

## Returns, Scanner, If/Else Practice

These problems are designed to give you practice with return statements, conditionals and Scanner. Returns are typically tricky, so I encourage you to take it slowly and make sure you understand why returns are useful and how the syntax works. You need to have a good mental model: a value that's returned from a method replaces the method call wherever it occurred.

I encourage you to skip around – I will grade you on how on-task you are. If these problems are boring and you totally get parameters, I encourage you to come up with your own programs using Graphics, Scanner, Math, etc. As long as you're doing Java and making progress, I'm happy!

1. Write a method `calcDistance` that takes `x` and `y` values for two points as parameters and returns the distance between them.
2. Write a method `calcHypotenuse` that given the lengths of two sides of a triangle returns the length of its hypotenuse. Can you use `calcDistance` for that? Reflection question: what's the advantage of separating out the two methods?
3. Write a method `convertFahrToCel` that given a double parameter representing temperature in Fahrenheit returns the temperature converted to Celsius (formula is  $5/9 * F - 32$ ).
4. Write a method `calculateBalance` that takes two double parameters: a former balance and an item cost. The method should return the sum of the item plus 8% in taxes and the former balance.
5. Write a method `checkout` that prompts the user for a number of items to purchase. It should then prompt the user for the price of each item and finally print out the total owed. You should charge 8% in tax. If only you had a method that could do that... (in other words, use `calculateBalance`) Here is a sample run (user input underlined):

```
How many items would you like to buy? 4
Price of item 1: 10
Price of item 2: 20
Price of item 3: 30
Price of item 4: 10
Total cost: 75.60000000000001
```

Reflection question: what would you use to make your program flexible to changes in tax rate?

Extra challenge: use multiplication and casting to round to two decimals. Make that into a round method that takes a double parameter and returns a rounded value.

6. Write a static method named `tax` that accepts a salary as a parameter and that returns the amount of tax you would owe if you make that salary. The tax is based on your tax bracket as found from the first two columns below. Once you know which row to use, start with the "flat amount" and add the "plus %" of the amount over the amount listed in the final column. For example, if your income is \$50,000, then you use the third row of the table and compute the tax as \$4,000 plus 25% of the amount over \$29,050, which comes to \$9,237.50. The total tax on \$27,500 is \$3,767.50.

For \$6,000, the tax is \$600. For \$120,000, the tax is \$28,227. Assume your method is passed a value  $\geq 0$ .

over	but not over	flat amount	plus %	of excess over
\$0	\$7,150	\$0	10%	\$0
\$7,150	\$29,050	\$715	15%	\$7,150
\$29,050	\$70,350	\$4,000	25%	\$29,050
\$70,350	<i>unlimited</i>	\$14,325	28%	\$70,350

7. Write code to prompt the user for many integers and print the total **even** sum and maximum of the **even** numbers.

```
How many integers? 3
Next integer? 2
Next integer? 5
Next integer? 4
Even sum: 6, even max: 4
```