CSI201 Week 6-1 is 5

- Chapter 3 Concepts Summary
- Project 03 Introduction
- Programming Last Weeks Computation Example as a Method
  - make and use “class methods” G&E 3.3.1
- Making a GCD (Greatest Common Divisor) Space Telescope.
Summary after G&E sec. 3.7

- 3.7.1 Invoking Object Methods

\[ \text{objectRef} \bullet \text{methodName}(\text{paramList}) \];

IMPOSSIBLE without an object to invoke the object method ON, WITH, or FOR!!
Creating Objects after GE 3.7.3

- `new ClassName( paramList );`

(usually) USELESS w/o FIRST making a reference variable so the shiny new object can be referred to AFTER it was built!

- Example:

```java
Turtle tu;

tu = new Turtle( new World( ) );
```
GE 3.7.1 and 3.7.3 together

Turtle tu;

    tu = new Turtle( new World( ) );

    tu.forward( 197 );

ClassName refVariable;

    refVariable = new ClassName( params1 );

    refVariable.methName( params2 );
GE 3.7.1 and 3.73 together

Turtle tu;

```
tu = new Turtle( new World( ));
tu.forward( 197 );
```

```
ClassName refVariable;

refVariable = new ClassName( params1 );

refVariable.methName( params2 );
```
What's Happening???

Turtle tu;

Make a variable good for referring to a Turtle object.

tu = new Turtle( new World( ) );

First, make a new World. Second, make a new Turtle. The Turtle maker gets the reference to that World as a parameter.

tu.forward( 197 );

Call the forward method on, with, for THAT Turtle, with param. value 197.
(There is no) Dumb Question.

Turtle tu;

World worldObjRef;

Don't you need to declare a World variable?

This is what the textbook shows!

```java
worldObjRef = new World();
tu = new Turtle( worldObjRef );
tu.forward( 197 );
```
Turtle tu; World worldObjRef;

Zero-th, make an (unnecessary) variable good for referring to a World.

worldObjRef = new World();

First, make a new World.

tu = new Turtle( worldObjRef );

Second, make a new Turtle. The Turtle maker gets the reference to that World as a parameter.

tu.forward( 197 );
(There is no) Dumb Question.

Turtle tu;

World worldObjRef;

Instead of the above,

IS IT OK to REVERSE THE ORDER?

World worldObjRef;

Turtle tu;

(A) Yes   (B) NO!!!

.............

worldObjRef = new World( )

tu = new Turtle( worldObjRef );
World worldObjRef;
worldObjRef = new World();

Turtle tu;
tu = new Turtle( worldObjRef );

What about this??

(A) OK   (B) BAD!!:(
(There is no) Dumb Question.

World worldObjRef;
worldObjRef = new World( );
Turtle tu;
tu = new Turtle( worldObjRef );

That's fine. But what about

tu = new Turtle ( worldObjRef );
Turtle tu;

(A) OK  (B) BAD!!:(

public class BadExample {
    public static void main(String[] a) {
        World worldObjRef;
        worldObjRef = new World();
        tu = new Turtle( worldObjRef );
        Turtle tu;
    }
}

1 error found:
File: /home/seth/Courses/CSI2018/BadExample.java [line: 6]
Error: /home/seth/Courses/CSI2018/BadExample.java:6: cannot find symbol
   symbol   : variable tu
   location: class BadExample
Computers generally do commands **IN THE ORDER YOU WRITE THEM**.

Line 6 is BEFORE Line 7.
Line 6 tries to USE a variable named tu BEFORE that variable is declared in Line 7. So it fails AT 6.
“Declared” means the variable and its name are put into the computer's memory.
Creating new (YOUR OWN) methods 3.7.4

• Decide what kind of objects you want to give YOUR new potential behavior to. Suppose that kind is ClassName

• Open that class's definition file ClassName.java

• Put directly within the outermost { ... } your method's definition:

```java
public returnType methodName(
    parmType1 parmName1, parmType2 parmName2)
{
    code that programs your behavior
}
```
Calling your own methods on objects like Turtles

• EASY! Just like calling the methods that CAME (from G&E) with Turtles.
Project 03

Add new image processing methods to G&E Pictures, your new methods must be parametrized by (1) what locations in the Picture to modify (2) some details to control the modification.

Programming Topics to learn:
Array idea
Using a return value returned by a method call
Scope of names of variables
Specifying packages sometimes
Files
Various kinds of loop statements
Project 03

READING:
ALL OF CHAPTER 4
(but at Albany, we make complete programs that do real things programmed to begin in the main method!)

CHAPTER 5
Just pages 131, 132, 133, 134
plus today's demos
The whole Picture gotten at with `myPict` after

```java
Picture myPict;
myPict = new Picture( ... );
```
Pixel gotten at with `myPict.getPixel(1, 0)`

The whole `Picture` gotten at with `myPict`

after

`Picture myPict;`

`myPict = new Picture( ... );`
Using G&E's stuff for digital Pictures

- `Picture pict; //Make a variable to refer to a Picture`
- `pict = new Picture( ... ); //Make the Picture object`
- `Pixel pix = pict.getPixel( SOME x-location, SOME y-location );`
- `pix.setColor( new Color( some red intensity, some green, some blue intensity ) );`
- `pict.explore( ); //Show a nice window for enlarging and viewing locations and RGB intensities of its Pixels one by one.`