You will each be given a problem to solve by writing a program in pseudocode. When you have finished your programs, we'll ask you to give your program to another pair of students, who will run your code (by hand).

Divisible Write a program that will print all the integers from 1 to 15 that are divisible by either 3 or 5.

Adding squares Write a program that will compute the sum of the squares of the numbers 1 to 5 and print that total.

Factorial Write a program that will compute and print 4!, which is $1 \times 2 \times 3 \times 4$.

1 Tricky tasks

Prime Write a program that given an integer, provided by the user, determines if it is prime. You may write in pseudocode something like "n = positive integer input by user."

Greatest common factor Write a program that given two integers provided by a user, finds and prints the greatest number that both integers are divisible by.

Factors of 2 Write a program that given an integers provided by a user, prints the number of times it can be evenly divided by 2. As an example, given 24 as input, the program should print 3, because $24 = 2 \cdot 2 \cdot 2 \cdot 3 = 2^3 \cdot 3$.

2 Challenging tasks

Square root Write a program which finds the square root of N to a precision of ± 0.1, where N is 15. Your program should assume that the "computer" can do addition, subtraction, multiplication, and division, but *cannot* compute square roots directly.

Guessing game Write a program that attempts to guess a number between 1 and 100 that the user is thinking of. You will need to write conditionals that ask whether a given guess is too big, too small, or just right. The person running the program will pick a number before executing it. The program should keep asking questions until it finds the correct answer.

Special relativity Write a program to solve for the speed (in units of the speed of light) for which time dilation is a factor of two. That is to say, solve for v/c such that

$$\sqrt{1 - \frac{v^2}{c^2}} = \frac{1}{2} \tag{1}$$

Your program should give an answer that is accurate within ± 0.1. Assume that your computer can multiply, divide, add and subtract, but *cannot* take a square root directly.

3 Extra fun tasks

Primes Write a program that identifies and prints the first five prime numbers. Note that it does *not* count to just identify them in your head!

Prime factors Write a program that computes and prints all the prime factors of a given number N, where N is 12.