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Assignment 2

A.

```
for(int i = 0; i < n; i++){
    someVariable = log(someVariable) + 3;
}
```

Code clip A is a simple O(N). The code will run a set number of times. The log function is a constant time length every time it gets run, meaning that the time will be linear based on the number of iterations it runs.

B.

```
for(int i = 0; i < n; i++){
    for(int j = 0; j< n; j++){
        someVariable = log(someVariable) + 3;
    }
}
```

Code clip B is $O(N^2)$. The reason is that the second for loop inside will run for each iteration. This means the total number of times it will run is N times N or N^2.

C.

```
for(int i = 0; i < n; i++){
    for(int j=0; j < i; j++){
        someVariable = log(someVariable) + 3;
    }
}
```

Code clip C is similar to code clip B. It is still O(N^2), however, it will not run as many times as Code Clip B, as the second for loop will begin at 0 and then proceed to i, rather than going to N, meaning it is faster the the beginning of the run but then gets slower as it goes on.

D.

```
for(int i = 0; i < n; i++){
    for(int j = 0; j < i; j++){
        if(j % 2 == 0){
            someVariable = log(someVariable) + 3;
        }
    }
}
```

Code clip D is very similar to C except it only calculates the even permutations of j. If it is odd, it will skip it. It will still be exponential based on the double for loop. $O(N^2)$