
CS29003 ALGORITHMS LABORATORY

(WorkSheet 1)

Date: Sep 12 2020

1 Compute the worst case time complexity and explain the steps

1.1 Question 1

```
for( int i = n; i > 0; i /= 2 ) {  
    for( int j = 1; j < n; j *= 2 ) {  
        for( int k = 0; k < n; k += 2 ) {  
            ... // constant number of operations  
        }  
    }  
}
```

1.2 Question 2 [assume $n = 2^m$]

```
for( int i = n; i > 0; i-- ) {  
    for( int j = 1; j < n; j *= 2 ) {  
        for( int k = 0; k < j; k++ ) {  
            ... // constant number C of operations  
        }  
    }  
}
```

1.3 Question 3 [compute the tight bound]

```
for( int temp = 1; temp <= n; temp *= 2 ) {  
    for( int i = 0; i < temp; i++ ) {  
        for( int j = 0; j < n; j += 2 ) {  
            ... // constant number of operations  
        }  
        for( int j = 1; j < n; j *= 2 ) {  
            ... // constant number of operations  
        }  
    }  
}
```