

## Quantitative Finance Solutions - Interview Questions

The purpose of this document is to provide a list of questions to assess the candidate quantitative skills. **Note** that we are more focused on the method than the answers, describe your detailed approaches.

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### I. Logic Questions

#### Question 1:

There are two bells. One rings five times per minute, and the other rings four times per minute. If they start at the same time, how long will it be until they next ring together?

#### Question 2:

What day was it 100 years ago from today?

#### Question 3:

An old-style analogue clock falls off the wall and the face breaks into three pieces. The numbers on each piece add to the same total. Describe the pieces.

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### II. Problem Solving

For the following problems, the candidate will use either Python, R, SQL, VBA or C# to solve the problem.

#### **Problem 1:** Simple Array Sum

Given an array of integers, find the sum of its elements.

For example, if the array ***ar*** = [1, 2, 3],  **$1 + 2 + 3 = 6$** , so return 6.

#### **Function description**

Create a *simpleArraySum* function. It must return the sum of the array elements as an integer.

*simpleArraySum* has the following parameter(s):

*ar: an array of integers*

## Input Format

For this exercise, use the following array inputs. The first step will be to take only the integer from the array:

$ar = [1, 2, 3a, b, na, 9, 10, 12, 13.54]$

## Output Format

Print the sum of the array's elements as a single integer.

### **Problem 2:** Pairs

You will be given an array of integers and a target value. Determine the number of pairs of array elements that have a difference equal to a target value.

For example, given an array of  $[1, 2, 3, 4]$  and a target value of 1, we have three values meeting the condition:  $2 - 1 = 1$ ,  $3 - 2 = 1$ , and  $4 - 3 = 1$

## Function Description

Create the *pairs* function. It must return an integer representing the number of element pairs having the required difference.

*pairs* has the following parameter(s):

- *k*: an integer, the target difference
- *arr*: an array of integers

## Input Format

For this exercise, use the following array inputs and target difference. The first step will be to take only the integer from the array:

- $ar = [1, 5, 3.4, 3, x, 4, 2, tsgd]$
- $k = 2$

## Output Format

An integer representing the number of pairs of integers whose difference is  $k$ .

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## III. General Questions

### Question 1:

When receiving a large amount of data with multiple datasets in separate files, which approach do you take to ensure data integrity and table relationships?

### Question 2:

Which approach do you take to validate your results?

### Question 3:

How do you modify the functions created from Part II to improve code reusability?

### Question 4:

How do you convert the functions created from Part II to Object-Oriented programming? And how do you improve code reusability by inheritance or polymorphism?

### Question 5:

What is coupling and cohesion in programming? You can use the two questions above as examples to explain.