Honors Computer Programming 1-2

Chapter 3 Activities

1A. Correct the errors in the following variable declarations:

a) `double 3.14159;` → `double num = 3.14159;`

b) `int;` → `int num;`

c) `double = 314.00;` → `double num = 314.00;`

d) `int double_value = 314.00;` →

```
double double_value = 314.00;
```

or

```
int value = 314;
```

e) `int_value 314;` → `int value = 314;`

f) `double working_value 314` → `int double_value = (int)314.00;`

```
double workingValue = 314;
```

1B Complete the following table by renaming the bad variable names and providing descriptions.

Bad Variable Declaration	Improved Declaration	Description
`double current profit;`	`double currentProfit;`	the current profit
	`int numSold;`	counts products sold this month
`double %increase`	`double percentIncrease;`	`the percent increase`
	`double dollarsEarned;`	dollars earned this month

1C Give definitions for each of the constant descriptions listed below.

Constant Defintion	Description
`final int DAYS_IN_WEEK = 7;`	Number of days in a week
`final int WEEKS_IN_YEAR = 52;`	Number of weeks in a year
`final double WAGE_PER_HOUR = 9.00;`	Minimum wage per hour

2A Fix the right-hand sides of the following assignments so that they are the correct type for the variable on the left side.

`int x = Math.sqrt(4);`	`int x = (int)Math.sqrt(4);`
`double y = "3";`	`double y = Double.parseDouble("3");`
`String z = 3.14;`	`String z = "" + 3.14;`

2B What is wrong with each of these assignments?

Statement	Error
`a + 2 = 3;`	left-hand side must be a variable
`Math.PI = 3;`	a constant cannot be modified
`x = x + 1;`	The assignment operator is a single =

2C Computations with floating-point numbers have finite precision. What values are assigned in the following assignments?

Statement	Value
`double x = Math.pow(10, 20) + 1;`	`1.0E20`

$$x = 10^{20} + 1$$
$$= 100000000000000000001$$

2C Computations with floating-point numbers have finite precision. What values are assigned in the following assignments?

Statement	Value
`double x = Math.pow(10, 20) + 1;`	`1.0E20`
`double y = x - 1;`	`1.0E20`

$$
\begin{aligned}
y &= x - 1 \\
&= (10^{20} + 1) - 1 \\
&= 10^{20} \\
&= 100000000000000000000
\end{aligned}
$$

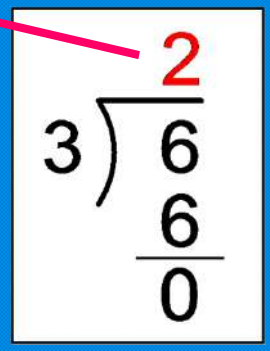
2C Computations with floating-point numbers have finite precision. What values are assigned in the following assignments?

Statement	Value
`double x = Math.pow(10, 20) + 1;`	`1.0E20`
`double y = x - 1;`	`1.0E20`
`double z = x - y;`	`0.0`

$$
\begin{aligned}
z &= x - y \\
&= (10^{20} + 1) - 10^{20} \\
&= 1
\end{aligned}
$$

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

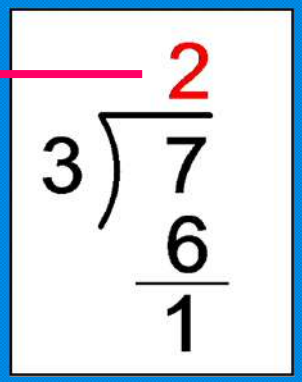
Statement	Value
`int x = 6 / 3;`	2



quotient is 2,
remainder is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2



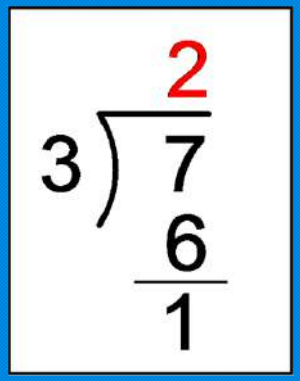
quotient is 2,
remainder is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0

convert 2 to a double

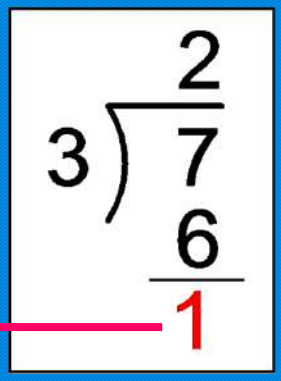
do division first



quotient is 2,
remainder is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0
`int x = 7 % 3;`	1

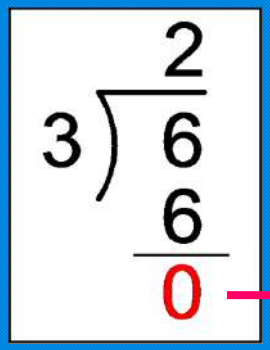


remainder is 1,
quotient is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0
`int x = 7 % 3;`	1

Statement	Value
`int x = 6 % 3;`	0

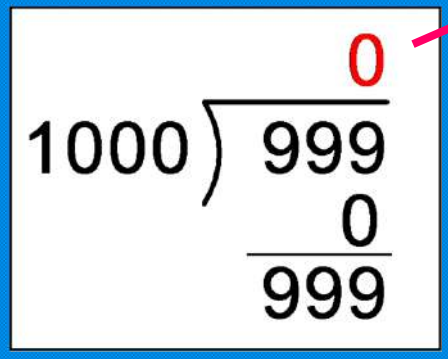


remainder is 0,
quotient is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0
`int x = 7 % 3;`	1

