

**3)** (10 pts) ANL (Recurrence Relations)

Using the iteration technique, determine a closed-form solution for the following recurrence relation in terms of  $n$ . Note: Your answer should be **EXACT** and not a Big-Oh bound.

$$\begin{aligned} T(0) &= 1 \\ T(n) &= 4T(n-1) + 2^n, \text{ for integers } n > 0 \end{aligned}$$

# Computer Science Foundation Exam

May 21, 2022

## Section D

### ALGORITHMS

**NO books, notes, or calculators may be used,  
and you must work entirely on your own.**

**Name:** \_\_\_\_\_

**UCFID:** \_\_\_\_\_

Question #	Max Pts	Category	Score
1	10	DSN	
2	10	ALG	
3	5	ALG	
TOTAL	25		

**You must do all 3 problems in this section of the exam.**

**Problems will be graded based on the completeness of the solution steps and not graded based on the answer alone. Credit cannot be given unless all work is shown and is readable. Be complete, yet concise, and above all be neat. For each coding question, assume that all of the necessary includes (stdlib, stdio, math, string) for that particular question have been made.**