

## Homework #2 Solution

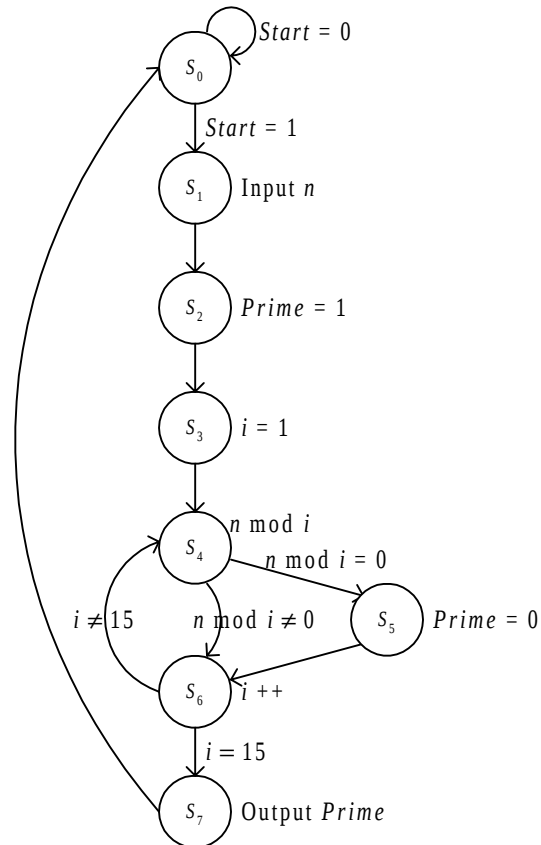
Variable usage

| Register | Variable |
|----------|----------|
| 0        | $n$      |
| 1        | $prime$  |
| 2        | $i$      |

Control words

|             | 16 | 15                | 14 | 13 | 12 | 11                 | 10 | 9 | 8   | 7                  | 6 | 5 | 4   | 3 | 2              | 1              | 0   |
|-------------|----|-------------------|----|----|----|--------------------|----|---|-----|--------------------|---|---|-----|---|----------------|----------------|-----|
|             | In | WA <sub>2-0</sub> |    |    | WE | RAA <sub>2-0</sub> |    |   | REA | RBA <sub>2-0</sub> |   |   | REB | M | S <sub>1</sub> | S <sub>0</sub> | Out |
| Input $n$   | 1  | 0                 | 0  | 0  | 1  | ×                  | ×  | × | ×   | ×                  | × | × | ×   | × | ×              | ×              | 0   |
| $Prime = 1$ | 0  | 0                 | 0  | 1  | 1  | ×                  | ×  | × | ×   | ×                  | × | × | ×   | 0 | 0              | 1              | 0   |
| $i = 1$     | 0  | 0                 | 1  | 0  | 1  | ×                  | ×  | × | ×   | ×                  | × | × | ×   | 0 | 0              | 1              | 0   |
| $n \bmod i$ | ×  | ×                 | ×  | ×  | 0  | 0                  | 0  | 0 | 1   | 0                  | 1 | 0 | 1   | 0 | 1              | 1              | 0   |
| $Prime = 0$ | 0  | 0                 | 0  | 1  | 1  | ×                  | ×  | × | ×   | ×                  | × | × | ×   | 0 | 0              | 0              | 0   |
| $i++$       | 0  | 0                 | 1  | 0  | 1  | ×                  | ×  | × | ×   | 0                  | 1 | 0 | 1   | 0 | 1              | 0              | 0   |
| Out $Prime$ | ×  | ×                 | ×  | ×  | ×  | ×                  | ×  | × | ×   | 0                  | 0 | 1 | 1   | 1 | 1              | 1              | 1   |

State diagram



Next-state table

[illegible]