

**SNS COLLEGE OF TECHNOLOGY**

**Kurumbapalayam (Po), Coimbatore – 641 107**

**AN AUTONOMOUS INSTITUTION**

**Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

**DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY**

**23CSB201-OBJECT ORIENTED PROGRAMMING**

**UNIT IV - EXCEPTION AND MULTITHREADING**

**TOPIC 4 - Runtime exception**



## What is a Runtime Exception?

- A **Runtime Exception** is an exception that occurs **during program execution (runtime)**.

- ✓ These exceptions are also called **Unchecked Exceptions**

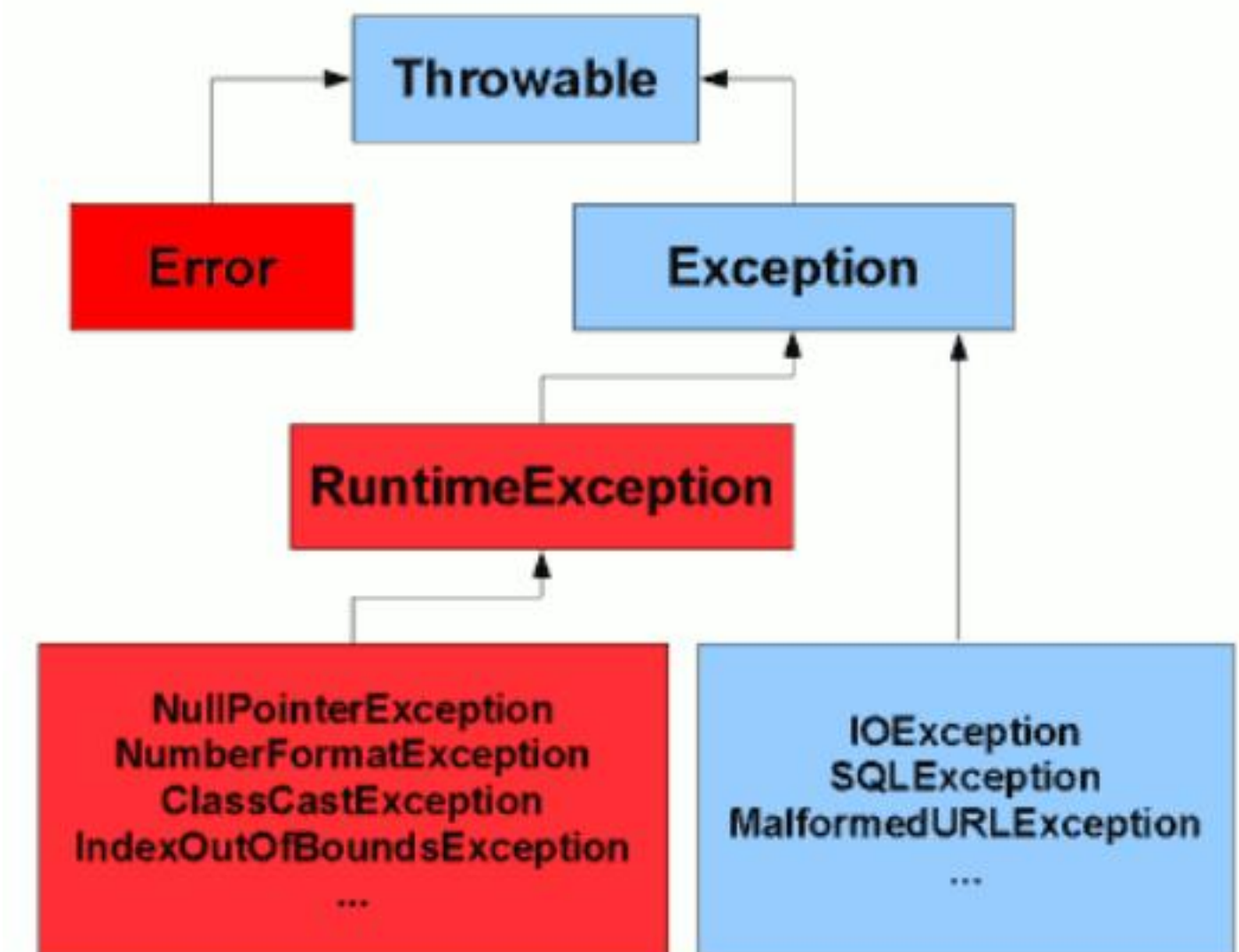
- ✓ They are **not checked at compile time**

- ✓ They occur due to **logical errors or improper coding**

### Definition:

- A Runtime Exception is a class that is a subclass of:

