

## Vectare developer assessment

Feel free to use any language you feel comfortable in. If you are unsure try Python or JavaScript.

Previously people have taken anywhere from 5 minutes to 2 hours on a problem. Please don't spend more than 2 hours on any, and not more than 40 minutes on most. If you get part way to a solution please include it, as it helps us to see how you think.

Each solution should run in under a minute, however if it takes longer please still include it.

Comments are always appreciated where code gets complex.

If you get a working version but then refactor it to make it run quicker, or make the code shorter, please include both or all attempts/versions.

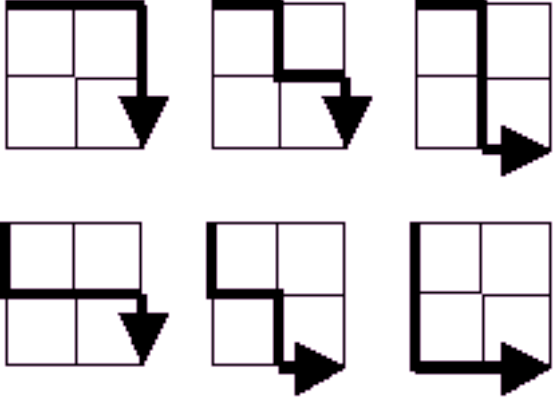
The answer to each question is a number. Please submit a list of these numbers either as a text file or in the body of an email. Please submit your code either as a zip file, or as a **private** git repository on GitHub.

All coders Google things, and it's a great way to learn, so it is permitted for these problems. However, you should only google small parts: "how to reverse a string in python" would be fine but "how to check if a number is prime in python" would be too much.

Similarly, libraries can be very useful; if using one would help with part of a problem then that's permissible. However, if it would solve most of the problem then we can't properly assess your skills, so use them carefully.

### Problems

Problem 1	<p>If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23.</p> <p>Find the sum of all the multiples of 3 or 5 below 1000.</p>
Problem 2	<p>Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:</p> <p style="text-align: center;">1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...</p> <p>By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.</p>
Problem 3	<p>A palindromic number reads the same both ways. The largest palindrome made from the product of two 2-digit numbers is <math>9009 = 91 \times 99</math>.</p> <p>Find the largest palindrome made from the product of two 3-digit numbers.</p>
Problem 4	<p>2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder.</p>

	<p>What is the smallest positive number that is <i>evenly divisible</i> by all of the numbers from 1 to 20?</p>
Problem 5	<p>By listing the first six prime numbers: 2, 3, 5, 7, 11, and 13, we can see that the 6th prime is 13.</p> <p>What is the 10,001st prime number?</p>
Problem 6	<p>Starting in the top left corner of a <math>2 \times 2</math> grid, and only being able to move to the right and down, there are exactly 6 routes to the bottom right corner.</p>  <p>How many such routes are there through a <math>20 \times 20</math> grid?</p>
Problem 7	<p>By starting at the top of the triangle below and moving to adjacent numbers on the row below, the maximum total from top to bottom is 23.</p> <div style="text-align: center;"> <p>3</p> <p>7 4</p> <p>2 4 6</p> <p>8 5 9 3</p> </div> <p>That is, <math>3 + 7 + 4 + 9 = 23</math>.</p> <p>Find the maximum total from top to bottom in triangle.txt (attached to the email), a 15K text file containing a triangle with one-hundred rows.</p>