CPTS223

YURUN HAN

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**Homework Assignment 1**

**1.**

|  |  |
| --- | --- |
| Unordered Complexities | Ordered Complexities |
|  | **10** |
|  | **8** |
|  | **9** |
| **N^2** | **7** |
| **N log N** | **4** |
| **N log(log(N))** | **6** |
| **N log^2 N** | **5** |
| **2/N** | **11** |
| **2^N** | **1** |
| **2^(N/2** | **2** |
| **37** | **12** |
| **N^2 log(N)** | **3** |

*→N log^2 N→N log(log(N))*

**2.**

**a.**

t=kn, for some constant k

then,

35=k \*20

=k \* 100

So,

=

= 35 \* ()

= 175 sec

**b.**

Here, N is the dominating term, thus the complexity gets simplified to O(N) only. Thus, the answer here is the same as in a.

= 175 sec

**c.**

t = k, for some constant k

then,

35=k \*

=k \*

So,

= 35 \*

= 4375 sec

**d.**

t=k \* , for some constant k

then,

35 = k \*

= k \*

so,

=35 \*

= 35 \*

=42,312,403,686,512,021,114,716,160 sec

**3.**

Total nodes 31

leaves nodes 16

**4.**

// to get the height of the tree

int Height(Node\* root)

{

if (root == NULL)

return 0;

// To compute depth of Left sub-tree

int Left\_depth = Height(root->pLeft);

// To compute depth of Right sub-tree

int Right\_depth = Height(root->pRight);

// return maximum of both + 1

return 1 + max(Left\_depth,Right\_depth);

}

**5.**

Recursion

Advantages: Big problems can be transformed into small problems, which can reduce the amount of code, while the code is streamlined and has good readability;

Disadvantages: Recursive calls waste space, and too deep recursion can easily cause stack overflow.

Iteration

Advantages: The code runs efficiently, because the time only increases due to the increase in the number of cycles, and there is no additional space overhead;

Disadvantages: the code is not as concise as recursion

**6.**

Git is an open source distributed version control system that can effectively and quickly handle the version management of projects from very small to very large. The biggest difference between distributed and centralized is that developers can submit to the local, and each developer copies a complete Git repository on the local machine by cloning (git clone).