

MIT OpenCourseWare  
<http://ocw.mit.edu>

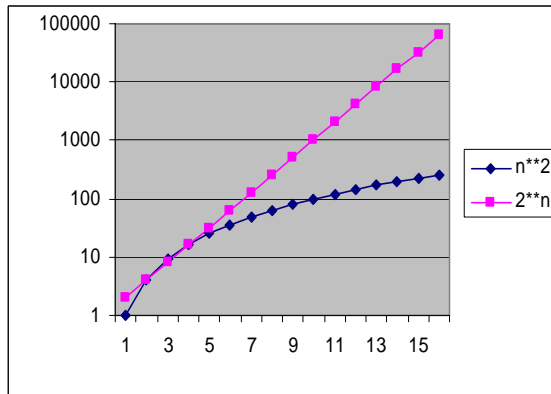
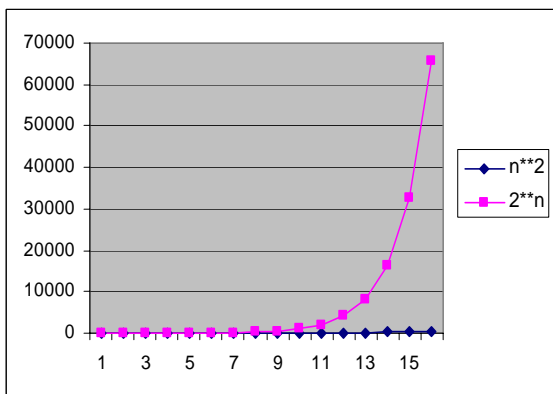
6.00 Introduction to Computer Science and Programming  
Fall 2008

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.

**6.00 Handout, Lecture 12**  
**(Not intended to make sense outside of lecture)**

Item	Size	Value	Number Available
watch (w)	1	15	2
vase (v)	5	10	2
radio (r)	3	9	2
picture (p)	4	5	2

a	b	c	d	e	f	g	h
-----							
0	0	0	0	0	0	0	1
0	0	0	0	0	0	1	0
0	0	0	0	0	0	1	1
...							
1	1	1	1	1	1	1	1



```
def fib(n):
    global numCalls
    numCalls += 1
    if n <= 1:
        return n
    else:
        return fib(n-1) + fib(n-2)
numCalls = 0
n = 5
print 'fib of', n, '=', fib1(n)
```

```
fib(5)
fib(4) + fib(3)
fib(3) + fib(2) + fib(2) + fib(1)
fib(2) + fib(1) + fib(1) + fib(0) + fib(1) + fib(0) + fib(1)
fib(1) + fib(0) + fib(1) + fib(1) + fib(0) + fib(1) + fib(0) + fib(1)
```

```
def fib1(n):
    global memo
    global numCalls
    numCalls += 1
    if not n in memo:
        memo[n] = fib1(n-1) + fib1(n-2)
    return memo[n]
memo = {0:0, 1:1}
```