iThink360's Java Programming Tutorial Series

Module 1 Challenge

Preface from the Desk of iThink360:

Greetings, fellow Thinker! iThink360 here. Thank you so much for accepting the Module 1 Challenge for my Java Programming Tutorial series!

The idea behind this challenge is to take all of the knowledge and skills you have learned over the past 14 episodes and do some practice on your own with them. This will help reinforce learning, since practice makes perfect!

I strongly encourage you to give this a go. If you are stuck, no worries! I will be dedicating Episodes 15 and 16 to the solutions for this challenge. As always, stay safe… stay healthy… keep Thinking360… and best of luck, fellow Thinker!

What Criteria is Covered in Today's Challenge?

1. Declaring a class and main method
2. Print statements
3. Variables and primitive types
4. Operators
5. Primitive upcasting and downcasting
6. Strings
7. Final constants
8. The Math class
9. Reading the Java API documentation
10. Boolean expressions
11. Conditionals
12. Arrays
13. Loops

What Resources Do I Have at My Disposal?

1. iThink360's Java Programming Tutorial series: https://youtu.be/v0jsNnCVRq0
2. Java API Documentation: https://docs.oracle.com/en/java/javase/11/docs/api/index.html

The Setup Directions:

1. Create a new project in BlueJ (or any IDE of your choice).
2. For each individual phase, create a new class, and within that class, create a main method. If you are not using BlueJ, you can create individual methods if you know how OR you can group all your code in one main method. All of the code for today's challenge will go inside these main methods.
3. Begin tackling the challenge below! Label your code segments by phase and mission, using comments as subheadings. Leave some whitespace in between for readability.
4. When finished, tune in to Episodes 15 and 16 to see the solutions to the challenge!

The Challenge:

When asked to print something, assume usage of System.out.println() unless otherwise indicated.

Phase I - Print Statements:

Mission:

1. Write a print statement to print "Hello, Challenge!"
2. Write a print statement to print any text of your choice, but do not create a new line. (HINT: Don't use System.out.println()... what's another print statement at our disposal?)
3. Write two blank print statements.

Phase II - Variables, Primitives, and Arithmetic Operators:

Mission:

1. Declare two int variables (with names intOne and intTwo) and one double variable (named myDouble). Assign the variables to any values of your choice.
2. Print the product of the first two ints.
3. Print the sum of one of the ints and the double.
4. Print the quotient of the other int and the double.
5. Print the modulus of any of the variables of your choice.
6. Print a hard-coded mathematical operation (directly into the print statement), using any numbers and any operator of your choice.

Phase III - Assignment Operators:

Mission:

1. Simultaneously add 534 to intOne, and reassign intOne to the sum.
2. Simultaneously divide myDouble by 3.14, and reassign myDouble to the quotient.
3. Simultaneously multiply intTwo by the value of intOne plus 9, and reassign intTwo to the product. (HINT: The value of intOne should not change).
4. Print the values of intOne, intTwo, and myDouble.

Phase IV - Logical Operators:

Mission:

1. Declare two boolean variables (boolOne and boolTwo), setting both equal to false.
2. Assign boolOne to the negated value of boolOne. (HINT: Don't use a hard coded value!)
3. Print out the logical AND and the logical OR of boolOne and boolTwo in separate print statements.
4. Consider boolTwo and the logical NOT of boolTwo. Take the logical OR of these values. Then take the logical AND of both the result of that operation and the logical NOT of boolOne. Print this compound operation to the terminal in a single print statement.

Phase V - Relational Operators, instanceof, and Boolean Expressions:

Mission:

1. Declare three booleans:
    a. boolExpOne → contains a comparison between any two ints using ==
    b. boolExpTwo → contains a comparison between two chars using >, >=, <, or <=
    c. boolExpThree → contains a comparison between two Strings using the equals() method
2. Create and print the result of a boolean expression that contains at minimum:
    a. Two logical ANDs of any two of the three booleans declared above
    b. Two logical ORs of any two of the three booleans declared above
    c. A logical NOT of any one of the three booleans declared above
    d. A logical NOT of any logical operation addressed here (HINT: use parentheses like order of operations!)
    e. A logical OR of any logical operation addressed here (HINT: use parentheses like order of operations!)
3. Print the result of using the instanceof operator on an anonymous String literal and the String class; the output should be true.
4. **BONUS:** Print the result of using the instanceof operator on an anonymous instance of the class you are currently working in and the name of the class you are working in; the output should be true.

Phase VI - Primitive Casting:

Mission:

1. Declare a long variable with any value of your choice, reference it as myLong.
2. Anonymously downcast the long into a byte and print the result; do not use any additional variables to do so.
3. Create a char variable with any value of your choice.
4. Anonymously upcast the char into a double and print the result; do not use any additional variables to do so.

Phase VII - Strings:

Mission:

1. Declare a String myString and assign it the String “Java Rocks!”
2. Print the result of comparing myString against the anonymous String literal “java rocks!” for equality. The result should be a boolean.
3. Print the result of comparing the ASCII values of myString against the anonymous String literal “java rocks!” The result should be a number.
4. Print the length of myString.
5. Create a String myBigString. Assign myBigString to the String myString surrounded by some whitespace. Complete this using concatenation.
6. Print out myBigString, then print out myBigString with the whitespace trimmed off.
7. Print out the index of “!” in myString.
8. Create a new String reference called mySubString, and assign it the substring of myString with indices that captures the substring “Rocks!” Don’t hard code the substring; retrieve it using String class methods. Concatenate a line break escape character to mySubString and print the result.

Phase VIII - Final Constants, the Math Class, and API Documentation:

Mission:

1. Declare a final constant, myConst, and assign it to any double of your choice divided by the value of pi. Print this value.
2. Compute and print the arcsine of $\sqrt{3}/2$.
3. Visit the API Documentation using the link above. Examine the Math class, and print out 3 computations of your choice with any values, using Math class methods NOT covered in Episode 9.

Phase IX - Conditionals:

Mission:

1. Declare two int variables with any values of your choice; myIntOne and myIntTwo.
2. Using a single if/else-if/else statement, print out the greater value, or print out "Equal!" if both integers are equal. Set up your if statement so that your code is prepared for any changes made to your int variables.
3. Repeat Phase 9, Mission 3 again, but use the ternary operator instead of an if statement.
4. Create an int variable called time, and set it anywhere between 0 to 23. Using a switch statement, switch this time variable, and print out the actual time you would see on a digital clock for each possible case. (EX: case 0 would yield 12:00 AM; case 1 would yield 1:00 AM; case 13 would yield 1:00 PM, etc.) You should have 24 total cases and an additional default case, which will print out "Time is unavailable."

Phase X - Arrays and Loops:

Mission:

1. Create an int array and initialize it to an array of any 20 integers of your choice.
2. Use a for loop and print out each element of the array. (**BONUS:** Do this with for-each)
3. Using a while loop, loop through the array, changing all nonnegative elements into their positive counterparts (and vice versa). Print out the new elements afterwards.

****** END MODULE 1 CHALLENGE ******

Congratulations, fellow Thinker! You've finished the Module 1 Challenge! Be sure to tune in to the next couple of episodes on the channel to see the solutions.

All the best,
— iThink360, aka iTK

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#PerceiveYourIdentity