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Experiment No. 12
Exception Handling
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Aim:- To implement Exception Handling.

Objective :- To implement the concept of exception handling through java program for reading and displaying single dimensional array.

Theory :- An exception (or exceptional event) is a problem that arises during the execution of a program. When an Exception occurs the normal flow of the program is disrupted and the program/Application terminates abnormally, which is not recommended, therefore, these exceptions are to be handled.

An exception can occur for many different reasons. Following are some scenarios where an exception occurs.

- A user has entered an invalid data.
- A file that needs to be opened cannot be found.
- A network connection has been lost in the middle of communications or the JVM has run out of memory.

The code which is prone to exceptions is placed in the try block. When an exception occurs, that exception occurred is handled by catch block associated with it. Every try block should be immediately followed either by a catch block or finally block.

Code:-

```
import java.util.Scanner;
```

```
public class ArrayExceptionHandling {
public static void main(String[] args) {
Scanner sc = new Scanner(System.in);
try {
System.out.print("Enter the size of the array: ");
int size = sc.nextInt();
int[] arr = new int[size];
System.out.println("Enter " + size + " elements:");
for (int i = 0; i < size+1; i++) {
arr[i] = sc.nextInt();
}
System.out.println("Array elements:");
for (int i = 0; i < size; i++) {
System.out.println("Element at index "+i+":"+ arr[i]);
}
} catch (java.util.InputMismatchException e) {
System.out.println("Invalid input. Please enter integers only." +e);
} catch (NegativeArraySizeException e) {
System.out.println("Array size cannot be negative." +e);
} catch (ArrayIndexOutOfBoundsException e) {
System.out.println("Array index out of bounds."+e);
}
}
}
```

Output:

```
PS G:\Programs\JAVA>  & 'C:\Program Files\Java\jdk-17\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessa
ges' '-cp' 'C:\Users\GAURAV\AppData\Roaming\Code\User\workspaceStorage\a31ef07c5754485dab625cca33c18cc3\r
edhat.java\jdt_ws\JAVA_e16f3d66\bin' 'ArrayExceptionHandling'
Enter the size of the array: -5
Array size cannot be negative.java.lang.NegativeArraySizeException: -5
PS G:\Programs\JAVA>  g:; cd 'g:\Programs\JAVA'; & 'C:\Program Files\Java\jdk-17\bin\java.exe' '-XX:+Show
CodeDetailsInExceptionMessages' '-cp' 'C:\Users\GAURAV\AppData\Roaming\Code\User\workspaceStorage\a31ef07
c5754485dab625cca33c18cc3\redhat.java\jdt_ws\JAVA_e16f3d66\bin' 'ArrayExceptionHandling'
Enter the size of the array: 2
Enter 2 elements:
12
14
15
Array index out of bounds.java.lang.ArrayIndexOutOfBoundsException: Index 2 out of bounds for length 2
PS G:\Programs\JAVA>  g:; cd 'g:\Programs\JAVA'; & 'C:\Program Files\Java\jdk-17\bin\java.exe' '-XX:+Show
CodeDetailsInExceptionMessages' '-cp' 'C:\Users\GAURAV\AppData\Roaming\Code\User\workspaceStorage\a31ef07
c5754485dab625cca33c18cc3\redhat.java\jdt_ws\JAVA_e16f3d66\bin' 'ArrayExceptionHandling'
Enter the size of the array: 1
Enter 1 elements:
cg
Invalid input. Please enter integers only.java.util.InputMismatchException
PS G:\Programs\JAVA>
```

Conclusion:-

Exception handling in Java is a fundamental mechanism that allows developers to manage and gracefully respond to runtime errors, enhancing the robustness and reliability of their applications. It involves using try-catch blocks to detect and handle exceptions, providing a structured way to deal with unexpected situations. By carefully managing exceptions, developers can prevent program crashes, log errors for debugging, and offer informative error messages to users, ultimately improving the overall quality and user experience of Java applications.