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CSE 122
HW 1
#3. Part a)

I.
```
sum = 0;
for (i = 0; i < n; i++)
    sum++;
```

Line	Cost	N
C1	1	1
C2	2	N+1
C3	1	n

$T(n)= C1(1) + C2(N+1) + C3(n)$
$= n(C2+C3)+ C2 + C1$
$T(n) = 3n+3 = 3(n+1)$

II.
```
sum = 0;
for (i = 0; i < n; i++)
    for (j = 0; j < n; j++)
       sum++;
```

Line	Cost	N
C1	1	1
C2	2	N+1
C3	2	N(n+1)
C4	1	N^2

$T(n)= C1(1) + C2(N+1) + C3(n(n+1))+C4(N^2)$
$T(n) = 1 + 2n + 2 + 2(n^2+n) + n^2$
$=3n^2 + 4n + 3$

III.
```
sum = 0;
for (i = 0; i < n; i++)
    for (j = 0; j < n * n; j++)
        sum++;
```

Line	Cost	N
C1	1	1
C2	2	N+1
C3	2	$N(n^2+1)$
C4	1	N^3

$T(n)= C1(1) + C2(N+1) + C3(n(n^2+1))+C4(N^3)$
$T(n) = 1 + 2n + 2 + 2(n^3+n) + n^3$

$=3n^3 + 4n + 3$

IV.
```
sum = 0;
for (i = 0; i < n; i++)
    for(j = 0; j < i; j++)
       sum++;
```

Line	Cost	N
C1	1	1
C2	2	N+1
C3	2	N(n+1)/2
C4	1	n(n-1)/2

$T(n)= C1(1) + C2(N+1) + C3(n(n+1)/2)+C4(n(n-1)/2)$
$T(n) = 1 + 2n + 2 + n^2 + n + (n^2 – n)/2$
$T(n)= (3n^2+5n+6)/2$

V.
```
sum = 0;
for (i = 0; i < n; i++)
    for(j = 0; j < i * i; j++)
        for(k = 0; k < j; k++)
            sum++;
```

Line	Cost	N
C1	1	1
C2	2	N+1
C3	2	(n-1)((n(2n-7)+12)/6
C4	2	(n-1) (n-2) $(6n^3-27n^2+47n-30)/60$
C5	1	(n-1) (n-2) (n-3) $(2n^2-3n)/20$

$T(n)= C1(1) + C2(N+1) + C3((n-1)((n(2n-7)+12)/6))+ C4((n-1) (n-2) (6n^3-27n^2+47n-30)/60) + C5((n-1) (n-2) (n-3) (2n^2-3n)/20)$
$T(n) = 1+2n+2+ 2((n-1)((n(2n-7)+12)/6) + 2((n-1) (n-2) (6n^3-27n^2+47n-30)/60) + ((n-1) (n-2) (n-3) (2n^2-3n)/20)$
$T(n)= (6n^5-45n^4+140n^3-225n^2+224n-50)/10$