FRC Java
Lesson 1

Intro

Variables, Arrays, Math

Gus Michel III

3946 Tiger Robotics – slidell-robotics.com

Hello World

```
public static void main(String args[]){
  System.out.println(“Hello World);
}
```

- “main” first method run in Java Program
- All Normal Java Programs need this framework
  - FRC Robots have their own however
- The ; in line 2 means the end of that statement

System.out

- Methods include print() and println()
  - `System.out.print();`
  - `System.out.println();`
- The data to print out is put inside the ()
  - `System.out.println(“Hello World”);`
  - `System.out.println(42);`

Variable Types

- `int` – Whole positive negative numbers
  - `5, 7, 2, 405, 334`
- `float` – Positive negative numbers with decimal
  - `3.554, 7.443, 4.3, 5.34`
- `double` – Positive negative with longer decimal
  - `4.55654, 99.76547, 86.54564,`
- `String` – Text (surrounded by “”)
  - `“Hello”, “why”, “good day”, “number 3”`
- `Boolean` – True and false
  - `true, false`

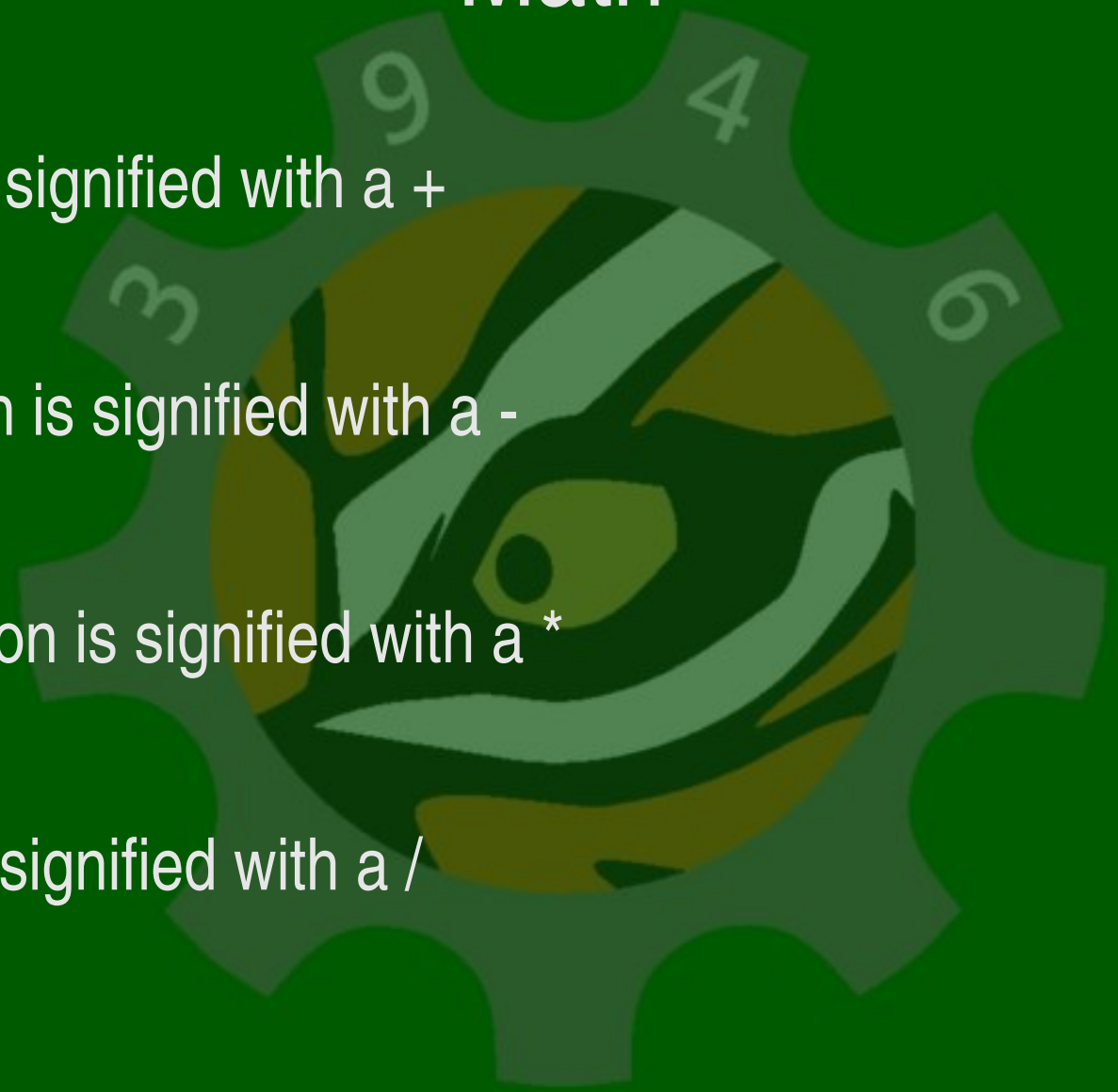
Variables

- Make a Variable
  - `<type> <name> = <data>;`
  - `int age = 43;`
- Make a variable with no data
  - `<type> <name>;`
  - `String name;`
- Change a variable's data (Do not put type here)
  - `<name> = <data>`
  - `name = “jimmy”; age = 3;`

Arrays

- An array is like a variable but it holds multiple values
- Made like Variable except with square brackets after type
  - int[ ] anArray;
- Then to allocate memory use the new operator
  - anArray = new int[#]
- To access/assign data use brackets and location(index)
  - AnArray[0] = 423
  - AnArray[3] = 33
- Array index ALWAYS starts at zero

Math



- Addition is signified with a +
  - 42 + 32
- Subtraction is signified with a -
  - 42 - 32
- Multiplication is signified with a *
  - 42 * 32
- Division is signified with a /
  - 42 / 32

Modulus

- Signified with a %
- Used to get Remainder