- `java.lang.RuntimeException`



## Key Characteristics:

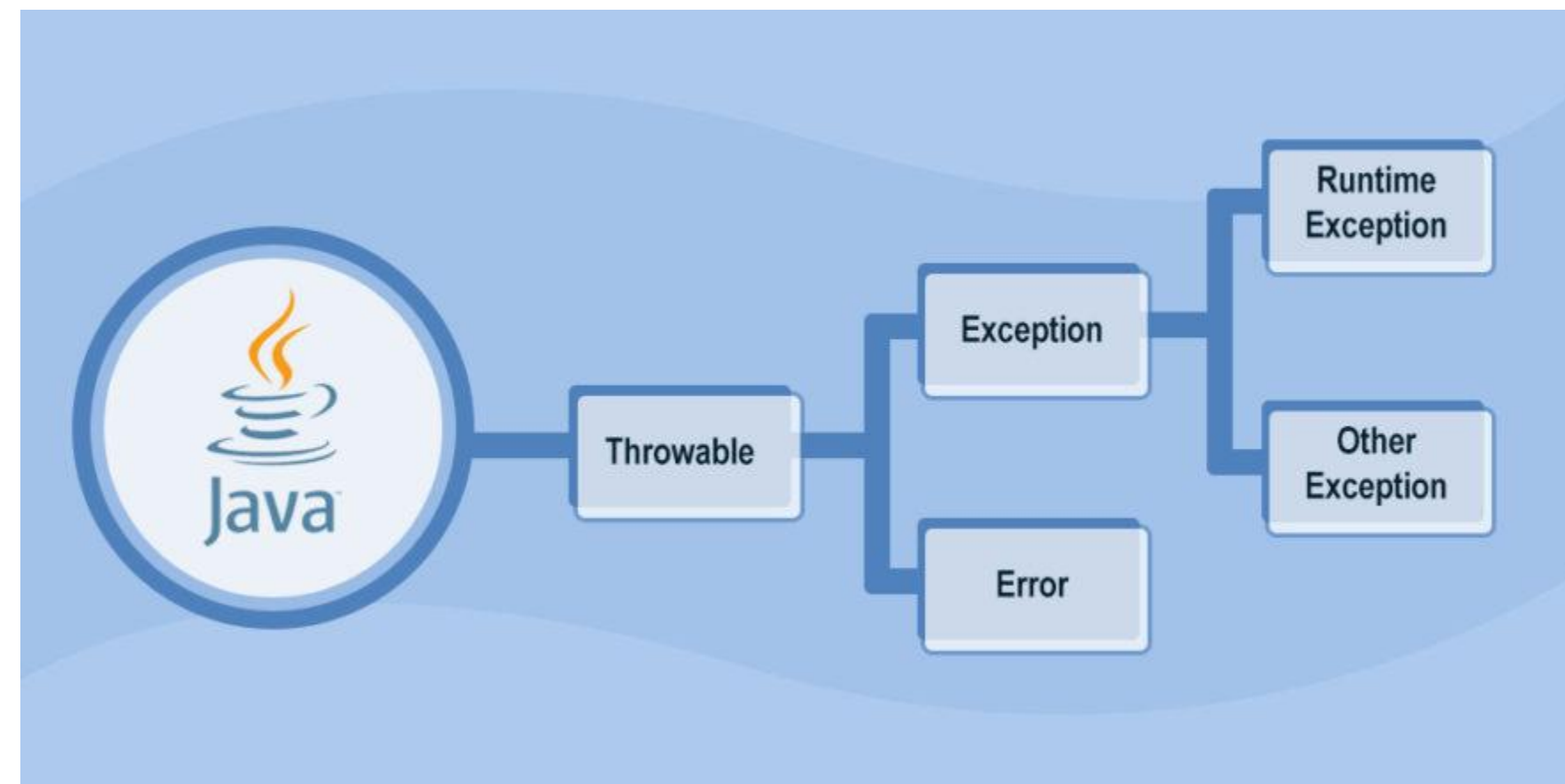
- ✓ Occurs at **runtime**, not compile time
- ✓ Compiler **does NOT force handling**
- ✓ Caused by **programming mistakes**
- ✓ Handling is **optional** (but recommended)

