

# Declaratieve Talen

## Prolog 2

### 1 Prime numbers

Implement an `all_primes/2` predicate that computes all prime numbers smaller than a given number using the Sieve of Eratosthenes,<sup>1</sup> and returns them as a list. The first argument gives the upper limit, while the second argument is the output list containing all prime numbers up to that upper limit.

```
?- all_primes(3,L).
```

```
L = [2, 3].
```

```
?- all_primes(15,L).
```

```
L = [2, 3, 5, 7, 11, 13].
```

```
?- all_primes(50,L).
```

```
L = [2, 3, 5, 7, 11, 13, 17, 19, 23|...].
```

```
?- all_primes(500000,L),reverse(L,NL).
```

```
L = [2, 3, 5, 7, 11, 13, 17, 19, 23|...],
```

```
NL = [499979, 499973, 499969, 499957, 499943, 499927, 499903, 499897, 499883|...].
```

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<sup>1</sup>[http://en.wikipedia.org/wiki/Sieve\\_of\\_Eratosthenes](http://en.wikipedia.org/wiki/Sieve_of_Eratosthenes)