

C# Advanced Lab - Algorithms

This document defines **algorithmic problems** from the ["Advanced C#" Course @ Software University](#). You are presented with some problems and certain steps you need to take in order to accomplish the tasks.

Problem 2. The Sieve of Eratosthenes

There are various methods for finding prime numbers. The [sieve of Eratosthenes](#) is one of the oldest and most popular algorithms for finding the primes in a given range. A picture is worth a thousand words, so this [animation](#) will probably be helpful.

This is the general description of the process:

1. Create a list/array of consecutive integers from 2 through N: (2, 3, 4, ..., N). For convenience, you may look into the [Enumerable.Range\(\)](#) method in C#. *Hint: You may also start the sequence from 0 to keep a correlation between any given number and its index in the array.*
2. Initially, let **p** equal 2, the first prime number.
3. Starting from p, enumerate (iterate) its multiples by counting to N in increments of p, and mark them in the list (these will be $2 * p$, $3 * p$, $4 * p$, etc.). The number p itself should not be marked. You may use any suitable value to mark the number that are not prime (e.g. -1, 0, 1 make sense, but a positive number greater than 1 does not).
4. Find the first number greater than p in the list that is not marked. If there was no such number, stop. Otherwise, let p now equal this new number (which is the next prime), and repeat from step 3.

Input

On the only input line you will receive a natural number N. N will be in the range [2 ... 50 000].

Output

On a single line on the console, print all prime numbers in the range [2 ... N], separated by a comma and space like in the examples below. You may check online if your program works correctly, e.g. [here](#).

Examples

Input	Output
2	2
3	2, 3
77	2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73
200	2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199