

```
1 // We'll get back to this later.
2 import java.util.Scanner;
3
4 /*
5  * All Java code goes in a .java file, which is akin to a .py file in that it
6  * contains source code. The Java compiler will read a .java file, make sure
7  * that its syntax and semantics are correct, then "compile" it, creating
8  * another file called a ".class" file. The .class file is then executed
9  * to run the program.
10  *
11  * Every Java program exists inside a "class". The name of a class always
12  * matches the name of the file that contains it, except for the ".java" part.
13  */
14 public class BasicIO { // in BasicIO.java
15
16     /*
17     * Unlike Python, Java programs are not executed top-down. Every Java
18     * program defines an "entry point" called main. It always looks like the
19     * following line.
20     */
21     public static void main(String[] args) {
22         // To print to the screen, we use System.out.println
23         System.out.println("Hello, world!");
24         // System.out.print will print without terminating the line.
25
26         // In Java, any value can be concatenated with a string.
27         System.out.println("5 plus 2 is " + (5 + 2));
28
29         /*
30         * Java has variables of different types, like Python, but in Java, the
31         * type of a variable MUST be listed when the variable is DECLARED for
32         * the first time.
33         */
34         int age = 21;
35
36         /*
37         * If a variable has already been declared in this scope, then we don't
38         * repeat the type when using it
39         */
40         age = 32;
41
42         System.out.println("I am " + age + " years old");
43
44         // A Scanner is used to gather input from the keyboard. It is always
45         // "constructed" first, like this:
46         Scanner input = new Scanner(System.in);
47         // Scanner is a type, like int.
48
49         // To read a value from the keyboard, Scanner has several methods:
50         System.out.println("What is your age? ");
51         int theirAge = input.nextInt(); // equiv. to int(input("..."))
52
53         System.out.println("What is your height? ");
```

```
53     float theirHeight = input.nextFloat();
54
55     // conditions in if statements/loops are surrounded by parens.
56     if (theirAge > age) {
57         System.out.println("Wow, you are " + (theirAge - age) +
58             " years older than me!");
59     }
60     else if (theirAge < age) {
61         System.out.println("Wow, you are " + (age - theirAge) +
62             " years younger than me!");
63     }
64     else {
65         System.out.println("Wow, we are the same age!!!");
66     }
67 }
68
69 }
70
```

```
1 // Java's "primitive" types.
2 public class PrimitiveTypes {
3     public static void main(String[] args) {
4         // Java has 8 primitive types.
5
6         // The integral types: byte, short, int, long
7
8
9
10
11        // The floating-point types: float, double
12
13
14
15
16
17        // The other types: boolean, char
18
19
20
21
22        // Arithmetic operators:
23        // +, -, *, /, %
24
25        // When an expression involves two values of different types, the
26        // higher-precision type is used as the result. The less-precise value
27        // is "up-cast" or COERCED into the higher-precision.
28
29        double pi = 3.14159;
30
31
32        double twoPi = pi * 2;
33        // pi is of type double; 2 is of type int
34        // 2 is coerced to a double, and the product is evaluated as a double.
35
36        /*
37         * WARNING!!!
38         * Integer division in Java by default drops remainders, like Python's
39         * two-slash (//) operator.
40         *
41         * Floating-point division is like Python.
42         */
43        int x = 7 / 2; // What is x?
44        int y = 7 % 2; // What is y?
45
46        double z = (double)x / y;
47    }
48 }
49
```

```
1 import java.util.Scanner;
2 // Make change for a dollar amount, finding every possible combination of coins
3 // that can make the given amount.
4 public class MakeChange {
5     public static void main(String[] args) {
6         final int DOLLAR_VALUE = 100;
7         final int QUARTER_VALUE = 25;
8         final int DIME_VALUE = 10;
9         final int NICKEL_VALUE = 5;
10        Scanner scan = new Scanner(System.in);
11        System.out.println("How much change to make? ");
12
13        int amount = (int)(scan.nextDouble() * DOLLAR_VALUE);
14
15        System.out.println(0.29 * 100);
16
17        /*
18         * Java's for loop is very different from Python's. Java's for has three
19         * components:
20         *
21         * for ( *initializer* ; *condition* ; *update*) {
22         * }
23         *
24         * The initializer happens only once, prior to the first iteration of the
25         * loop. The condition happens after the initializer is run, and then is
26         * evaluated again after each iteration completes, like a while loop.
27         * The update is run after each iteration, but before the condition is
28         * re-evaluated.
29         */
30        for (int quarters = amount / QUARTER_VALUE; quarters >= 0; quarters--) {
31            int qLeft = amount - quarters * QUARTER_VALUE;
32
33            for (int dimes = qLeft / DIME_VALUE; dimes >= 0; dimes--) {
34                int dLeft = qLeft - dimes * DIME_VALUE;
35
36                for (int nickels = dLeft / NICKEL_VALUE; nickels >= 0; nickels--) {
37                    int nLeft = dLeft - nickels * NICKEL_VALUE;
38
39                    System.out.println(quarters + " quarters, " + dimes + " dimes, "
40                                     + nickels + " nickels, " + nLeft + " pennies.");
41                }
42            }
43        }
44    }
45 }
46
```