Exercises — The sieve of Eratosthen

version #

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Contents

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1 The sieve of Eratosthenes

Files to submit:

- sieve_eratosthenes/Makefile
- sieve_eratosthenes/sieve.c

Makefile: Your makefile should define at least the following targets:

- all: Generate sieve.o

Authorized functions: You are only allowed to use the following functions:

- printf(3)

Authorized headers: You are only allowed to use the functions defined in the following headers:

- stddef.h
- assert.h
- err.h
- errno.h

1.1 Makefile

You must provide a makefile with a `all` rule, that must compile your `sieve.c` and produce the `sieve.o` object file.

1.2 Goal

The goal here is to create a sieve of Eratosthenes. It is a simple iterative sieve used to find prime numbers.

It works with an array of numbers from `2` to `n`. The first number, `2`, is identified as a prime number. Then, all multiples of `2` are marked. When encountering a new unmarked number, it is identified as a prime number, and its multiples are marked.

You must write a function taking an integer `n` and printing the list of all prime numbers from `2` to `n`, included.

Prototype:

```c
void sieve(int n);
```

If `n` is lower than `2`, the function will not print anything. This will not be tested with `n` greater than `1000`. The `sieve.c` file must not include a `main` function. You may use a `main.c` file for your tests.

1.3 Example

You can use a `main` to test your program, but it must not be included in your submission. Calling the `sieve` function with the first program argument as parameter, will produce the following output:

```
42sh$ ./sieve 11 | cat -e
2$
3$
5$
7$
11$
42sh$ ./sieve 0 | cat -e
42sh$ ./sieve 42 | cat -e
2$
3$
5$
7$
11$
13$
17$
19$
23$
29$
31$
37$
41$
```

Be careful!

You must **not** include a `main` function.

It is my job to make sure you do yours.