Checked vs Unchecked Exceptions in Java

In Java, there two types of exceptions:

1) Checked: are the exceptions that are checked at compile time. If some code within a method throws a checked exception, then the method must either handle the exception or it must specify the exception using *throws* keyword.

For example, consider the following Java program that opens file at locatiobn “C:\test\a.txt” and prints first three lines of it. The program doesn’t compile, because the function main() uses FileReader() and FileReader() throws a checked exception *FileNotFoundException*. It also uses readLine() and close() methods, and these methods also throw checked exception *IOException*

```
import java.io.*;

class Main {
    public static void main(String[] args) {
        FileReader file = new FileReader("C:\\test\\a.txt");
        BufferedReader fileInput = new BufferedReader(file);

        // Print first 3 lines of file "C:\test\a.txt"
        for (int counter = 0; counter < 3; counter++)
            System.out.println(fileInput.readLine());

        fileInput.close();
    }
}
```

Output:

```
Exception in thread "main" java.lang.RuntimeException: Uncompilable source code -
unreported exception java.io.FileNotFoundException; must be caught or declared to be
```

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```
thrown
        at Main.main(Main.java:5)
```

To fix the above program, we either need to specify list of exceptions using throws, or we need to use try-catch block. We have used throws in the below program. Since *FileNotFoundException* is a subclass of *IOException*, we can just specify *IOException* in the throws list and make the above program compiler-error-free.

```
import java.io.*;

class Main {
    public static void main(String[] args) throws IOException {
        FileReader file = new FileReader("C:\\test\\a.txt");
        BufferedReader fileInput = new BufferedReader(file);

        // Print first 3 lines of file "C:\test\a.txt"
        for (int counter = 0; counter < 3; counter++)
            System.out.println(fileInput.readLine());

        fileInput.close();
    }
}
```

Output: First three lines of file “C:\test\a.txt”

2) Unchecked are the exceptions that are not checked at compiled time. In C++, all exceptions are unchecked, so it is not forced by the compiler to either handle or specify the exception. It is up to the programmers to be civilized, and specify or catch the exceptions.
In Java exceptions under *Error* and *RuntimeException* classes are unchecked exceptions, everything else under throwable is checked.

```
                +-----------+
                | Throwable |
                +-----------+
                 /         \
                /           \
        +-------+           +-----------+
        | Error |           | Exception |
        +-------+           +-----------+
```

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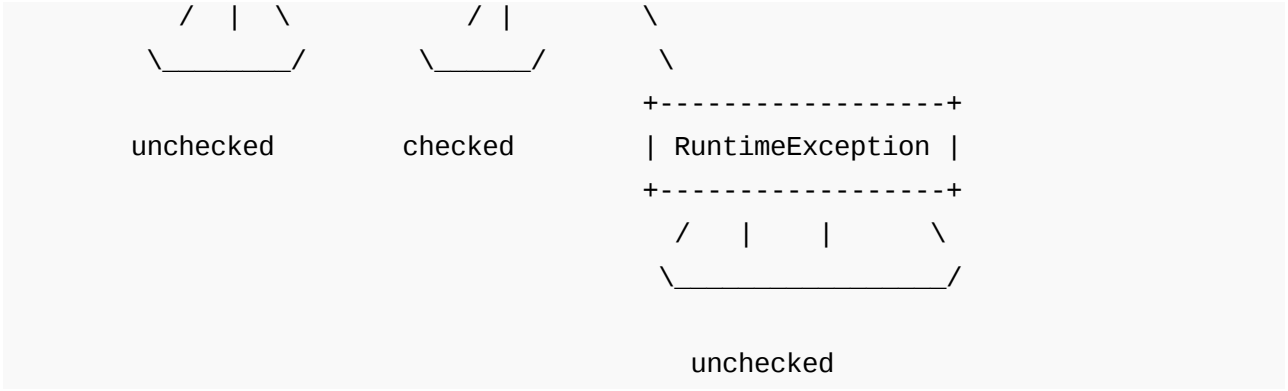

Consider the following Java program. It compiles fine, but it throws *ArithmeticException* when run. The compiler allows it to compile, because *ArithmeticException* is an unchecked exception.

