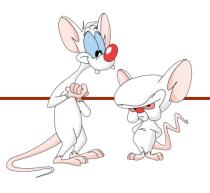
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Week 3-1; Errors, exception and assist blocks

Giulia Alberini, Fall 2020

WHAT ARE WE GOING TO DO IN THIS VIDEO?



- Errors and Exceptisignment Project Exam Help
- Try/catch blocks

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KIND OF ERRORS

Stylistic Errors

The functionality of your code is not affected.
Your code Assignment Project Exam Help

Something is w https://eduassistpro.github.jo/program.
Your code does not compile!
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Run-time errors

Something goes wrong when you run your program. Your code does not run!

Logic errors

Something isn't working the way you think. The program does not do the correct thing.

COMPILE TIME ERRORS

These errors are detected by the compiler.

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They prevent your the program violates the syntactic rules ohttps://eduassistpro.github.io/

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- Compile-time errors include missing a semicolon, adding an extra bracket, or using the incorrect types.
- Compile-time errors are the easiest to fix!

RUN-TIME ERRORS

- These errors happen at run time. They are detected by the JVM when it tries to execute the instructions in the program.

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- Common run-time ehttps://eduassistpro.githubuinds exceptions, division by zero, or null pointered edu_assist_pro
- They are more difficult to fix than compile-time errors, but the JVM output some useful text to help you with that.

EXCEPTIONS

Java displays a message with:

```
the name of the exception,
Assignment Project Exam Help
```

- the line of the progr
- a "stack trace": the li https://eduassistpro.github.jo/e application was in the middle of when and the widdle edu assist pro

```
java.lang.StringIndexOutOfBoundsException: String index out of range: 3
  at java.lang.String.charAt(Unknown Source)
  at Test.method3(Test.java:19)
  at Test.method2(Test.java:13)
  at Test.method1(Test.java:9)
  at Test.main(Test.java:4)
  at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
```



RUN TIME ERRORS AND EXCEPTIONS

An exception is an examp which except the execution of a the normal flow of the program https://eduassistpro.github.io/

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Exceptions happen when the computer is asked to do something that doesn't make sense.

AN EXAMPLE

```
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int[https://eduassistpro.github.io/
System.out.prin
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```

On the second line we try to access an element that does not exists. An ArraysIndexOutOfBoundsException will be thrown.

THROWING EXCEPTIONS

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When you want https://eduassistpro.github.io/input was passe https://eduassistpro.github.io/curred during the execution of the https://eduassistpro.github.io/curred during the stop the execution of your code by throwing an exception.

```
public Assignment Project Exammed (n < retu https://eduassistpro.github.io/

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}
```

Do we want to return false? We can instead throw an exception!

```
public static Assignment Project Fram Help
   if (n <= 1) {
      throw new Ilhttps://eduassistpro.github.jo/primality
   is not defined for Add WeChat edu_assist_pro);
   }
   ...
}</pre>
```

```
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if (n <= 1) {
    throw new I

is not lefined for the content of t
```

Keywords

Keywords

```
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public static bookean isPrime (int n)

if (n <= 1) {
    throw new I

    throw new I

is not lefined for the content of the c
```

Exception name

```
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if (n <= 1) { https://eduassistpro.github.io/

