

NAME _____

DATE _____

PERIOD _____

UNIT 1 · TOPIC 1.4 · WORKSHEET

Store It and Scan It

Trace the arrows, rebuild a program that reads input, and catch the swap that lost a value.

About 30 minutes

10 questions

Cumulative through 1.4

TOPIC

1.4

**DIRECTIONS**

Work each puzzle in pencil. For code, write exactly what prints, one line per `println`. Some puzzles include pieces you won't need.

PART A · 2 QUESTIONS

A

Warm up your brain

1

YOU'RE THE JVM

You are the Java Virtual Machine. Run this code in your head. What prints?

```
int width = 5;
int height = 2;
int area = width * height;
width = 8;
System.out.println(area);
```

A 10**B** 16**C** 40**D** area**THINK FIRST**

Line 3 of the next question is `a = b - a;`. Does the right side use the old value of `a` or the new one? Guess in the margin; question 2 settles it.

2 PENCIL CHECK

Trace the code one line at a time. After each line runs, write the value stored in each variable. Write *none* if the variable doesn't exist yet.

```
1 int a = 4;
2 int b = a * 3;
3 a = b - a;
4 b = a + b / 4;
5 a = a % 5;
```

After line	a	b
1		
2		
3		
4		
5		



WATCH OUT

Scanner isn't automatically available to every program. Leave out `import java.util.Scanner;` at the top of the file, and the compiler says cannot find symbol the moment you write Scanner.

PART B · 3 PUZZLES

B Puzzles

3 CODE TILES

Hopper's snack-stand program reads how many snacks a customer buys and the price of one snack, then prints the total cost. The user types 3 2.50 and presses Enter. Someone knocked the tiles off the fridge. Put them back in order, under the two lines shown, so the program prints the output below. Two tiles are decoys and aren't used.

```
import java.util.Scanner;
...
Scanner console = new Scanner(System.in);
```

<code>System.out.println(total);</code>	<code>int price = console.nextInt();</code>
<code>int quantity = console.nextInt();</code>	<code>double total = quantity * price;</code>
<code>int total = quantity * price;</code>	<code>double price = console.nextDouble();</code>

Target output

7.5

YOUR PROGRAM

4 FACE-OFF

Tonight: the equals sign from math class meets Java's assignment operator. Fill in the blanks.

MATH'S =	When I say $x = 5$, I mean both sides are _____, always. Read me left to right or right to left; it's the same.
JAVA'S =	I'm a one-way street. I work out the value on my _____ first, then store it in the variable on my _____.
MATH'S =	So you'd let someone write <code>count = count + 1</code> ? In my world that is _____ true.
JAVA'S =	In mine it's routine. I take the value <code>count</code> holds now, add 1, and store the result back in _____.
MATH'S =	Fine. Then write <code>5 = count</code> and watch what happens.
JAVA'S =	That won't _____. The left side has to be a _____, a place to store a value, not a value.

5 SNIPPET POOL

Hopper hopped 17 meters in 2 jumps. Fill each numbered hole with a snippet from the pool so the program prints the average jump, 8.5. Each snippet is used at most once, and some aren't needed.

AverageJump.java

```
int meters = (1);
(2) average = meters / (3);
System.out.println(average);
```

THE POOL

Each snippet can be used only once, and not every snippet is needed.

"17"	17	int	double
String	2	2.0	



FAIR QUESTION

Is typing the only kind of input?

No. Input is any data a program gets from outside itself: a tap or a button press (tactile), a voice (audio), a camera (visual), or text. Scanner is one way a Java program gets *text* input from the keyboard.

PART C · 5 QUESTIONS



Catch the mistake

6

YOU'RE THE COMPILER

You are the compiler. For each snippet, decide whether it compiles. If it does, write what it prints. If it doesn't, say why in a few words.

Snippet	Compiles?	Output, or why not
1 <code>int score;</code> <code>System.out.println(score);</code>		
2 <code>int lives = null;</code>		
3 <code>String team = null;</code> <code>System.out.println(team);</code>		
4 <code>int half = 9 / 2.0;</code>		
5 <code>int points;</code> <code>points = 4 * 3 % 5;</code> <code>System.out.println(points);</code>		

7 ONE-NAME FIX

This code is supposed to swap the values in `first` and `second`. Instead it prints 8 twice. Change exactly one variable name (not a number) so that, at the end, `first` holds 8 and `second` holds 3.

```
1 int first = 3;
2 int second = 8;
3 int temp = first;
4 first = second;
5 second = first;
6 System.out.println(first);
7 System.out.println(second);
```

LINE, OLD NAME, NEW NAME, AND WHY IT WAS BROKEN

8 TWO TRUTHS AND A LIE

Two of these claims about the code are true and one is a lie. Circle the lie, then rewrite it so it's true.

```
String coach = null;
String captain = "null";
System.out.println(coach);
System.out.println(captain);
```

- **1** Both `println` lines print `null`.
- **2** `captain` refers to a `String` object made of the letters `n`, `u`, `l`, `l`.
- **3** `coach` and `captain` hold the same thing, because they print the same thing.

THE LIE, REWRITTEN

9 WHO AM I?

Some of today's ideas are playing a party game. Each gives a clue about itself. Name it.

Clue	I am...
I'm a one-way arrow: I store the value on my right in the variable on my left.	
I mean "no object here." Only reference variables can hold me.	
You need <code>import java.util.Scanner;</code> to use me, and I turn typed text into values.	
Call me on a Scanner, and I hand back the next piece of input as a real number.	
I get thrown when the input doesn't match the type the program asked for.	
A variable becomes me the first time it's assigned a value.	

10 WRAP-UP



REFLECTION

In one sentence: a program runs `int total = price * quantity;` and then changes `price`. What has to happen for `total` to show the new price, and why?

YOUR ANSWER