Prime Number Design
Algorithm Design

```
1 PROMPT user for number
2 GET number from user
3 numbers = [num for num in range(0, number + 1)]

4 increment = 2
5 numbers[0] = “X”
6 numbers[1] = “X”

7 WHILE increment < sqrt(number)
8     FOR i in range(increment * 2, number + 1, increment)
9           numbers[i] = “X”
10    increment += 1

11 PUT non-“X” numbers from list on the screen
```

Algorithmic Efficiency

The algorithmic efficiency on this program is O(n), as the amount of loops and therefore the run time is directly related to the input.

Line	number	increment	i	numbers
1	/	/	/	/
2	10	/	/	/
3	10	/	/	[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
4	10	2	/	[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
5	10	2	/	[X, X, 2, 3, 4, 5, 6, 7, 8, 9, 10]
6	10	2	/	[X, X, 2, 3, 4, 5, 6, 7, 8, 9, 10]
7	10	2	/	[X, X, 2, 3, 4, 5, 6, 7, 8, 9, 10]
8	10	2	4	[X, X, 2, 3, 4, 5, 6, 7, 8, 9, 10]
9	10	2	4	[X, X, 2, 3, X, 5, 6, 7, 8, 9, 10]
8	10	2	6	[X, X, 2, 3, X, 5, 6, 7, 8, 9, 10]
9	10	2	6	[X, X, 2, 3, X, 5, X, 7, 8, 9, 10]
8	10	2	8	[X, X, 2, 3, X, 5, X, 7, 8, 9, 10]
9	10	2	8	[X, X, 2, 3, X, 5, X, 7, X, 9, 10]
8	10	2	10	[X, X, 2, 3, X, 5, X, 7, X, 9, 10]
9	10	2	10	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
10	10	3	/	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
8	10	3	6	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
9	10	3	6	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
8	10	3	9	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
9	10	3	9	[X, X, 2, 3, X, 5, X, 7, X, X, X]
10	10	4	/	[X, X, 2, 3, X, 5, X, 7, X, 9, X]
11	10	4	/	[X, X, 2, 3, X, 5, X, 7, X, 9, X]