Quiz Submissions - Fall 2021 Quiz 01

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Exit Preview

Attempt 2

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Submission View

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Question 1 0 / 1 point

How many times is function F called in the code segment? Choose the tightest bound

```
for (i = n; i > 0; i = i - 4):
    for (j = 1; j < i; j = 2*j):
        F(i, j)
        F(i, j)
    end for
end for
```

$$ightharpoonup O(n\log{(n)})$$

$$\bigcirc$$
 $O(n\sqrt{n})$

$$\bigcirc$$
 $O(1)$

$$\bigcirc O(n)$$

Question 2 0 / 1 point

Which of the below statements are true (All logarithm bases are 2)?

$$f(n) = 42n^3 + 28n^2 \log^4{(n)} + 74n \log(n) + 2$$

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$$ightharpoonup$$
 $ightharpoonup$ $f(n) = O(n^5)$

$$ightharpoonup$$
 $ightharpoonup$ $f(n)= heta(n^3)$

$$ullet Oig(nig) = Oig(n^2\log^4ig(nig)ig)$$

$$ightharpoonup$$
 $ightharpoonup$ $f(n) = Oig(n^3 \log^6ig(nig)ig)$

Question 3 0 / 1 point

All logarithm bases are 2

$$\log\Bigl(\log\Bigl(n\Bigr)\Bigr) \ = \ O\Bigl(rac{\log(n)}{\log(\log(n))}\Bigr)$$

- True
 - **False**

Question 4 0 / 1 point

All logarithm bases are 2

$$8^{\log(n)} = O\Big(0.9^n\Big)$$

- True
- **False**

Question 5 0 / 1 point

You are creating a 5-digit pin code, and the numbers 2 and 5 must be included. How many possible pin codes can be created? (numbers can be repeated in the pin code)

- 4970
- 14670

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- 5040
- 20000

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- We reason there are 9⁵ codes without a 2, 9⁵ codes without a 5, and 8⁵ codes without a 2 or a 5. Because the 8⁵ codes without a 2 or a 5 are counted in both the codes without a 2 and without a 5, the total number of codes without a 2 or a 5 is 2*9^5 - 8^5.
- Using complementary counting, we have 10⁵ possible codes minus 2*9⁵-8⁵ invalid codes, which is $10^5 - (2^9^5 - 8^5) = 14670$ possible codes.

Question 6 0 / 1 point

Consider the functions

$$egin{aligned} f(n) &= n! \ g(n) &= (2n)! \end{aligned}$$

$$h(n) = 5n!$$

Which of these relationships are true?

$$ightharpoonup$$
 $ightharpoonup$ $f(n) = O(g(n))$

$$ullet$$
 $h(n) = \Theta(g(n))$

$$ightharpoonup$$
 $ightharpoonup$ $g(n) = \Omega(h(n))$

Question 7 0 / 1 point

In how many ways can 8 people form couples of 2?

→ () 105

Notice that if the positions of the b's and d's are fixed, the resulting word is uniquely determined by that fixing (you have no choice of how to place a's and b's).

Thus, it is sufficient to sequentially choose the positions for the b's and d's, giving us

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$$\binom{8}{2} \cdot \binom{6}{2}$$

Question 9 0 / 1 point

You go to a pizza party, and there are 5 types of pizza, each with unlimited slices. You have been studying non-stop for the CS 381 final for 3 days neglecting food and sleep, so you want to eat 13 slices. However, you want to sample each type at least once. In how many ways can you do this? Order does not matter

- 40320
- 56
- - 390625

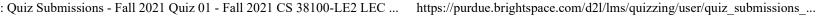
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We fix one slice of each type, which leaves us 8 slices to eat. Then, this is a straightforward "stars and bars" problem where we can choose freely with repetition. (8+5-1 choose 5-1) = (12 choose 4) = 495

Attempt Score: 0 / 9 - 0 %

Done

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