## Common Runtime Exceptions:

### 1. ArithmeticException

Occurs when dividing by zero

```
int a = 10 / 0;
```



## 2. NullPointerException

Occurs when accessing object with null reference

```
String s = null;
```

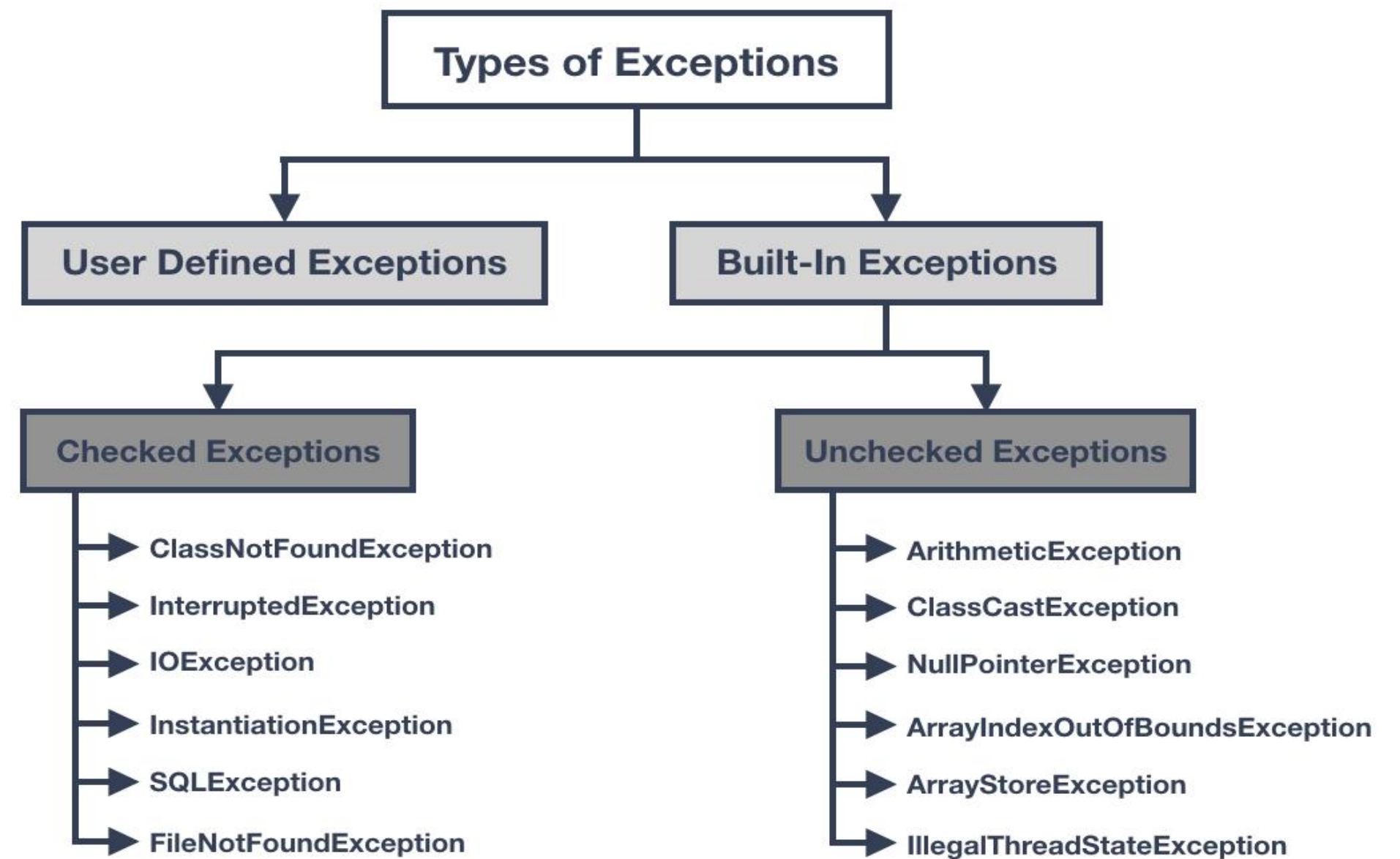
```
System.out.println(s.length());
```

## 3. ArrayIndexOutOfBoundsException

Accessing invalid index in array

```
int arr[] = {1, 2, 3};
```

```
System.out.println(arr[5]);
```



## 4. NumberFormatException

Invalid conversion from string to number

```
int num = Integer.parseInt("abc");
```

## 5. ClassCastException

Invalid type casting

```
Object obj = "Hello";
```

```
Integer i = (Integer) obj;
```

## Example Program

```
class RuntimeExample {  
    public static void main(String[] args) {  
        try {  
            int a = 10 / 0;  
        } catch (ArithmeticException e) {  
            System.out.println("Exception handled: " + e);  
        }  
    }  
}
```