throw new I

is not defined for the company that the company that
```

Message that will be displayed

THROWING EXCEPTIONS

You can throw any kind of Exception you want.

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Example:

ArithmeticExcepti https://eduassistpro.githubeicception,

ArrayStoreException, Glass Cast and edu_assis abase ument Exception, Illegal MonitorStateException, Illegal ption, Illegal ThreadStateException, IndexOutOfBoundsException, NegativeArraySizeException, NullPointerException, NumberFormatException, ...

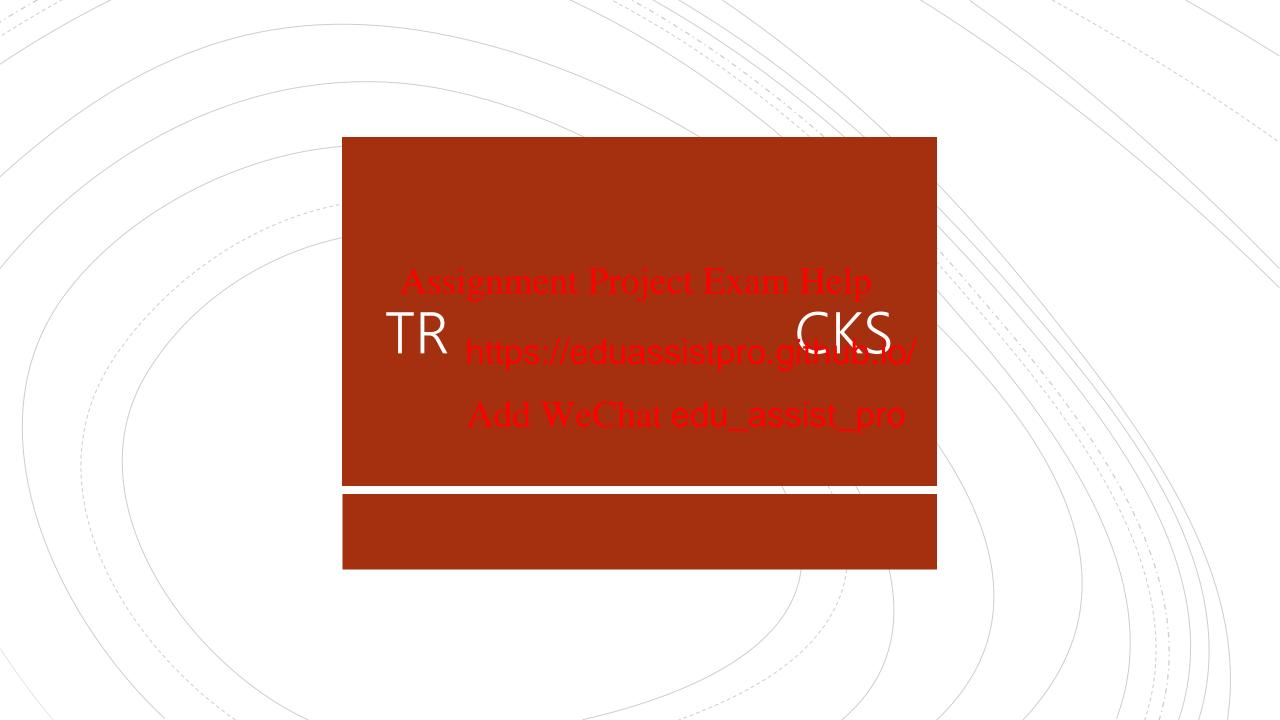
THROWING EXCEPTIONS

In general, if you want to throw and exception you can Assignment Project Exam Help add the following statement in your code:

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throw new And Meter edu_assisteproge)

The type of message is String and the message is optional.



DEALING WITH EXCEPTIONS

What can we do to prevent our code from crashing at run-time? Assignment Project Exam Help

What type of exception are we trying to prevent?

Is there another way?

CATCHING EXCEPTIONS

In order to prevent our code from crashing, we can *catch* Exceptions as follows:

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```
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try {
    // code that mighAde WeChkt edu_assist_pro
}
catch (Exception e) {
    // code that should be executed if there was a problem
}
// whatever comes after
```

TRY/CATCH BLOCKS

A try/catch block allows us to try some code, and if an exception is rai https://eduassistpro.githubeim/eption.

An exception that is chief by edu_assist program to crash.

CATCHING MULTIPLE EXCEPTIONS

If we want to do something different depending on the type of the exception caught, we can use multiple catch blocks.