Statement	Value
`int x = 6 % 3;`	0
`int x = 999 / 1000;`	0

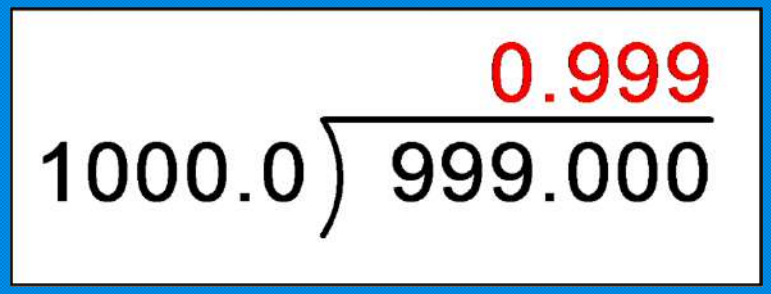


quotient is 0,
remainder is discarded

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0
`int x = 7 % 3;`	1

Statement	Value
`int x = 6 % 3;`	0
`int x = 999 / 1000;`	0
`double x = 999.0 / 1000.0;`	.999

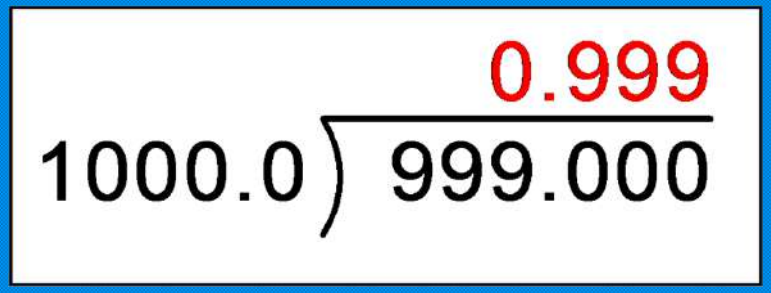


ordinary decimal division

3A Recalling what you've learned about integers and floating-point values, what value is assigned to x by each of the following?

Statement	Value
`int x = 6 / 3;`	2
`int x = 7 / 3;`	2
`double x = 7 / 3;`	2.0
`int x = 7 % 3;`	1

Statement	Value
`int x = 6 % 3;`	0
`int x = 999 / 1000;`	0
`double x = 999.0 / 1000.0;`	.999
`int x = (int)(999 / 1000.0);`	0



ordinary decimal division

convert to an integer:
drop the decimal part

3B Translate the following algebraic expressions into Java:

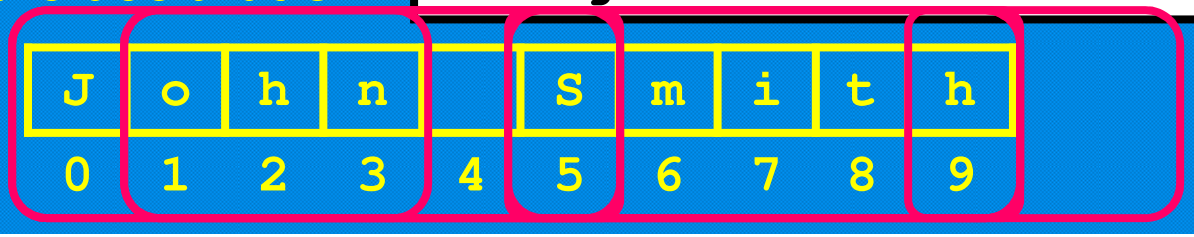
Algebraic Expression	Java Equivalent
$y = x + \frac{1}{2}$	`y = x + 1.0 / 2.0;`
$y = x^2 + 2x + 1$	`y = Math.pow(x, 2)` `+ 2 * x + 1;`
$y = \frac{x}{1 - x}$	`y = x / (1 - x);`

or

```
y = x * x + 2 * x + 1;
```

4. What will be the resulting substring in the following examples?

Assume the declaration: `String name = "John Smith"`



Substring Expression	Result
`String firstName = name.substring(0, 4);`	John
`String lastName = name.substring(5, 6);`	S
`String name2 = name.substring(1, 11);`	out-of-bounds error
`String lastName = name.substring(5);`	Smith
`String lname = name.substring(0, 6);`	John S
`String lname = name.substring(9, 10);`	h
`String lname = name.substring(1, name.length());`	ohn Smith

5. Using `JOptionPane.showInputDialog`, ask the user to supply two integers `a` and `b`. Then print out the values `a / b` and `a % b`.

```
import javax.swing.JOptionPane;  // necessary for input dialog
...
// input the first number
String input = JOptionPane.showInputDialog("Enter an integer:");
int a = Integer.parseInt(input);

// input the second number
input = JOptionPane.showInputDialog("Enter a second integer:");
int b = Integer.parseInt(input);

// output the quotient and remainder
System.out.println("Quotient = " + (a / b));
System.out.println("Remainder = " + (a % b));

// allow the program to exit automatically
System.exit(0);
```

6. Assume:

```
int x = 2;
int y = 3;
int z = 4;
String line = "The answer is: ";
```

State the output for each of the following.

a)
```
System.out.println(line + x + y + z);
```
```
The answer is: 234
```

b)
```
System.out.println(line + (x + y + z));
```
```
The answer is: 9
```

c)
```
System.out.println(line + x + " " + z);
```
```
The answer is: 2 4
```

d)
```
System.out.println(x + ")" + line + y + z);
```
```
2)The answer is: 34
```

e)
```
System.out.println(line + ((x + y + z) / 3));
```
```
The answer is: 3
```