QUIZ FOR DETERMINE THE COMPLEXITY OF ALGORITHM

Created by - Group 5

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1. **What is time complexity of fun()?**

```
int fun(int n)
{
  int count = 0;
  for (int i = n; i > 0; i /= 2)
     for (int j = 0; j < i; j++)
        count += 1;
  return count;
}
```

A. $O(n^2)$

B. $O(n \log n)$

C. $O(n)$

D. $O(n \log n \log n)$

Answer: C

2. **What is time complexity of func()?**

```
int fun(int n)
{
  int count = 0;
  for (int i = 0; i < n; i++)
     for (int j = i; j > 0; j--)
        count = count + 1;
  return count;
}
```

A. $\Theta(n^2)$

B. $\Theta(n \log n)$

C. $\Theta(n)$

D. $\Theta(n \log n \log n)$

Answer: A

3. **Which is the following is not $O(n^2)$?**

A. $15^{10} + 2020$

B. $n^{1.98}$

C. $20^{19}n$

D. $\frac{n^3}{\sqrt{n}}$

Answer: D

4. **Which of the given option provides the increasing order of asymptotic complexity of function f1, f2, f3, f4?**

$$f1(n) = 2^n$$

$$f2(n) = n^{3/2}$$

$$f3(n) = n \log n$$

$$f4(n) = n^{\log n}$$

A. f3, f2, f4, f1

B. f2, f3, f1, f4

C. f3, f2, f1, f4

D. f2, f3, f4, f1

Answer: A

5. **What is the time complexity of the below function?**

```
void fun(int n, int arr[])
{
    int i = 0, j = 0;
    for(; i < n; ++i)
        while(j < n && arr[i] < arr[j])
            j++;
}
```

A. $O(n^2)$

B. $O(n \log n)$

C. $O(\log n)$

D. $O(n)$

Answer: D

6. **Which of the following sorting algorithm has the lowest worst-case complexity?**

A. Bubble Sort

B. Quick Sort

C. Merge Sort

D. Selection Sort

Answer: C

7. **Which one of the following most closely approximates the time complexity of the function fun1()?**

```
int fun1 (int n)
{
   int i, j, k, p, q = 0;
   for (i = 1; i<n; ++i)
   {
      p = 0;
      for (j = n; j > 1; j = j/2)
         ++p;
      for (k = 1; k < p; k = k*2)
         ++q;
   }
   return q;
}
```

A. $\Theta(n^3)$

B. $\Theta(n \log n (\log n))$

C. $\Theta(n \log n)$

D. $\Theta\left(n(\log n)^2\right)$

Answer: B

8. **Which of the following is false?**

a. $100n \log n = O(\frac{n \log n}{100})$

b. $\sqrt{\log n} = O(\log \log n)$

c. If $0 < x < y$ then $n^x = O(n^y)$

d. $2^n \neq O(nk)$

A. a

B. b

C. c

D. d

Answer: B

9. **The time complexity of the following C function is?**

```
int recursive (mt n)
{
   if (n == 1)
     return (1);
   else
     return (recursive (n-1) + recursive (n-1));
}
```

A. $O(n)$

B. $O(n \log n)$

C. $O(n^2)$

D. $O(2^n)$

Answer: D

10. **Consider the following recurrence:**

$$\mathrm{T}(n) = 3T\left(\frac{n}{5}\right) + \log_2 n \times \log_2 n$$

What is time complexity of *T*(n)?

A. $\Theta(n^{\log_5 3})$

B. $\Theta(n^{\log_3 5})$

C. $\Theta(n \log n)$

D. $\Theta(\log n)$

Answer: A