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```
try {
   https://eduassistpro.github.io/
Add WeChat edu_assist_pro catch(ArrayIndexOutOfBo ion e) {
   // what to do in this case
catch(NullPointerException e) {
   // what to do in this other case
   whatever comes after
```

```
int[] x = \{1, 2, 3\};
                        Assignment Project Exam Help
try {
   System.out.println(x
                             https://eduassistpro.github.io/
                                                           What prints?
catch (ArrayIndexOutOfBoundsExcepti Add WeChat edu_assist_pro
System.out.println("Wrong index edu_assist_pro
Bad math
                                                            Everything else
catch (ArithmeticException e) {
   System.out.println("Bad math");
System.out.println("Everything else");
```

CATCHING ALL EXCEPTIONS

If we would like to catch all possible exceptions with the same catch block we can do the following:

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All different exceptions are considered to be of type Exception.

WHAT ABOUT ALL THE INFO?

NOTE: e is the name of the variable name used in the catch block.

If you would like to display all the information related to some caught exception (what you would normally see in red when the code crashes), you can use the following method:

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If you want to just print the name of the exception you can use a print/println statement:

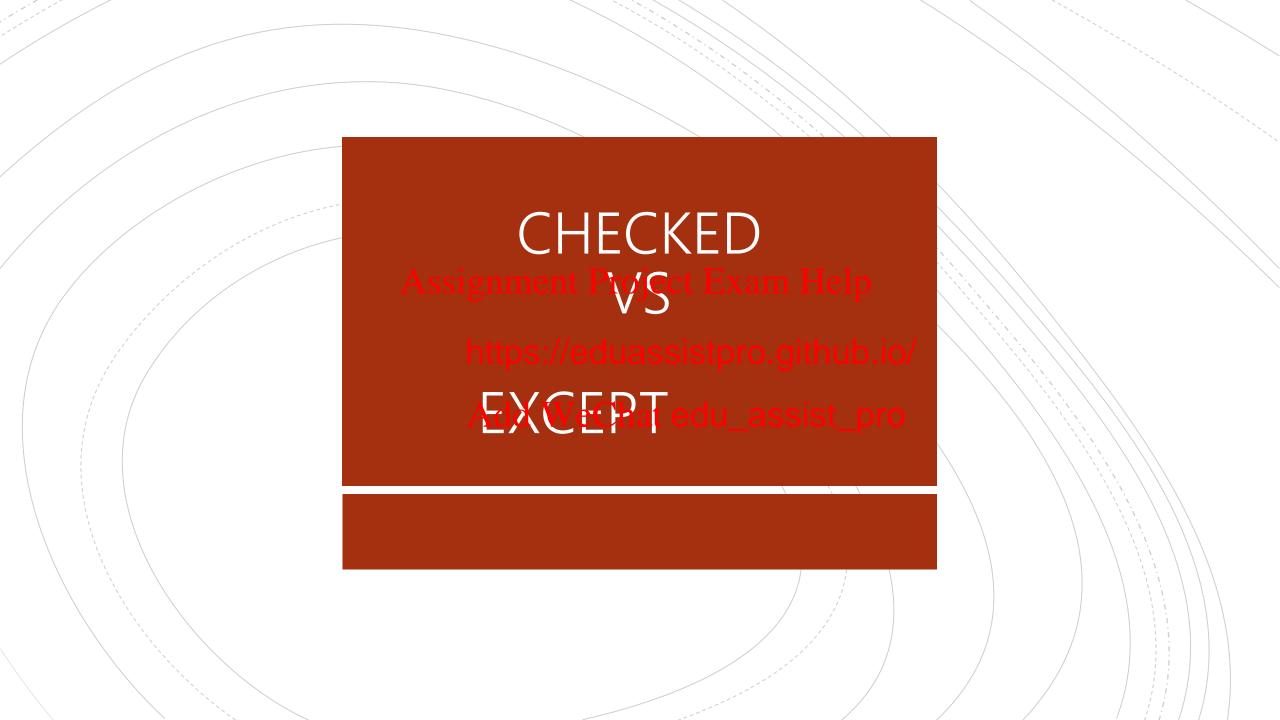
System.out.println(e);

finally **BLOCK**

- The finally block always executes when the try block exists. This ensures that the finally block is executed even if one of the following happens:

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 - an unexpected exce oc.
 - an exception occurs https://eduassistpro.github.io/
 - There's a return/continue that edu_assist the try/catch block.
- You can have a finally even with just a try block (and no catch).
- The finally block is useful for more than just exception handling.

 Good practice: put cleanup code in a finally block even if no exception is anticipated.



CHECKED VS UNCHECKED EXCEPTIONS

In java there are two kinds of exceptions:

- Checked
 - Assignment Project Exam Help

 Exception

 - IOExcept https://eduassistpro.github.io/
 - FileNotFormdEweCharedu_assist_pro
- Unchecked
 - NullPointerException
 - ArrayIndexOutOfBoundsException
 - ArithmeticException

UNCHECKED EXCEPTIONS

- These exceptions are *not* checked at compile-time.

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- Most (if not all) exc https://eduassistpro.githulovioare
 unchecked, they can cause your c hat run-time.
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- You are not forced by the compiler to handle these exceptions. It is up to the programmer to decide if to catch the exceptions.

CHECKED EXCEPTIONS

These exceptions are checked at compile-time!

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• Usually, these kind https://eduassistpro.gltfiub.io/mething that isn't the programme rying to read from a file whose name is misspelled. These edu_assist_procoverable errors, which is why you have to handle them - it might be possible to keep going and not just crash!

CHECKED EXCEPTIONS

The programmer is forced to *handle* these exceptions. There are 2 ways to do that:

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- 1. Use try/catch blohttps://eduassistpro.gathhatim/ight throw a checked exception Add WeChat edu_assist_pro
- 2. Specify in the method header that the method contains code that might throw an exception, and therefore the method itself (might) throws an exception.

EXAMPLE - READING FROM A FILE

You can read from a file in Java using
the same Scanner class that we use to
read from standard input! Assignment Project Exam Help

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You use an overloaded constructor inside the Scanner class. Add WeChat edu_assist_pro

File is an object meant to store information related to the File. You can create one by providing a path to a file.

EXAMPLE – READING FROM A FILE

Notice the "throws" keyword in the method header. This means that you need to handle a FileNotFoundException to avoid the compiler error. Assignment Project Exam Help

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For example,
filePath could be
"C:\\documents\
\whatever.txt"

We would like to write the method below, but we get the following compile-time error:
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```
unreported exc tFoundException; must be https://eduassistpro.githublio/wn
```

