COS 212 (Algorithms and Data Structures)

Tutorial 1 Exercise

2020/02/11

Question 1 Complexity Analysis............(4 marks)

Give the big-O complexity for each of the following code segments (1 mark each).

1.1
```
public int func(int n) {
    int x = n * (n + 1) / 2;
    return x;
}
```

1.2
```
public int rec(int n) {
    if (n < 1) return 0;
    return rec(n - 5) + 2*n;
}
```

1.3
```
int val = 0;
for(int i = 1; i < n; i *= 2)
    for(int j = i; j < m; j += 4)
        val += i * j;
```

1.4
```
int a = n, b = 0;
while(a > 0) {
    for(int k = a-n; k < a; k++)
    {
        b += 5;
    } a -= 5;
}
```

Question 2 Skip Lists......................(4 marks)

2.1 Assume a skip list with 2047 nodes. Answer the following:

a) [1 point] How many levels should the skip list have?

b) [2 points] Give the `powers` array for the list (page 108 textbook), corresponding to the node level initialization intervals.

c) [1 point] How many nodes should be on level 4?