

# CSCI 1311: Quiz 5

2 Mar 2020

Name: \_\_\_\_\_ email: \_\_\_\_\_

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## Question Weighting

Question:	1	2	3	4	5	Total
Points:	2	3	3	1	6	15
Score:						

The quiz is graded out of 10 points, although you can earn up to 15 points for this quiz.

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Consider the following recurrence

$$a_n = 7a_{n-1} + 8a_{n-2}$$

$$a_0 = 2$$

$$a_1 = 7$$

1. [2 points] What is the characteristic equation for  $a_n$ ?

2. [3 points] What are the formulas for  $r_n$  and  $s_n$  that define a sequence with the same recurrence as  $a_n$ ? (Hint, you need to find the roots of the quadratic.)

3. [3 points] The formula for  $a_n = Cr_n + Ds_n$ . Using your solution from before, solve the system equations for  $a_0$  and  $a_1$  to find  $C$  for  $D$ .

4. [1 point] What is the final formula for  $a_n$ ?

5. Using the formula and the recurrence, compare your answers for the final solution. That is compute the value of  $a_i$  using the recurrence and using the formula and check to see if it s equal. **Show your work for full credit.**

(a)  $a_0$

i. [1 point] By recurrence for  $a_n$

ii. [1 point] By formula for  $a_n$

(b)  $a_1$

i. [1 point] By recurrence for  $a_n$

ii. [1 point] By formula for  $a_n$

(c)  $a_2$

i. [1 point] By recurrence for  $a_n$

ii. [1 point] By formula for  $a_n$