- 4 % 3 = 1
- 100 % 6 = 4
- 20 % 6 = 2

Math Shortcuts

- <variable>++; - adds 1 to the variables value
- <variable>--; - subtracts 1 to the variables value

- <variable> += <data> - adds data to the variable
- <variable> -= <data> - subtracts data from variable
- <variable> *= <data> - multiply data with variable
- <variable> /= <data> - divide data with variable
- <variable> %= <data> - modulus data with variable
- var *= 30; is same as: var = var * 30;
- age += 10; is the same as: age = age + 10;

Data Types and Type Casting

- Doing math on two int will result in an int
  - 4 / 3 = 1
  - (double) 4 / 3 = 1.33333
- If one or more are float/double result is such
  - 4.0 / 3 = 1.33333
  - (int) 4.0 / 3 = 1
- Casts go just before the number you are casting
  - Correct: (int) 3.44 – 2 (This will change 3.44 to 3)
  - Incorrect: (int) 2 – 3.44 (This will not change 3.44)

Concatenating Strings

- Concatenate means to link in series
  - “hello” + “world” = “helloworld”
  - “dude” + 32 = “dude32”

```
System.out.println(“hello ” + “world”);

String string1 = “hello”;
int int1 = 32;
String string3 = string1 + int1;
System.out.println(string3);
```

Making and Changing Variables

```
String name = “Jimmy”;
int age = 32;
System.out.println(name);
System.out.println(age);

name = “George”;
age = 33;
System.out.println(name);
System.out.println(age);
```

Variables and Math

```
int operand1 = 32;
int operand2 = 53;
double operand3 = 4.33;


System.out.println(43-32);
System.out.println(operand1/operand2);
System.out.println(43%operand1);
int operand4 = (int) operand1 * operand3;
double operand 5 = (double) operand 1 / operand3;
operand1 = operand2 % operand5;
```

Assignment

- Write a program to write out your Name
- Write program to print first name on line 1, last name on line 2
  - Then do it with ONE System.out.print(ln)(“”);
- Write a program to write out your address