CS223 Written HW 01

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1.

Ordered Complexities
2^N
2^(N/2)
N^2 log N
N^2
N^1.5
N log^2 N
N log N
N
N log(log N))
√N
89
3/N

2.

   a. 175 secs
   b. 167.598 secs
   c. 875 secs
   d. 4.23×10^{25}

3.

$$\sum_{i=1}^{\infty} \frac{2 \times i}{4^i} = 2 \times \sum_{i=1}^{\infty} \frac{i}{4^i} = 2 \times \sum_{i=1}^{\infty} i \cdot \left(\frac{1}{4}\right)^i$$

$$= 2 \times \sum_{i=1}^{\infty} \frac{i}{4} \cdot \left(\frac{1}{4}\right)^{i-1}$$

$$= 2 \times \left(\frac{1/4}{(1-1/4)^2}\right)$$

$$= 2 \times \left(\frac{1/4}{(3/4)^2}\right)$$

$$= 2 \times \left(\frac{1}{4} \cdot \frac{4^2}{3}\right)$$

$$= 2 \times \left(\frac{1}{4} \cdot \frac{16}{9}\right)$$

$$= 2 \times \left(\frac{4}{9}\right) = \boxed{\frac{8 \times}{9}}$$

4.

```
int height (Node root) {
    if(root == null)
        return 0;
    else{                       int left = height(pLeft);
        int right = height(pRight);
        if (left ≥ right)
            return 1+left;
        else
            return 1+right;
    }
}
```

5. Tower of Hanoi Pseudo
   if there are 0 disks, return
   else
       move n-1 disks to from A to C
       move disk in A to B
       move n-1 disks from C to A

6. Git is a distribution version control system. It is used to store code as the code is changed & collaborated on.

7. "∼ "is used for home directory while "\" is used for paths in the file system and can also rep the root directory.

8. Argc is the number of command line arguments and argv a pointer to the command line argument. They get set when the program is called in terminal.