Tests & Quizzes

S4-DAA-Quiz1

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Part 1 of 2 - Part1 / 10.0 Points

Question 1 of 15   1.0 Points

What is the time complexity of the following code ?

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

- ✔ ○ A. O(n)

- ✔ ○ B. O(n log n)

- ✔ ○ C. O(n^2)

- ✔ ○ D. O(n^2Logn)

Answer Key: B

Question 2 of 15   1.0 Points

int value = 0;

for(int i=0;i<n;i++)

    for(int j=0;j<i;j++)

        value += 1;

Find the time complexity?

- ✔ ○ A. n

- ✔ ○ B. n+1

- ✔ ○ C. n(n-1)/2

- ✔ ○ C. n(n-1)/2
- ✗ ○ D. n(n+1)

Answer Key: C

Question 3 of 15   1.0 Points

Which of the given options provides the increasing order of asymptotic complexity of functions f1, f2, f3, and f4?

f1(n) = 2^n

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

f3(n) = n*log(n)

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

- ✔ ○ A. f3, f2, f1, f4
- ✔ ○ B. f2, f3, f1, f4
- ✔ ○ C. f3, f2, f4, f1
- ✔ ○ D. f2, f3, f4, f1

Answer Key: C

Question 4 of 15   1.0 Points

O(n^2) is the worst case time complexity, so among the given options it can represent :-

- ✔ ○ A. O(n)
- ✔ ○ B. O(1)
- ✔ ○ C. O (nlogn)
- ✔ ○ D. All of the above

Answer Key: D

Question 5 of 15   1.0 Points

Solve the recurrence relation $T(n) = 2T(n/2) + nlogn$

- ✔ ○ A. $\theta\ (n^2log^2n)$
- ✔ ○ B. $\theta\ (nlog^2n)$
- ✔ ○ C. $\theta\ (n^2)$
- ✘ ○ D. $\theta\ (nlogn)$

Answer Key: B

Question 6 of 15   1.0 Points

Arrange the below functions in the increasing order of asymptotic growth rate

$$f_1 = 10^n \qquad f_2 = n^{\log n} \qquad f_3 = n^{\sqrt{n}}$$

- ✔ ○ A. f3,f2,f1
- ✔ ○ B. f2,f3,f1
- ✔ ○ C. f2,f1,f3
- ✔ ○ D. f1,f2,f3

Answer Key: B

Question 7 of 15   1.0 Points

What will be the time complexity of the following code?

for (int i = 1; i < n; i++)

{

i *= k;

}

- ✔ ○ A. O(n)
- ✔ ○ B. O(k)

- ✔ ○ C. $O(\log_n k)$

- ✔ ○ D. $O(\log_k n)$

Answer Key: D

Question 8 of 15   1.0 Points

Solve the recurrence relation $T(n) = \sqrt{2}T(n/2) + \log n$

- ✔ ○ A. $\theta\ (n^2)$

- ✔ ○ B. None of these

- ✔ ○ C. $\theta\ (\sqrt{n})$

- ✘ ○ D. $\theta\ (n)$

Answer Key: C

Question 9 of 15   1.0 Points

Which one of the following correctly determines the solution of the recurrence relation $T(n)=2T(n/2)+\log n$, with $(1)=1$

- ✘ ○ A. $n\log n$

- ✔ ○ B. n

- ✔ ○ C. n^2

- ✔ ○ D. $\log n$

Answer Key: B

Question 10 of 15   1.0 Points

Solve the following recurrence relation- $T(n) = 3T(n/2) + n^2$

- ✔ ○ A. θ(nlogn)

- ✗ ○ A. θ(nlogn)
- ✔ ○ B. θ(n² logn)
- ✔ ○ C. θ(n²)
- ✔ ○ D. θ(n²log²n)

Answer Key: C

Part 2 of 2 - Part2 / 10.0 Points

Question 11 of 15   2.0 Points

The running time of an algorithm is represented by the following recurrence relation:

$$T(n) = \begin{cases} n & n \le 3 \\ T(\frac{n}{3}) + cn & otherwise \end{cases}$$

Which one of the following represents the time complexity of the algorithm?

- ✔ ○ A. θ(n)
- ✔ ○ B. θ(nlogn)
- ✔ ○ C. θ(n²)
- ✗ ○ D. θ(n²logn)

Answer Key: A

Question 12 of 15   2.0 Points

What is the time complexity of the given 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*log(n)^2)
- ✔ ○ B. O(n)
- ✔ ○ C. O(n*log(n))
- ✗ ○ D. O(n^2)

Answer Key: B

Question 13 of 15   2.0 Points

Suppose you want to move from 0 to 100 on the number line. In each step, you either move right by a unit distance or you take a shortcut. A shortcut is simply a pre-specified pair of integers i,j with $i < j$. Given a shortcut i, j if you are at position i on the number line, you may directly move to j. Suppose T(k) denotes the smallest number of steps needed to move from k to 100. suppose further that there is at most 1 shortcut involving any number, and in particular from 9 there is a shortcut to 15. Let y and z be such that T(9) = 1 + min(T(y), T(z)). Then the value of the product yz is_____.

- ✔ ○ A. 50
- ✘ ○ B. 100
- ✔ ○ C. 150
- ✔ ○ D. 200

Answer Key: C

Question 14 of 15   2.0 Points

Find the time complexity?

```
TOH(n, x, y, z)
{
    if (n >= 1)
    {
        // put (n-1) disk to z by using y
        TOH((n-1), x, z, y)

        // move larger disk to right place
        move:x-->y

        // put (n-1) disk to right place
        TOH((n-1), z, y, x)
    }
}
```

- ✔ ○ A. O(n)
- ✔ ○ B. O(2^n)
- ✔ ○ C. O(2n-1)

- ✔ ○ D. O(n^2)

Answer Key: B

Question 15 of 15   2.0 Points

In a competition, four different functions are observed. All the functions use a single for loop and within the for loop, same set of statements are executed. Consider the following for loops:

A) for(i = 0; i < n; i++)

B) for(i = 0; i < n; i += 2)

C) for(i = 1; i < n; i *= 2)

D) for(i = n; i <= n; i /= 2)

If n is the size of input(positive), which function is most efficient

- ✔ ○ A. A
- ✘ ○ B. B
- ✔ ○ C. C
- ✔ ○ D. D

Answer Key: C

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