Q1.What is Exception in Java?

Ans :  An exception is an event, which occurs during the execution of a program, that disrupts the normal flow of the program's instructions. When an error occurs within a method, the method creates an object and hands it off to the runtime system.

Q2.What is Exception Handling?

Ans : Exception handling is a mechanism that separates code that detects and handles exceptional circumstances from the rest of your program. Note that an exceptional circumstance is not necessarily an error. When a function detects an exceptional situation, you represent this with an object.

Q3.What is the difference between Checked and Unchecked Exceptions and Error?

Ans : Checked Exceptions

* They occur at compile time.
* The compiler checks for a checked exception.
* These exceptions can be handled at the compilation time.
* It is a sub-class of the exception class.
* The JVM requires that the exception be caught and handled.
* Example of Checked exception- ‘File Not Found Exception’

Unchecked Exceptions

* These exceptions occur at runtime.
* The compiler doesn’t check for these kinds of exceptions.
* These kinds of exceptions can’t be caught or handled during compilation time.
* This is because the exceptions are generated due to the mistakes in the program.
* These are not a part of the ‘Exception’ class since they are runtime exceptions.
* The JVM doesn’t require the exception to be caught and handled.
* Example of Unchecked Exceptions- ‘No Such Element Exception’.

Q4.What are the difference between throw and throws in Java?

Ans :

| S. No. | Key Difference | throw | throws |
| --- | --- | --- | --- |
| 1. | Point of Usage | The throw keyword is used inside a function. It is used when it is required to throw an Exception logically. | The throws keyword is used in the function signature. It is used when the function has some statements that can lead to exceptions. |
| 2. | Exceptions Thrown | The throw keyword is used to throw an exception explicitly. It can throw only one exception at a time. | The throws keyword can be used to declare multiple exceptions, separated by a comma. Whichever exception occurs, if matched with the declared ones, is thrown automatically then. |
| 3. | Syntax | Syntax of throw keyword includes the instance of the Exception to be thrown. Syntax wise throw keyword is followed by the instance variable. | Syntax of throws keyword includes the class names of the Exceptions to be thrown. Syntax wise throws keyword is followed by exception class names. |
| 4. | Propagation of Exceptions | throw keyword cannot propagate checked exceptions. It is only used to propagate the unchecked Exceptions that are not checked using the throws keyword. | throws keyword is used to propagate the checked Exceptions only. |

Q5.What is multithreading in Java? mention its advantages.

Ans : Multithreading allows many parts of a program to run simultaneously. These parts are referred to as threads, and they are lightweight processes that are available within the process. As a result, multithreading increases CPU utilization through multitasking.

Advantages :

1. Improved performance: Multithreading can help increase the overall performance of an application, especially on systems with multiple processors or cores. It allows multiple tasks to run concurrently, utilizing the available CPU resources more efficiently.
2. Responsiveness: In a single-threaded environment, if a long-running task blocks the main thread, the entire application becomes unresponsive. Multithreading can prevent this issue by running such tasks in separate threads, ensuring the application remains responsive.
3. Better resource utilization: Multithreading allows better utilization of system resources by keeping the CPU busy while waiting for I/O operations or other tasks to complete.
4. Simplified modeling: Some problems can be more naturally modeled using multiple threads. This makes the program easier to design, understand, and maintain.
5. Parallelism: Multithreading enables parallelism, which can lead to significant performance improvements in applications that can be divided into smaller, independent tasks.

Q6.Write a program to create and call a custom exception

Ans : import java.util.ArrayList;

import java.util.Arrays;

// create a checked exception class

class CustomException extends Exception {

public CustomException(String message) {

// call the constructor of Exception class

super(message);

}

}

class Main {

ArrayList<String> languages = new ArrayList<>(Arrays.asList("Java", "Python", "JavaScript"));

// check the exception condition

public void checkLanguage(String language) throws CustomException {

// throw exception if language already present in ArrayList

if(languages.contains(language)) {

throw new CustomException(language + " already exists");

}

else {

// insert language to ArrayList

languages.add(language);

System.out.println(language + " is added to the ArrayList");

}

}

public static void main(String[] args) {

// create object of Main class

Main obj = new Main();

// exception is handled using try...catch

try {

obj.checkLanguage("Swift");

obj.checkLanguage("Java");

}

catch(CustomException e) {

System.out.println("[" + e + "] Exception Occured");

}

}

}

Q7.How can you handle exceptions in Java?

Ans : Exception handling can *catch* and *throw*exceptions. If a detecting function in a block of code cannot deal with an anomaly, the exception is thrown to a function that can handle the exception. A catch statement is a group of statements that handle the specific thrown exception. *Catch parameters* determine the specific type of exception that is thrown.

Exception handling is useful for dealing with exceptions that cannot be handled locally. Instead of showing an error status in the program, the [exception handler](https://www.theserverside.com/definition/exception-handler) transfers control to where the error can be handled. A function can throw exceptions or can choose to handle exceptions.

Q8.What is Thread in Java?

Ans : A thread is a thread of execution in a program. The Java Virtual Machine allows an application to have multiple threads of execution running concurrently. Every thread has a priority. Threads with higher priority are executed in preference to threads with lower priority.

Q9. What are the two ways of implementing thread in Java?

Ans : In java multithreading a thread can be created in two ways i.e. using the Thread class and using the Runnable interface. If our class extends thread class then by creating its objects, we are creating threads.

Q10.What do you mean by garbage collection?

Ans : Garbage collection in Java is the automated process of deleting code that's no longer needed or used. This automatically frees up memory space and ideally makes coding Java apps easier for developers.