

# Sieve of Eratosthenes

# Algorithm

- Start by assuming a list of all numbers starting from 2 are all prime until proven otherwise
  - Loop through all numbers not yet proven to be not prime, and assume all multiples of that number are not prime

```
FOR I = 2:SQRT(N)
  IF (I IS PRIME)
    FOR J = I*I:N
      J IS NOT PRIME
```

# Algorithm for quickly calculating a list of prime numbers

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

# Algorithm for quickly calculating a list of prime numbers

	2	3		5		7		9	
11		13		15		17		19	
21		23		25		27		29	
31		33		35		37		39	
41		43		45		47		49	
51		53		55		57		59	
61		63		65		67		69	
71		73		75		77		79	
81		83		85		87		89	
91		93		95		97		99	

# Algorithm for quickly calculating a list of prime numbers

	2	3		5		7			
11		13				17		19	
		23		25				29	
31				35		37			
41		43				47		49	
		53		55				59	
61				65		67			
71		73				77		79	
		83		85				89	
91				95		97			

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		83						89	
						97			



# Loop Carried Dependencies

- Define where there is and is not loop carried dependency in the following nested loop. How does this affect parallelization?

```
FOR I = 2:SQRT(N)
  IF (I IS PRIME)
    FOR J = I*I:N
      J IS NOT PRIME
```