STUDY GUIDE 4: Variables

AP Computer Science - WHS Mulvaney

Name _____ Per _____

Resources

Lecture Slides	Video Lectures	Textbook Section
- 2A: Primitive Data Types and Expressions - 2B: Evaluating Expressions and Dangerous Division - 2C: Variables and Casting	- Primitives, Operations, mod, Dangerous Division - Assignments and Operators	- 2.1 and 2.2

- **PracticeIt** (Building Java Programs 4th Edition, Chapter 2)
  - (2B) Self Check: 2.1, 2.3
  - (2C) Self Check: 2.5, 2.8, 2.12, 2.13, 2.14, 2.15, 2.17		

2A Lecture Notes: Primitive Data Types and Expressions

Vocabulary

data type	
int	
double	
boolean	
char	
primitive type	
reference type	
arithmetic operator	
mod	
expression	

Task 1: Mod and other Operators

Work with your desk partner. Assign each of you one of the programs below. Attempt each statement and note the value printed to the console. Then attempt the questions at the bottom of your column. When both of you are finished, share your answers with your neighbor. Help them understand the answers to the questions.

```
public class Tester {
      public static void main(String[] args) {
            // Your test statement goes here
      }
}
```

Partner A Test Statements	**Partner B Test Statements**

`System.out.println(2 + 3);`
`System.out.println(5 - 100);`
`System.out.println(3.4 + 3.6);`
`System.out.println(7.8 - 123.456);`
 	
`System.out.println(2147483646);`
`System.out.println(2147483647);`
`System.out.println(2147483648);`
`System.out.println(2147483647 + 1);`
`System.out.println(Integer.MAX_VALUE);`
`System.out.println(-2147483647);`
`System.out.println(-2147483648);`
`System.out.println(-2147483649);`
`System.out.println(-2147483648 - 1);`
`System.out.println(Integer.MIN_VALUE);`
 	
`System.out.println(Double.MIN_VALUE);`
`System.out.println(Double.MAX_VALUE);`
	`System.out.println(10 % 5);`
	`System.out.println(9 % 5);`
	`System.out.println(8 % 5);`
	`System.out.println(5 % 5);`
	`System.out.println(4 % 5);`
	`System.out.println(22 % 7);`
	`System.out.println(100 % 10);`
	`System.out.println(99 % 10);`
	
	`System.out.println(2 + 3.14);`
	`System.out.println(1.9 + 5);`

1. Can ints and doubles hold negative values? 2. What are the greatest and least value that int can hold? Doubles?	3. How does the % operator work? 4. What type to you get when you mix an int and a double

2B Lecture Notes: Evaluating Expressions and Dangerous Division

Task 2: Dangerous Division

Work with your desk partner. Assign each of you one of the programs below. Attempt each statement and note the value printed to the console. Then attempt the questions at the bottom of your column. When both of you are finished, share your answers with your neighbor. Help them understand the answers to the questions.

```
public class Tester {
      public static void main(String[] args) {
            // Your test statement goes here
      }
}
```

Partner A Test Statements	**Partner B Test Statements**

`System.out.println(6 / 3);`
`System.out.println(9 / 9);`
`System.out.println(0 / 100);`
`System.out.println(20 / 4);`
`System.out.println(51 / 17);`
 	
`System.out.println(8 / 3);`
`System.out.println(7 / 3);`
`System.out.println(5 / 3);`
`System.out.println(1 / 3);`
`System.out.println(100 / 3);`
	`System.out.println(5.0 / 2.0);`
	`System.out.println(1.0 / 4.0);`
	`System.out.println(1.0 / 1000.0);`
	`System.out.println(2.5 / 2.0);`
	`System.out.println(100.00 / 12.5);`
	
	`System.out.println(1.0 / 3.0);`
	`System.out.println(2.0 / 7.0);`
	`System.out.println(4.0 / 3.0);`
	`System.out.println(1.0 / 99.0);`
	`System.out.println(3.0 / 4.0);`

5. When is int division correct? 6. When is int division incorrect? What number does it give instead?	7. When is double division correct? 1.0 / 99.0 == 2.0 / 198.00 8. When is double division incorrect? Describe the mistake it makes

Practice 1	**Practice 2**
1. `2 + 2 * 5`	1. `100 - 5 * 5 + 27 % 2`
2. `3 * 3 + 2 * 2`	2. `2000 % 300`
3. `7 + 5 / 2 * 3 - 4`	3. `(37 * 28 - 1000 ) * (22 % 11)`
4. `+3 * -4`	
5. `3 + -4`	
6. `3 - -4`	

1. What acronym do we use for order of operations instead of PEMDAS?

implicit casting	
explicit casting	
variables	

Variable Base Code

Assigning a Variable	Declaring a Variable
Assigning and Declaring a Variable	

Great Memory Waffle	
Drops and Puddles	
Shorthand Operators	
Increment	
Decrement	
Concatenation	