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CST 370
Homework 4

1a. Sum of the squares from 1 to n
1b. Multiplication
1c. n
1d. O(n)

2a. The range of values in the array
2b. Comparison
2c. 2n-2
2d. O(n)

3a. $999=1 + 2(n-1)$
$999=1+2n-2$
$999=2n-1$
$2n=100$
$n=500$
$S_n=\frac{500(1+999)}{2}$
$S_n=250(1000)=250000$

3b. $1024=2(2)^{n-1}$
$512=2^{n-1}$
$\ln(512)=\ln(2^{n-1})$
$\ln512=(n-1)\ln2$
$\ln512/\ln2=n-1$
$\ln512/\ln2+1=n$
$n=10$
$S_n=\frac{2(2)^{10}-2}{1}$
$S_n=2046$

4. f(1)=1; f(2)=2; f(3)=3; f(4)=5; f(5)=8…
f(n)=f(n-1)+f(n-2), n>=3; f(1)=1, f(2)=2
fibonacci

5a. x(n)=x(n-1)+5
x(1)=0
x(2)=x(n-1)+5=5
x(3)=x(n-1)+5=10
x(4)=x(n-1)+5=15
x(n)=5(n-1)

5b. $x(n)=3x(n-1)$

$x(1)=4$

$x(2)=3x(n-1)=3*4=12$

$x(3)=3\ x(n-1)=3*3*4=36$

$x(4)=3\ x(n-1)=3*3*3*4=108$

$x(n)=3^{(n-1)} * 4$

5c. $x(n)=x(n-1) + n$

$x(0)=0$

$x(1)=x(n-1) + n=0+1=1$

$x(2)=x(n-1)+n=0+1+2=3$

$x(3)=x(n-1)+n=0+1+2+3=6$

$x(4)=x(n-1)+n=0+1+2+3+4=10$

$x(5)=x(n-1)+n=0+1+2+3+4+5=15$

$x(n)=1+2+3\ldots+n=\frac{n(n+1)}{2}$