(ArithmeticException ae)
```

```
        {
```

```
            System.out.println(ae.toString());
```

```
            System.out.println(ae.getMessage());
```

```
            ae.printStackTrace();
```

```
        }
```

```
    }
```

```
}
```

Output

```
java.lang.ArithmeticException: / by zero  
/ by zero
```

```
java.lang.ArithmeticException: / by zero  
at Test.main(E111.java:7)
```

There are three methods to print exception information

- `toString()`
- `getMessage()`
- `printStackTrace()`

eg:

class Test

What is the Output?

```
{  
    public static void main(String[] args)  
    {  
        System.out.println("Divide By Zero");  
        try {  
            System.out.println(10/0);  
        }  
        catch (ArithmeticException ae) {  
            System.out.println(10/2);  
            System.out.println(ae);  
        }  
        System.out.println("Rest of the your application");  
    }  
}
```

Output

Divide By Zero

5

java.lang.ArithmeticException: /
by zero

Rest of the your application

What is the Output?

class Test

```
{  
    public static void main(String[] args)  
    {  
        System.out.println("Divide By Zero");  
        try {  
            System.out.println(10/0);  
        }  
        catch (ArithmeticException ae) {  
            System.out.println(10/2);  
            System.out.println(ae);  
        }  
        System.out.println("Rest of the your application");  
    }  
}
```

Syntax of exception handling

```
try
{
    // block of code to monitor for errors
}
catch (ExceptionType1 ex)
{
    // exception handler for ExceptionType1
}
```

J exception1.java X

J exception1.java > exception1 > main(String[])

```
1 public class exception1 {  
    Run | Debug  
2     public static void main(String[] args) {  
3         try{  
4             int a=5,b=0;  
5             int res=a/b;  
6             System.out.println(res);  
7         }  
8     } catch(Exception e){  
9  
10    }  
11 }  
12 }  
13
```

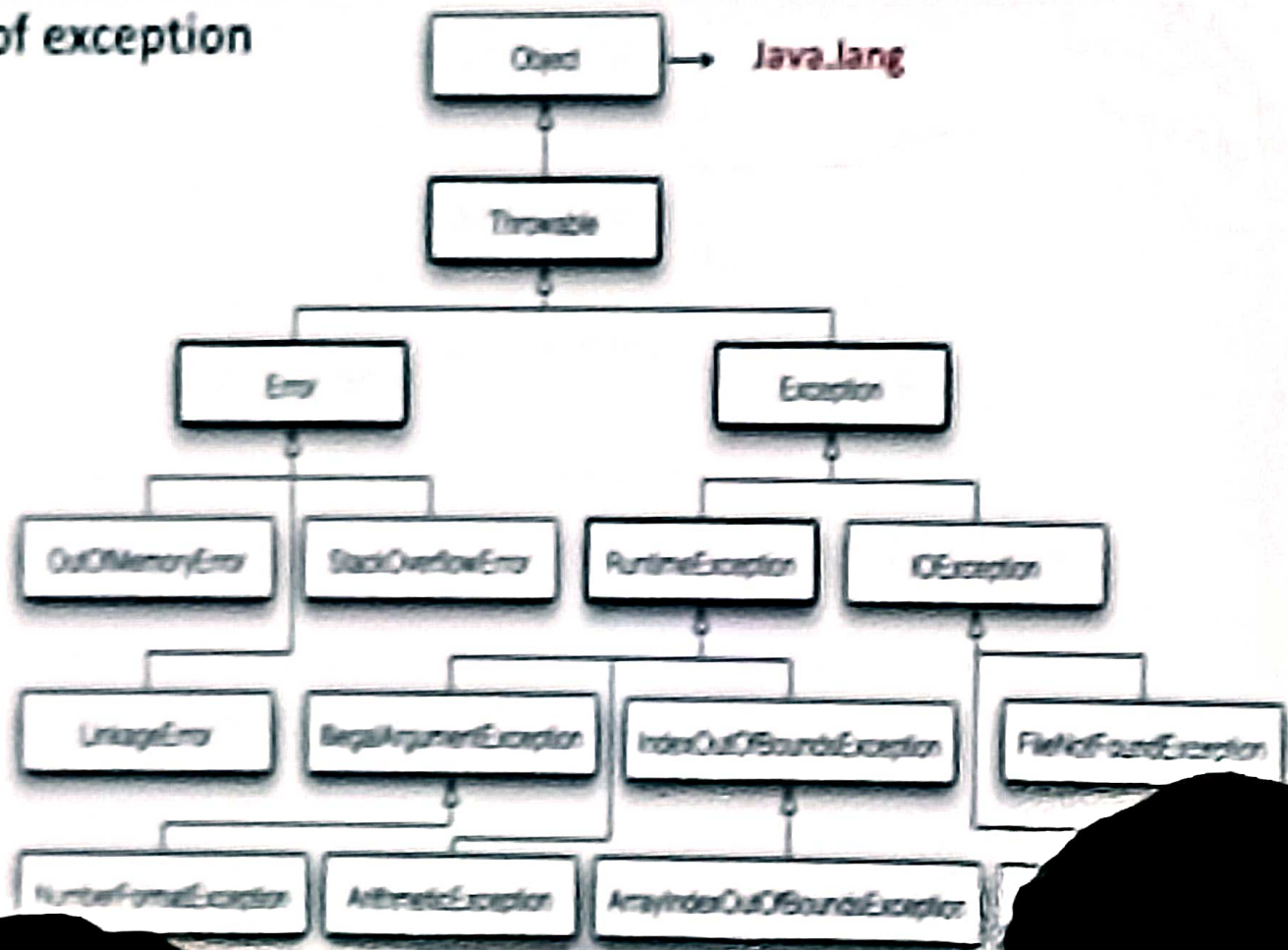
Exception Handling keywords

- try
- catch
- finally
- throws
- throw

There are two ways to handle the exceptions in java

- By using **try-catch** block
- By using **throws** keyword

Hierarchy of exception



Exception vs. Error

- The **exceptions** are occurred due to several reasons, that are
 - Developer mistakes
 - End-user input mistakes.
 - Resource is not available
 - Networking problems.
- But **errors** are caused due to lack of system resources.
StackOverflowError, OutOfMemoryError, AssertionError... etc
- It is possible to handle the exceptions by using **try-catch** blocks or **throws** keyword but it is not possible to handle the errors.
- Error is an un-checked type exception in java.

Unchecked Exceptions

- The exceptions which are not checked by the compiler are called unchecked exception. Eg. `ArithmeticException`, `ArrayIndexOutOfBoundsException`, `NumberFormatException`....etc
- The class that extends `RuntimeException` class is called unchecked exceptions.

