(14.5)

BRAC UNIVERSITY
Department of Computer Science and Engineering
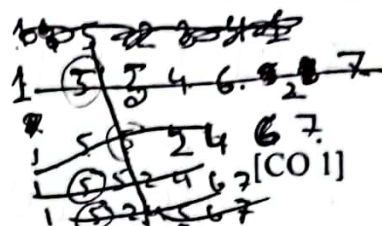
Examination: Quiz   Semester: Fall 2022
Duration: 25 minutes   Full Marks: 20

Sec: 10

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CSE221: Algorithms

1. Simulate that Quick sort is not stable.   [CO 1]

2. Determine the worst case and best case time complexity of the following code: [CO 7]

```
findElement(arr){
    for(int i=1; i<=n; i=i*4)          ──→ O(log_4 n)
    {
            for( int j=0; j<n; j=j+2) ──→ O(n/2) ≈ O(n)
            {
                    if (arr[i][j] == k)
                    {
                            return true;
                    }
            }
    }
    return false;
}
```

$\Big\} O(n\log_4 n)$

(4)

3. Identify if the statement $n^2 \neq \Omega(n\lg n)$ is true or not.   [CO 7]

$n_0 = 4$

$c = 5$

$\forall n \geq 4, \quad n^2 \ngtr 5n\lg n$

$\therefore \quad n^2 \neq \Omega(n\lg n)$

(2)

$\sim$ 5 5 2 4 67

1 5 2 4 6 5 7

1 2 4 5 6 5 7

1 2 4 ~~5 6 7~~
      5   6 5 7

1   4   5   5 6 7

          5 6 7

③ ↓ ↗pivot ↓

1 5b 5a 2 4 67

1 5a 5b 2 4 67

1 5a 2 5b 4 67

| 1 5a 2 4 | 5b | 6 2 |
↓   ↓

| 1 5a 2 4 | 5b | 6 7 |

| 1 2 4 5a | 5b 6 7 |

| 1 2 4 5a 5b 6 7 |
      ↑   ↑

Position changed

~~scribble~~

| 1 2 | 4 5a | 5b 6 | 7 |

| 1 2 4 5a | 5b 6 7 |

| 1 2 4 5a 5b 6 7 |