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```
public static void myMethod(String filePath) {
   File f = new File(filePath);
   Scanner fileReader = new Scanner(f);
   int firstNumber = fileReader.nextInt();
}
```

OPTION 1

Surround the code that might throw an exception with a try/catch block.

```
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public stati
           https://eduassistpro.github.io/
     File f
     ScannerAfid Wedhat edu_assistepto);
     int firstNumber = f
                         nextInt();
   catch(FileNotFoundException e) {
      System.out.println("File not found");
```

OPTION 2

Specify in the method header that there's an exception using the throws keyword followed by the type of the exception.

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```
public static void myMetho https://eduassistpro.githubiO/eNotFoundException {
    File f = new File(filePath);
    Scanner fileReader = newAddarWeChat edu_assist_pro
    int firstNumber = fileReader.nextInt();
}
```

Whenever this method is called, the FileNotFoundException will have to be handled. To do so, you can use any of the two options we have just seen.

```
public static void test() throws FileNotFoundException {
   // code from the previous slide
public static void tesksighment Projecto Exame Ptip {
   test();
                          https://eduassistpro.github.io/
                          Add WeChat edu_assist_pro
public static void test3() throws FileNotFoundException {
   test2();
public static void main(String[] args) throws FileNotFoundException {
   test3();
```

```
public static void test() throws FileNotFoundException {
  // code from the previous slide
public static void test2() throws FileNotFoundException {
   test();
              Assignment Project Exam Help
test2();
                  Add WeChat edu_assist_pro
public static void main(String[] args) {
  try{
     test3();
   } catch(FileNotFoundException e) {
     System.out.println("Caught here!");
```

```
public static void test() throws FileNotFoundException {
    // code from the previous slide
public static void test2() throws FileNotFoundException {
   test();
               Assignment Project Exam Help
public static void thttps://eduassistpro.github.io/
   try{
                    Add WeChat edu_assist_pro
       test2();
   } catch(FileNotFoundException e) {
       System.out.println("Caught here!");
public static void main(String[] args) {
   test3();
```



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In the next video

t objects and classes. https://eduassistpro.github.io/

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