In this quiz we asked you to study some code and then answer some questions.

The intended functionality of the code is described in the comment block.

/\* This method should compute the cost of a computer, as follows:

\* memory costs $10 per GB

\* processor costs $200 plus $50 for each GHz in speed

\* computer costs $500 plus memory cost plus processor cost

\*/

This is what the code is supposed to do. The code given is incorrect. Your job is to explain what the bug is and try to fix it.

public int priceComputation(int memoryInGB, int processorSpeedInGHz) {

int memoryCost = memoryInGB \* 10;

int processorCost = processorSpeedInGHz \* 50;

int computerCost = 500 + memoryCost + processorCost;

return computerCost;

}

**QUESTION 1:** *priceComputation(3,2) should return 830. What does priceComputation(3,2) return?*

To solve this question we simulate calling the method with arguments 3 and 2.

To trace the execution of the method we start by assigning the parameters of the method, memoryInGB and processorSpeedInGHz, the corresponding argument values, 3 and 2. The parameters are given in the method header:

public int priceComputation(int memoryInGB, int processorSpeedInGHz)

Next, we carry out the instrutions inside the body of the method,

int memoryCost = memoryInGB \* 10;

int processorCost = processorSpeedInGHz \* 50;

int computerCost = 500 + memoryCost + processorCost;

return computerCost;

in the order given. First we evaluate the expression

memoryInGB \* 10

Since the value of memoryInGB is 3, the expression has value 30. This value is assigned to the variable memoryCost.

Second we evaluate the expression

processorSpeedInGHz \* 50

Since the value of processorSpeedInGHz is 2, the expression has value 100. This value is assigned to the variable processorCost.

Third we evaluate the expression

500 + memoryCost + processorCost

Since the value of memoryCost is 30 and the value of processorCost is 100, the expression has value 500 + 30 + 100 = 630. This value is assigned to the variable computerCost, and is the value returned by the method.

The answer to question 1 is therefore 630.

**QUESTION 2:** *In your own words, what is the error (or "bug") in the code?*

If we compare the specification for the method (the text in the comment block) and compare it to what the code actually computes, we can see a discrepancy. The specifications say,

processor costs $200 plus $50 for each GHz in speed

but the code computes,

int processorCost = processorSpeedInGHz \* 50;

It looks like the code neglects to add in the $200 base charge. If we compare the expected answer, 830, to the actual answer that we got in question 1, 630, we see that there is a difference of exactly 200.

The “bug”, therefore, is that the computation of the processor cost has been implemented incorrectly.

**QUESTION 3:** *Fix the bug: rewrite the code so that it produces the correct result.*

To fix the bug we make sure that 200 is added to the cost of the processor, highlighted in red:

public int priceComputation(int memoryInGB, int processorSpeedInGHz) {

int memoryCost = memoryInGB \* 10;

int processorCost = 200 + processorSpeedInGHz \* 50;

int computerCost = 500 + memoryCost + processorCost;

return computerCost;

}