



COMPUTER ENGINEERING

OOPM ODD SEM 2021-22/EXPERIMENT 5

NAME:- GAURAV AMARNANI (D7A. 67)

Experiment - 5

AIM: To implement Exception and Packages

THEORY:

Exception:

An exception is an unwanted or unexpected event which occurs during the execution of a program i.e. at runtime, that disrupts the normal flow of the program's instruction.

Default, Exception Handling

Whenever inside a method if an exception has occurred. The method creates an object known as Exception object and hands it off to the run time system (JVM). The exception object contains name and description of the exception and current state of the program where exception has occurred creating the Exception object and handing to the run time system is called throwing an exception. There might be the list of the methods that has been called to get to the method where exception was occurred. This ordered list of exception was occurred is called call stack. Some predefined exception are

- 1) Arithmetic Exception
- 2) Class not found Exception
- 3) File not found Exception
- 4) Array Index out of Bounds
- 5) IOException
- 6) Null pointer Exception

User defined Exception

Java exception handling is managed via five keyword: Try, catch, throws, throws and finally. Briefly, here is how they work. Program statements that you think can raise exception are contained within a try block. If an exception occurs within the try block it is thrown. Your code can catch this exception (using catch block) and handle it in some rational manner. System generated exceptions are automatically thrown by Java run time system. To manually throw an exception, use the keyword, throw. Any exception that is thrown out of a method must be specified as such by a throws clause. Any code that absolutely must be executed after a try block completely so put in a finally block.

For each try block there can be zero or more catch blocks but only one finally block. In a Method, we can have more than one statement that might throw



exception

Syntax of Try Catch

```
try {  
    // Block of code to try  
}  
catch (Exception e) {  
    // Block of code to handle errors  
}
```

Packages

Packages in java is a mechanism to encapsulate a group of classes sub packages and interfaces packages are used in

- Preventing naming Conflict
- Making searching locating and usage of classes, interfaces, enumeration easier
- Providing Controlled access
- Packages can be considered as data encapsulation (or data hiding)

All we need to do is put related classes into packages After that we can simply write an import class from existing package.



Built in Packages

These packages consist of a large number of classes which are a part of Java API. Some of the commonly used built in packages are

- i] Java lang contains language support classes
- ii] Java.io - Contains classes for supporting input/output operations
- iii] Java.util - Contains utility classes which implement data structure
- iv] Java.applet - Contains classes for creating applets
- v] Java.net - Contains classes for supporting network operations
- vi] Java.awt - Contains classes for supporting components for graphical user interfaces

User defined Package

These are the packages that are defined by the user. First, we create a directory my package (name should be same as the name of the package). Then create the my class inside the directory with the first statement being the package name.



eg
Package My Package
Public class A {
 //code
}

Now we can use class A in our program
import my package A;
Public class main {
 Public static void main (String args []) {
 A obj = new A ();
 }
}

Conclusion:

By performing this experiment we understood the concept of Exception handling default exception handling. User defined exception Packages, Built-in-Packages and User-defined Package and learned how to implement it in a program.

Program:

```
import java.util.Scanner;

class AgeOutOfBounds extends Exception {
    public AgeOutOfBounds(String str) {
        System.out.println(str);
    }
}

public class TestClass {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        System.out.print("Enter ur age :: ");
        int age = s.nextInt();
        s.close(); try {
            if(age < 18)
                throw new AgeOutOfBounds("You are below 18");
            else
                System.out.println("Valid age");
        }
        catch (AgeOutOfBounds a) {
            System.out.println(a);
        }
    }
}
```

Output-

Command Prompt

```
C:\java>javac TestClass.java
```

```
C:\java>java TestClass
```

```
Enter ur age :: 19
```

```
Valid age
```

```
C:\java>java TestClass
```

```
Enter ur age :: 7
```

```
You are below 18
```

