Exception Handling

1.Exception and why is to be handled

DEFINITION/WHAT

Exception is abnormal termination of the execution of a program. It is an object which is thrown at runtime

NEED/WHY

- ✓ Need 1:If program terminated abruptly on exception,then control switches to JVM and remaining lines of code doesn't get executed
- ✓ Need 2:Developer wants to handle the exception and continue the program execution

IMPLEMENTATION/HOW IT WORKS

Use the built in exception or create custom/user defined exception

REAL TIME EXAMPLE

A program when prompts the user for some input, but user gives invalid input, then program terminated.Eg: InputMismatchException, ArrayIndexOutOfBoundsException

ADDITIONAL INFORMATION

Exceptions are defined in java. Lang package.Throwable is the super class of Exception.

Throwable class has another child class called Error. Exception can be handled, but Error can't be handled.

Eg:for Error Class-OutOfMemoryError

2.How to Handle Exception

DEFINITION/WHAT

Exception can be handled by a user using 5 keywords

1)try 2)catch 3) Throw 4)Throws 5)finally

Java 7.0 replaces finally with **try with resources**

3. Define try

DEFINITION/WHAT

A block of code, which may generate an exception, is put in try block. Whenever an exception arises, an object of exception is created and thrown out of try block

NEED/WHY

- ✓ Need 1:lines of code which are susceptible for exceptions has to be put in try

ADDITIONAL INFORMATION

try blocks can also be nested

4. Define catch

DEFINITION/WHAT

Exception generated in try block is handled in appropriate catch block

NEED/WHY

- ✓ Need 1:to handle exception.
- ✓ Need 2: If catch block to handle the correct exception object is not provided,then program terminated abruptly

ADDITIONAL INFORMATION

One try can have any number of catch blocks.

Instead of providing multiple catch block any exception generated can be handled in catch(Exception e) block.

If defining catch (Exception e) and other catch blocks too, then catch (Exception e) should be the last block, otherwise compilation result occurs.

5. Define throw

DEFINITION/WHAT

A user can manually throw an exception using throw keyword

NEED/WHY

- ✓ Need 1:to manually throw some user defined Exception or checked exception to be handled by calling method.

IMPLEMENTATION/HOW IT WORKS

throw new Exception ()

REAL TIME EXAMPLE

SQLException thrown from Orders table can be translated to OrderNoFoundException

ADDITIONAL INFORMATION

Catch block can also throw exception

6. throws

DEFINITION/WHAT

throws keyword tells the compiler that this particular method will be throwing an exception which is not handled in the current method.

Need/Why

- ✓ Need 1: When a checked exception occurs:

  It needs to be handled with a try catch block

  (OR)

  The exception needs to be declared with throws keyword as part of method definition, so that the exception is propagated to the calling methods

IMPLEMENTATION/HOW IT INTERNALLY WORKS

throws keyword to be used.

Compiler will throw error if checked exceptions are not handled with try-catch block or if it is not declared in throws clause.

Real Time Example

By Default FileNotFoundException will be thrown by FileInputStream/FileOutputStream constructor when we try to do file operations.

Exception needs to be caught or declared in throws clause.

ADDITIONAL INFORMATION

Both checked and unchecked exceptions can be declared in throws clause.

However, unchecked exception like NullpointerException and ArrayOutOfBoundException needs to be handled by the programmer programmatically.

7. finally

DEFINITION/WHAT

Code written inside finally block is always executed.It is executed even when any unhandled exception occurs and program is about to terminate

Need/Why

- ✓ Cleanup codes to be written inside finally block
  - closing a file, db conenction

IMPLEMENTATION/HOW IT INTERNALLY WORKS

Real Time Example

When u are trying to read and parse a file, NullPointer exception occurs and the control in switched to catch block.

In such scenario, FileReader or BufferReader objects to be closed in finally block.

ADDITIONAL INFORMATION

When the program is terminated with System.exit(0), finally block will not get executed.

8.Try with resources

DEFINITION/WHAT

The try-with-resources statement is a try statement that declares one or more resources. A *resource* is an object that must be closed after the program is finished with it. The try-with-resources statement ensures that each resource is closed at the end of the statement. Any object that implements java.lang.AutoCloseable, which includes all objects which implement java.io.Closeable, can be used as a resource.

NEED/WHY

- ✓ Need 1:replacement for finally
- ✓ Need 2:to autoclose the resources
- ✓ Need 3:can open multiple resources separated by ;
- ✓ Need 4: code more readable and reduces the number of lines

IMPLEMENTATION/HOW IT WORKS

try(resource declaration){ //use of resources }

catch(Exception e){}

REAL TIME EXAMPLE

File resource/Socket resource Connection

ADDITIONAL INFORMATION

closing of resource is done by try itself by calling close() of AutoCloseable.

9. CheckedException

DEFINITION/WHAT

Exceptions which arise at compile time and need to mandatorily handle using try catch block or declared to be thrown whether exception arises or not.

NEED/WHY

- ✓ Need 1: if there is no try catch block, then the compiler checks whether the method is declared using the throws keyword. And, if the compiler finds neither of the two cases, then it gives a compilation error

IMPLEMENTATION/HOW IT WORKS

Using try catch block or using throws keyword

REAL TIME EXAMPLE

Working with FileHandling,Database Connectivity

ADDITIONAL INFORMATION

Examples include FileNOtFOundException,SQLException etc.,

10. UnCheckedException

DEFINITION/WHAT

Also called RuntimeException.It is not mandatory to handle exception. If Exception arises and user has provided try catch block then catch block handles the exception. If try catch block is not provided, then JVM handles the exception.

NEED/WHY

- ✓ Need 1: Its good to provide try catch for continuous flow of execution of program

IMPLEMENTATION/HOW IT WORKS

Using try catch

REAL TIME EXAMPLE

Division by zero

ADDITIONAL INFORMATION

Examples include ArithmeticException,ArrayIndexOutOfBoundsException etc.,

11.CustomException/UserDefinedException

DEFINITION/WHAT

A user can write his own exception called user defined Exception.

This is done by extending super class Exception

NEED/WHY

- ✓ Need 1: to define our own exceptions other than builtin Exception

IMPLEMENTATION/HOW IT WORKS

By Extending Exception class

REAL TIME EXAMPLE

SchoolAdminException,LaptopException etc.,

ADDITIONAL INFORMATION

custom exception, we can have your own exception and message. Here, we have passed a string to the constructor of superclass i.e. Exception class that can be obtained using getMessage() method on the object we have created.