

## CSE 130 Lab 9

### Fibonacci Design

Pseudocode:

```
GET number from user                                A

IF number == 0
    SET f0 <- 0
    PUT f0
END

ASSERT number >= 0
END

SET f1 <- 1                                          B
SET f2 <- 1                                          C

FOR i <- 2 ... number
    SET placeholder <- f2
    SET f2 <- f2 + f1
    SET f1 <- placeholder
    D
    E
    F
    G

PUT f2                                              H
END
```

Algorithmic Efficiency:

O(n) Efficiency/ Linear Performance

The execution time is directly related to input size.

Linear algorithms are characterized by a loop where every element in the collection is visited once. The index  $i$  increments by 1s.

There is a loop controlled by the input, *number*. Every element is visited.

Program Trace:

**Your program trace is to include a single test case: the seventh Fibonacci number.**

	number	f1	f2	i	fib	display
A	7	/	/	/	/	/
B	7	1	/	/	/	/
C	7	1	1	/	/	/
D	7	1	1	2	/	/
E	7	1	1	2	1	/
F	7	1	2	2	1	/
G	7	1	2	2	1	/
D	7	1	2	3	/	/
E	7	1	2	3	2	/

F	7	1	3	3	2	/
G	7	2	3	3	2	/
D	7	2	3	4	/	/
E	7	2	3	4	3	/
F	7	2	5	4	3	/
G	7	3	5	4	3	/
D	7	3	5	5	/	/
E	7	3	5	5	5	/
F	7	3	8	5	5	/
G	7	5	8	5	5	/
D	7	5	8	6	/	/
E	7	5	8	6	8	/
F	7	5	13	6	8	/
G	7	8	13	6	8	/
D	7	8	13	6	/	/
H	7	8	13	6	/	<b>13</b>