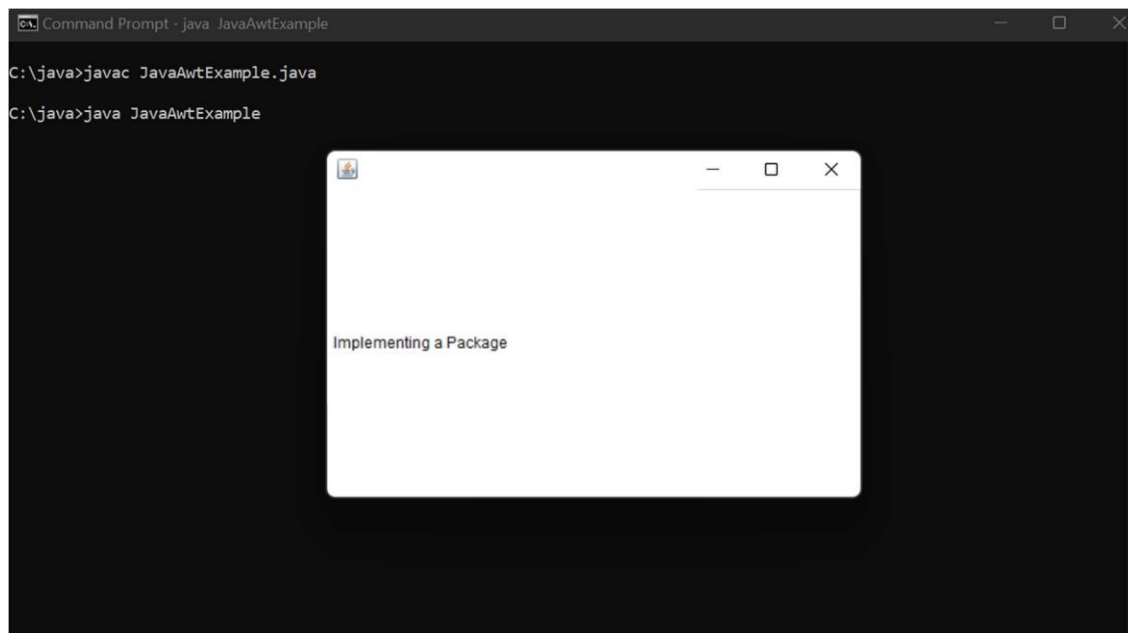
```
AgeOutOfBounds
```

```
C:\java>
```

Program-

```
import java.awt.Frame;  
import java.awt.Label;  
class JavaAwtExample {  
    public JavaAwtExample() {  
        Frame fm = new Frame();  
        Label lb = new Label(" Implementing a Package ");  
        fm.add(lb);  
        fm.setSize(300, 200);  
        fm.setVisible(true);  
    }  
    public static void main(String args []) {  
        JavaAwtExample at = new JavaAwtExample();  
    }  
}
```

Output-



Program-

```
package calculator;

public class Add {

public int add(int n1 , int n2 ) {

return n1 + n2;

}

}
```

```
package calculator;

public class Sub{

public int sub(int n1 , int n2 ) {

return n1 - n2;

}

}
```

```
package calculator;

public class mult {

public int multiply(int n1 , int n2 ) {

return n1*n2;

}

}
```

```
package calculator;

public class div{

public int divide(int n1 , int n2 ) {

return n1/n2;

}

}
```

```
import calculator.*;
import java.util.*;

class calc {

public static void main(String args[]) {

Scanner sc = new Scanner(System.in);

int choice = 0; int n1 , n2;

System.out.println();

do {

System.out.println("Calculator");
```

```
System.out.println("1.addition\n2.subtracation\n3.multiply\n4.divide\n5.exit");
System.out.println("enter choice :");
choice = sc.nextInt();
switch(choice) {
case 1:
System.out.println("enter first number : ");
n1= sc.nextInt();
System.out.println("enter second number : ");
n2= sc.nextInt();
Add a = new Add();
System.out.println("addition of " + n1 + " and " + n2 + " is " + a.add(n1,n2));
System.out.println();
break; case 2:
System.out.println("enter first number : ");
n1= sc.nextInt();
System.out.println("enter second number : ");
n2= sc.nextInt();
Sub b = new Sub();
System.out.println("result of subtracting " + n2 + " from " + n1 + " is " + b.sub(n1,n2)); System.out.println();
break; case 3:
System.out.println("enter first number : ");
n1= sc.nextInt();
System.out.println("enter second number : ");
n2= sc.nextInt();
mult c = new mult();
System.out.println("multiplication of " + n1 + " and " + n2 + " is " + c.multiply(n1,n2)); System.out.println();
break; case 4:
System.out.println("enter first number : ");
n1= sc.nextInt();
System.out.println("enter second number : ");
n2= sc.nextInt();
div d = new div();
System.out.println("dividing " + n1 + " and " + n2 + " is " + d.divide(n1,n2));
System.out.println();
break;
default:
break;
}
}
while(choice!=5);
sc.close();
```

}
}

Output-

```
Command Prompt - java calc
enter choice :
1
enter first number :
12
enter second number :
8
addition of 12 and 8 is 20

Calculator
1.addition
2.subtracation
3.multiply
4.divide
5.exit
enter choice :
3
enter first number :
2
enter second number :
3
multiplication of 2 and 3 is 6

Calculator
1.addition
2.subtracation
3.multiply
4.divide
5.exit
enter choice :
```

```
Command Prompt - java calc
enter choice :
2
enter first number :
13
enter second number :
3
result of subtracting 3 from 13 is 10

Calculator
1.addition
2.subtracation
3.multiply
4.divide
5.exit
enter choice :
4
enter first number :
20
enter second number :
10
dividing 20 and 10 is 2

Calculator
1.addition
2.subtracation
3.multiply
4.divide
5.exit
enter choice :
```