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.

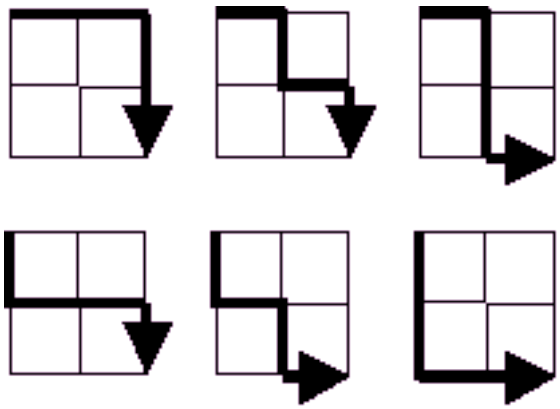
The answer to each question is a number. Please submit a list of these numbers either as a text file or in the body of an email. Please submit your code either as a zip file, or as a git repository on GitHub.

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	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. Find the sum of all the multiples of 3 or 5 below 1000.
Problem 2	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: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ... By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.
Problem 3	A palindromic number reads the same both ways. The largest palindrome made from the product of two 2-digit numbers is $9009 = 91 \times 99$. Find the largest palindrome made from the product of two 3-digit numbers.
Problem 4	2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder.

	What is the smallest positive number that is *evenly divisible* by all of the numbers from 1 to 20?
Problem 5	By listing the first six prime numbers: 2, 3, 5, 7, 11, and 13, we can see that the 6th prime is 13. What is the 10,001st prime number?
Problem 6	Starting in the top left corner of a 2×2 grid, and only being able to move to the right and down, there are exactly 6 routes to the bottom right corner.  How many such routes are there through a 20×20 grid?
Problem 7	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. **3** **7** 4 2 **4** 6 8 5 **9** 3 That is, 3 + 7 + 4 + 9 = 23. 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. **NOTE:** It is not possible to try every route to solve this problem, as there are 2^{99} altogether! If you could check one trillion (10^{12}) routes every second it would take over twenty billion years to check them all. There is an efficient algorithm to solve it. ;o)