```
class Test {  
    public static void main(String[] args)  
    {  
        System.out.println(10/0);    //java.lang.ArithmeticException: / by zero  
        System.out.println("ashish".charAt(13)); //java.lang.StringIndexOutOfBoundsException  
    }  
}
```


Checked Exceptions

- The Exceptions which are checked by the compiler are called Checked Exceptions. Eg. `IOException`, `SQLException`, `InterruptedException` ...etc
- The classes that extends `Exception` class are called checked exceptions.

```
import java.io.*;
class Test
{
    public static void main(String[] args)
    {
        FileInputStream fis = new FileInputStream("xyz.txt"); //FileNotFoundException
        Thread.sleep(500); //InterruptedException
    }
}
```


The process of catching the exception for converting JVM given exception message to end-user understandable message or for stopping abnormal termination of the program is called **exception handling**.

Need of Exception handling

In project exception is handled

- To stop abnormal termination
- To provide user understandable messages when an exception is raised. So that we can take decision without developer's help. Basically by implementing **exception handling** we are providing life to a program to talk to user on behalf of developer

Types of Exceptions

As per the sun micro systems standards
The Exceptions are divided into three types

- Checked Exception
- Unchecked Exception
- Error

The process of catching the exception for converting JVM given exception message to end-user understandable message or for stopping abnormal termination of the program is called **exception handling**.

Need of Exception handling

In project exception is handled

- To stop abnormal termination
- To provide user understandable messages when an exception is raised. So that we can take decision without developer's help. Basically by implementing **exception handling** we are providing life to a program to talk to user instead of developer.