Summer 2022
CSE221
Assignment 1
Marks: 70
Deadline: Jul 17, 2022

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1. **Find out the time complexities of given codes. [10 marks]**
   a.
```
for [i=0; i<n; i=i+2]
        for[j=1;j<n;j=j*5]
```

   b.
```
int a,b;
for [i=0;i<a;i++]
        for [j=0;j>=a;j=j/2]
                sum=a+b
```

2. **Find out the time complexities of given recursive equations using any suitable method. [15 marks]**
   a. $T(n)= T(n-1) + T(n-2) + C, T(1)=1$
   b. $T(n)= 8T(n/2) + n^2, T(1)=1$
   c. $T(n)= 2T(n^{1/2}) + \log n, T(2)=2$

3. **On this given sorted array perform the search operation to find out the element 13 using binary and ternary search algorithms showing proper steps and find out the time complexities of both algorithms. [5+5=10 maks]**

5	9	11	12	14	19	22	28

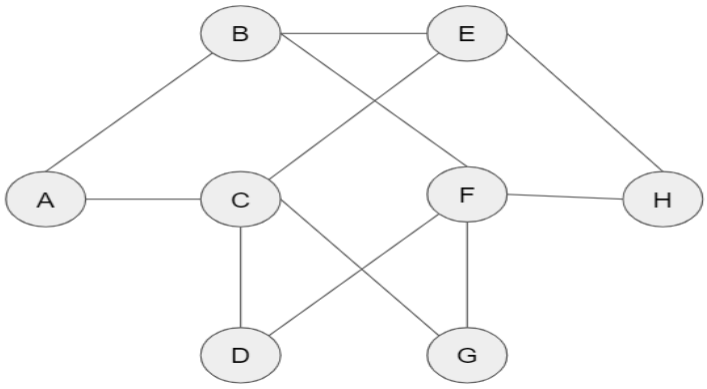
4. **Simulate the following sorting algorithms showing the proper steps on the given array. [7.5+7.5=15 Marks]**

5	2	10	9	1	7	21	13

   a. **Merge sort. Find out the recurrence relation of its worst case and solve it using any suitable method.**

   b. **Quick sort considering the first element as pivot. Find out the recurrence relation of its best and worst case and solve them using any suitable method.**

5. **Simulate the following graph traversal algorithms on the given graph showing the proper details. [5+5=10 marks]**



   a. **BFS (Breadth First Search) starting from source A to the entire graph. Explain the time complexity.**

   b. **DFS (Depth First Search) starting from source A to the entire graph. Explain the time complexity.**

6. **Find out the strongly connected components form the given graph showing proper steps. Consider source is A. [10 marks]**