Tutorial-1

(1) What do you understand by Asymptotic notations. Define different Asymptotic notation with examples.

Ans: Asymptotic notations are the mathematical notations used to describe the running time of an algorithm when the input tends towards a particular value or a limiting value.

Ex: In bubble sort, when the input array is already sorted the time taken by the algorithm is linear.

(2) What should be time complexity of

```
for( i=1 to n )
{ i=i*2;
}
```

Ans: ~~O(n)~~ O log(n)

(3) What should be time complexity of

```
int i=1, s=1;
while (s<=n)
{ i++;
  s=s+i;
  Printf("#");
}
```

Ans: O(n)

(4) T.C of—

```
void function (int n)
{ int i, count=0;
  for(i=1; i*i<=n; i++)
      count++;
}
```

Ans: O(n)

(5) Time complexity of —

```
void function (int n)
{
    int i, j, k, count = 0;
    for(i = n/2; i <= n; i++)
    {
        for(j = 1; j <= n; j = j * 2)
        {
            for(k = 1; k <= n; k = k * 2)
                count++;
        }
    }
```

Ans: Time complexity = $O(n) + O(\log^2 n)$

(6) Time complexity of —

```
function (int n)
{
    if (n == 1) return;
    for (i = 1 to n)
    {
        for(j = 1 to n)
        {
            printf("*");
        }
        function (n-3);
    }
```

Ans: $O(n^2)$

(7) Time complexity of

```
void function (int n)
{
    for (i = 1 to n)
    {
        for (j = 1; j <= n; j = j + i)
        {
            printf("*");
        }
    }
```

Ans: $O(n^2)$.