```
class Main {
   public static void main(String args[]) {
      int x = 0;
      int y = 10;
      int z = y/x;
  }
}
```

Output:

```
Exception in thread "main" java.lang.ArithmeticException: / by zero
        at Main.main(Main.java:5)
Java Result: 1
```

Why two types?
See Unchecked Exceptions — The Controversy for details.

Should we make our exceptions checked or unchecked?
Following is the bottom line from Java documents
If a client can reasonably be expected to recover from an exception, make it a checked exception. If a client cannot do anything to recover from the exception, make it an unchecked exception

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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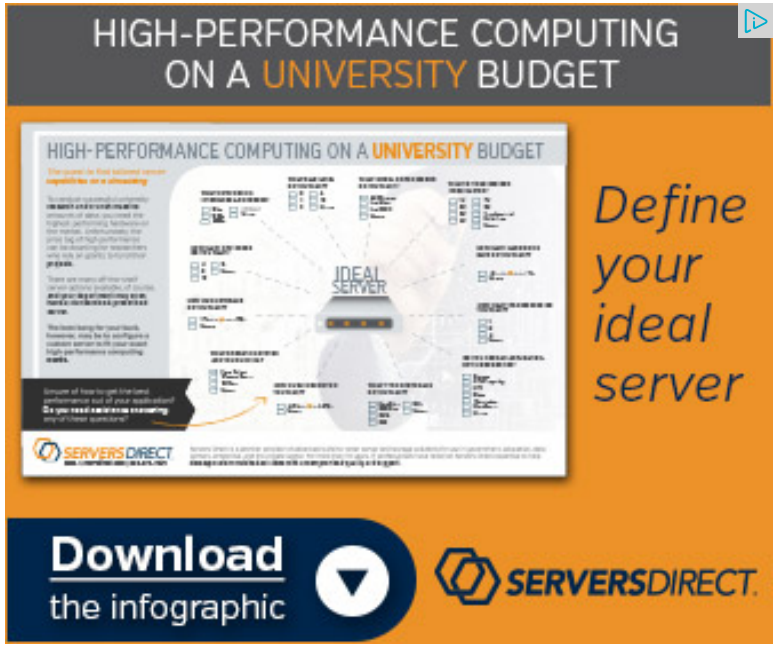

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Sean Collier • 2 months ago

I have an "unhandled exception" when I try to run a program. I have been tryinç

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Vinay Singh Sean Collier • 2 months ago

Can you elaborate or share some code snippet. Usually "unhandled ex handling (throws or try-catch block) a checked exception.

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Sean Collier Vinay Singh • 2 months ago

My email is scollier1981@gmail.com. I am at work now. If you e when I'm off work. I'd greatly appreciate it. From what I know I n have both

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rishav • 3 months ago

so how compiler decide it is checked or unchecked...

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Vinay Singh rishav • 2 months ago

All exceptions are classes, derived from one of the classes in the Exce hierarchy (please notice that there are lines below the above mentione classes below Exception and RuntimeException, the number of derive feasible to include them in the diagram).
Exception classes derived from RuntimeException class or any class RuntimeException are "unchecked" and the others are "checked".
If you browse the Java documentation for any exception class, you wou

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where it's derived is mentioned at the top of the page, if you find java.la
hierarchy then it's unchecked else it's checked.

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RahulPratap Singh ➚ rishav • 3 months ago

If the compiler is able to find out the problem at the time of compilation
the program.. It reports that first U have to handle the Exception... so o
whether it's checked or Unchecked

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Gani • 5 months ago

Nice

1 ^ | v • Reply • Share ›

Abhishek • 6 months ago

Why would the first program throw a FileNotFound exception. Is is assumed th
location?

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JavaUser ➚ Abhishek • 3 months ago

Because at the time of compilation only, the JVM comes to know that t
compiling the code and giving the Exception :)

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ali • 6 months ago

nice

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Shrawan Patel • 6 months ago

thanx for description, Interviewer asked me about checked and unchecked exc
example.

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vikalp • 6 months ago

it is really useful....thank you

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Ravi • 7 months ago

Please do correct spelling mistake..

Should we make our exceptions checked or checked?

Here it should be checked or unchecked.

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GeeksforGeeks Mod ➦ Ravi • 6 months ago

Thanks for pointing this out. We have updated the post.

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