Tools

IDE - Integrated Development Environment

Software that combines tools that allow you to write code, compile and run, check for errors, and debug.

Git and GitHub

Version control software for keeping multiple versions of programs or projects saved in case of error which leads to the current build being broken

Functions of GitHub:

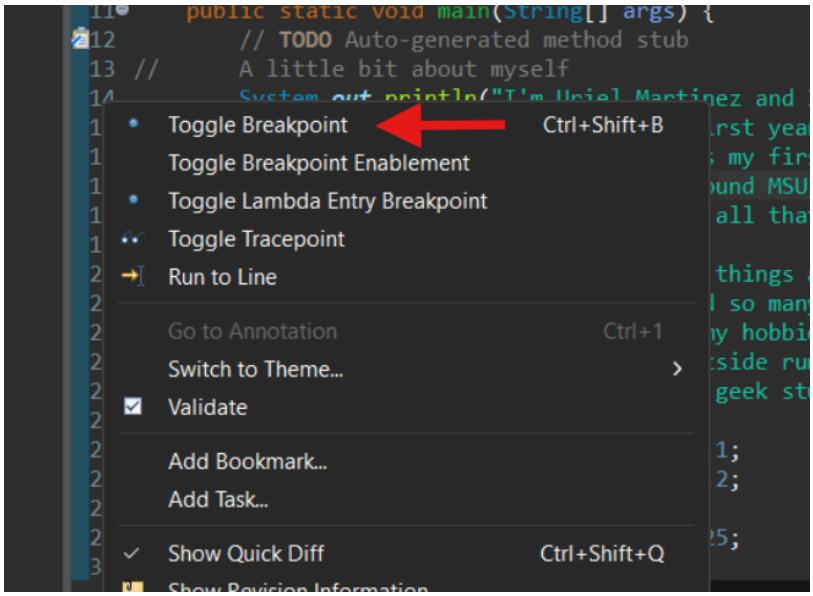
- Allows you to upload your repository to the cloud servers
- Allows you to push new versions
- Allows you to pull previous versions back from the cloud servers
- Can clone repos on systems that don't already have them
- Shows the changes between versions for clarity

Eclipse Debugging

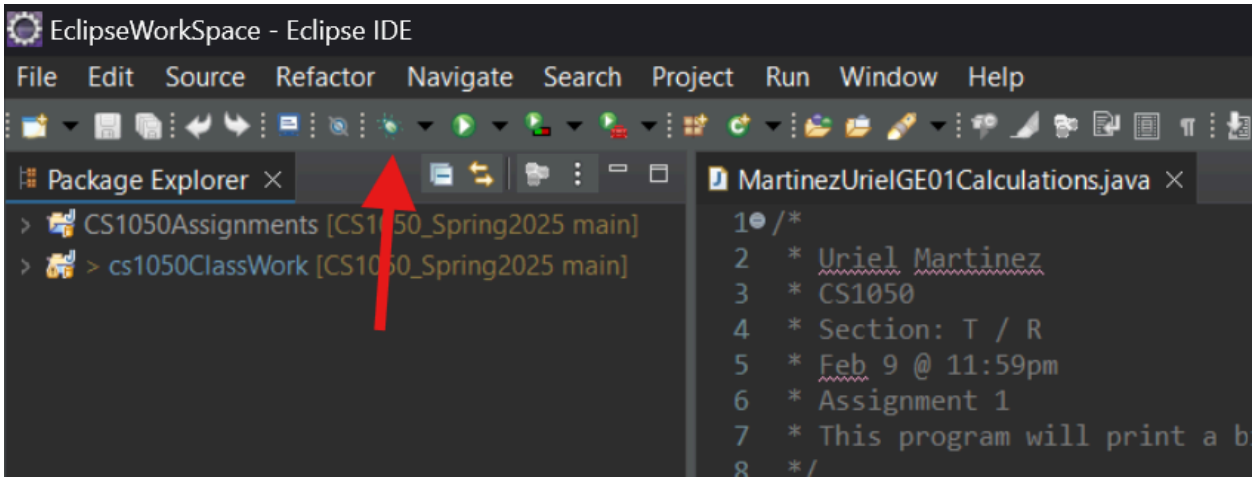
Debugging allows you to closely examine your code to better understand what it is doing.