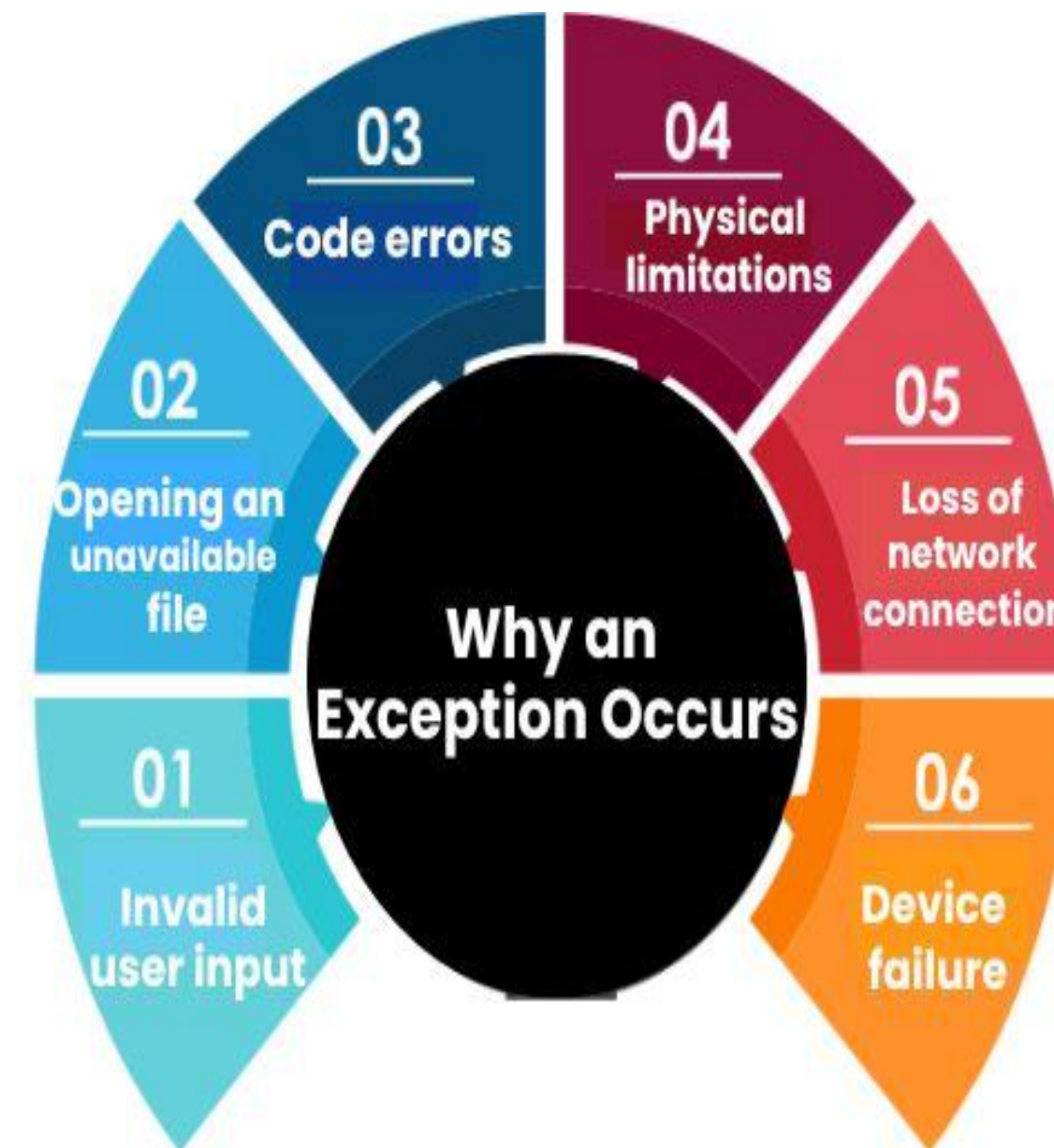
## Output:

Exception handled: java.lang.ArithmeticException: / by zero

## Why Runtime Exceptions Occur?

They usually happen due to:

- ✘ Incorrect logic
- ✘ Invalid user input
- ✘ Improper memory access
- ✘ Null references
- ✘ Wrong type conversion



## Checked vs Runtime Exception

Feature	Checked Exception	Runtime Exception
Checked at compile time	Yes	No
Handling compulsory	Yes	No
Example	IOException	NullPointerException
Cause	External issues	Programming errors

## Handling Runtime Exceptions

Even though not mandatory, we can handle them using:

```
try {  
    // risky code  
} catch (Exception e) {  
    // handle exception  
}
```

## **Advantages of Runtime Exceptions**

- ✓ Makes code cleaner (no forced handling)
- ✓ Developer can handle only when needed
- ✓ Useful for detecting logical errors

