

Introduction

Welcome to the Intro to Java: Functional Programming, Lesson 1 problem set! These problem sets are an opportunity for you to practice the concepts you learned in class before moving on to the next lesson. Learning a computer programming language is similar to learning a human language. Nobody can pick it up overnight, there's a lot of vocabulary and syntax to remember. Language learners often speak of the moment when they realized they stopped translating in their head and actually started thinking in their second language. This will happen with Java too! Eventually, you will be able to consider a task that needs coding and immediately imagine what Java code would complete it. To get there, though, requires practice.

That's where the problem sets come in. They aren't mandatory, and they aren't graded. They're just extra learning materials to help you along.

Completing the Problem Sets

There isn't a right or wrong way to work on these. Some problems require you to examine code or do some arithmetic. You can take notes on paper, print this document and use the space provided, or try to do it all in your head—whatever works for you. For the exercises that require programming, we highly recommend that you pick your favorite text editor, open a blank text file, and try writing out the code.

Question 1

Which of the following Java variable declarations has an error?

- A. `int x = 5;`
- B. `double temperature = 75.6;`
- C. `char grade = 'A';`
- D. `String name = 'Adam';`

Question 1 Solution

```
D. String name = 'Adam';
```

When defining Strings, we need to use double quotes around the text, like this:

```
String name = "Adam";
```

Single quotes are used for defining single characters, like this:

```
char grade = 'A';
```

Question 2

What value for `register` will be printed at the end of this block of Java code?

```
double register = 10.0;
register = register + 5;    //Customer pays $5.
register = register - 2.5; //Customer receives $2.50 as change.
register = register + 10;  //Customer pays $10.
register = register - 3;   //Customer receives $3 as change.
System.out.println(register);
```

- A. 19.0
- B. 19.5
- C. 22.5
- D. 25.5

Question 2 Solution

B. 19.5

The register has a starting value of 10. Then 5 is added, so the variable's new value is 15. Then 2.5 is subtracted, giving the variable a new value of 12.5. Next, 10 is added, bringing the value up to 22.5. Finally, 3 is subtracted, leaving a value of 19.5.

Question 3

Define an integer variable called `bankBalance`. Initialize it to a value of 500. Then add 250 to it. Then subtract 100 from it. Finally, print the resulting value.

Question 3 Solution

Example solution code:

```
int bankBalance = 500;  
bankBalance = bankBalance + 250;  
bankBalance = bankBalance - 100;  
System.out.println(bankBalance);
```

Question 4

What value will be printed by this line of Java code?

```
System.out.println(2.0 * (5 / 2));
```

- A. 4
- B. 4.0
- C. 5
- D. 5.0
- E. This line of code will give an error.

Question 4 Solution

B. 4.0

When evaluating the arithmetic expression $2.0 * (5 / 2)$, Java will evaluate the expression inside the parentheses, $5 / 2$. When dividing two integers, Java will take ignore the remainder, so $5 / 2$ evaluates to the integer 2, not the double 2.5. This process is called *truncation*. The second step in evaluating the expression is evaluating $2.0 * 2$. When multiplying a double and an integer, the result is a double, so the value printed is the double 4.0.

Question 5

Write Java code to define an integer variable called `day`, and a String variable called `month`. Give `month` and `day` appropriate values for your birthday.

Question 5 Solution

Example solution code:

```
int day;  
String month;  
day = 1;  
month = "January";
```

*//Note that this can be compressed into two lines by defining the
//variables and giving them an initial value at the same time:*

```
int day = 1;  
String month = "January";
```

Question 6

Write Java code to create a String variable called `firstName`, define it to be your first name as a String. Then define a variable called `lastName` and define it to be your last name as a String. Then define a variable called `fullName` and set it to be your first name followed by a space followed by your last name. Use the existing variables for your first and last name and String concatenation to define `fullName`. Finally, write code to print this text:

```
Hello, my name is [full name].  
There are [number] letters in my name.
```

Use String concatenation to create the first String to print using the `fullName` variable, and use the `.length()` command on `firstName` and `lastName` to calculate the number of letters.

Note: you can concatenate an integer and a String and the integer will be converted to a String. For example, this expression:

```
"There are "+ 7 + "days in a week."
```

will be evaluated as the String:

```
"There are 7 days in a week."
```

Question 6 Solution

Example solution code:

```
String firstName = "Asser";
String lastName = "Samak";
String fullName = firstName + " " + lastName;

System.out.println("Hello, my name is " + fullName + ".");
int lettersInName = firstName.length() + lastName.length();
System.out.println("There are " + lettersInName
    + " letters in my name.");
```

Question 7

Write Java code to define a double variable called `fahrenheit` and set it to an initial value between 0 and 100. Then, create a double variable called `celsius`, and calculate its value based on the value of `fahrenheit`. (To convert from Fahrenheit to Celsius, subtract 32, then multiply by 5, then divide by 9.) Finally, print the final value of `celsius`.

Question 7 Solution

Example solution code:

```
double fahrenheit = 68.0;
double celcius;
celcius = (fahrenheit - 32) * 5 / 9;
System.out.println(celcius);
//With fahrenheit having a value of 68.0, this would print 20.0.
```