Steps for debugging in Eclipse:

1. Add a line break by right clicking the line you want to start on



2. Click on the debugging button near the run button

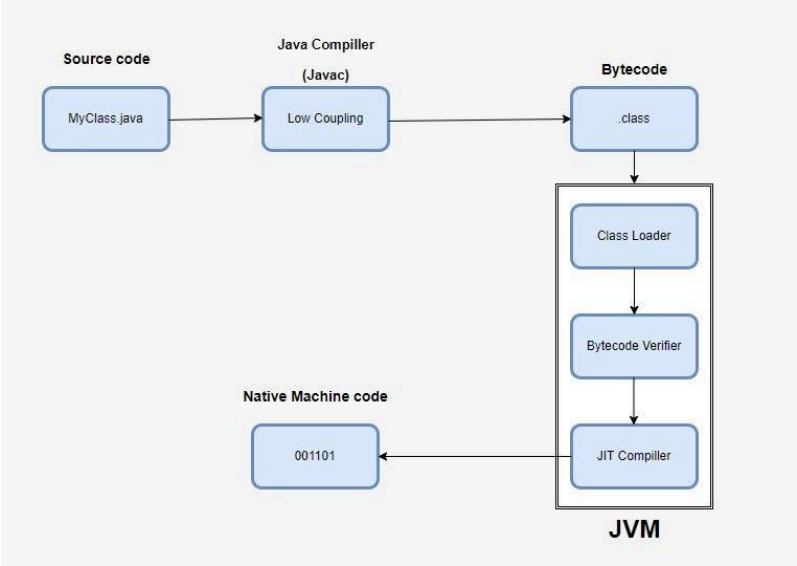


3. Press either F5 to step through code or F6 to step over it
    a. Stepping over is good for specific statements which you don't want to see everything that's going on under the hood

Java Concepts

Compilation Process

Source Code is turned into byte code which can be read by any system with a Java Virtual Machine. The JVM then turns it into machine code that the computer can read.



Primitive Data Types

Data types that are capable of only holding one value at a time

List of basic primitive data types:

- Integer
- Long
- Float
- Double
- Boolean
- Char

Variables

“Containers” that hold a value which can be changed at any point in the program

```
Int userGuessNumber = 45;
```

Constants

Values in the programs which once initialized, can't be changed without causing an syntax error

```
final double TAX_RATE_PERC = 2.3;
```

Arithmetic Operators

Symbols in programming that are used to carry out a specific operation
Some basic operations:

- Addition +
- Subtraction -
- Multiplication *
- Division /
- Modulus %
    - Divides 2 number values and only returns the remainder
- Assignment =

Combined Assignment Operators

Allows you to combine 2 basic functions into one symbol that can be carried out on one line
Some examples:

- Add then assign +=
- Subtract then assign -=
- Multiply then assign *=
- Divide then assign /=
- Modulus then assign %=
    - What modulus does

Memory Allocation

The amount of memory that is allocated depends on the data type that variables are given

Type	Size (in bits)	Range
byte	8	-128 to 127
short	16	-32,768 to 32,767
int	32	-2^{31} to $2^{31}-1$
long	64	-2^{63} to $2^{63}-1$
float	32	1.4e-045 to 3.4e+038
double	64	4.9e-324 to 1.8e+308
char	16	0 to 65,535
boolean	1	true or false

Conversion

When a smaller data type is assigned to the value of a bigger data type. Think of pouring the contents of a shot glass into a soda can

Casting

Occurs when a data type is manually changed into a different data type.

Naming Conventions

Aspects of programs are often named different depending on what they are

Variables

Start with a lowercase letter and use camelCasing for the rest of the name

Constants

Written in all caps and uses underscores for spaces

Classes

Start with an uppercase letter and use camelCasing for the rest