## **Disadvantages**

- ✗ Program may crash if not handled
- ✗ Harder to debug if ignored

## Real-Life Example

```
import java.util.*;

class InputExample {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter a number:");

        try {

            int num = Integer.parseInt(sc.next());

            System.out.println("Number: " + num);

        } catch (NumberFormatException e) {

            System.out.println("Invalid input!");

        }

    }

}
```

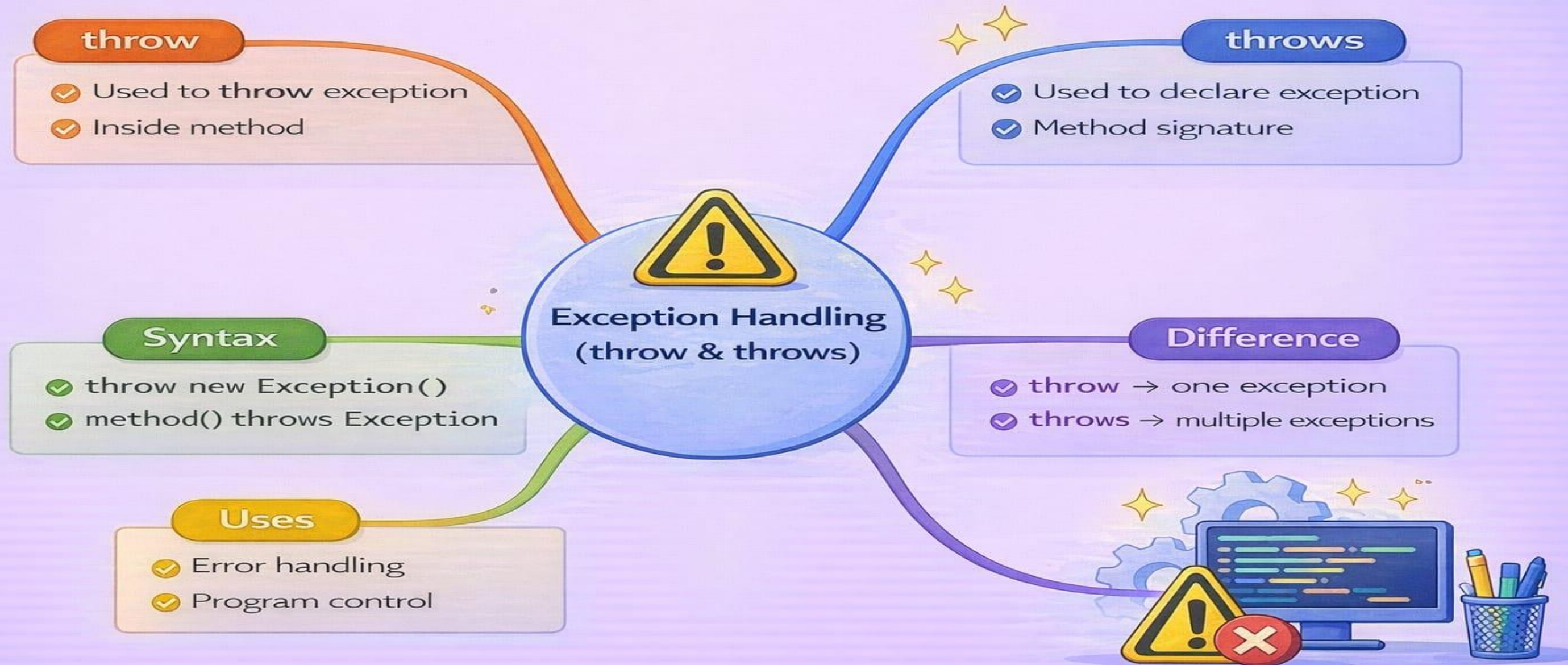


## Important Points for Exams

- Runtime exceptions are **unchecked exceptions**
- They occur due to **program logic errors**
- They extend **RuntimeException class**
- Handling is **optional but recommended**

## Summary

- Runtime Exception = occurs during execution
- Not checked by compiler
- Caused by coding mistakes
- Can be handled using try-catch



# Assessment



**1. Which of the following statements is TRUE about Runtime Exceptions?**

- A. They are checked at compile-time and must be handled using a try-catch block.
- B. They are the same thing as Checked Exceptions.
- C. They are subclasses of the RuntimeException class and are not required to be handled or declared.

**Which of these is NOT a Runtime Exception in Java?**

- A. NullPointerException
- B. ArrayIndexOutOfBoundsException
- C. ArithmeticException

**3. Which keyword is used to explicitly throw an exception object?**

- A. throws
- B. throw
- C. catch
- D. finally



**THANK YOU**

