3) (5 pts) ANL (Summations)

What is the closed form of the following summation? Please show each step of work. **(Note: the bounds on the inner summation are NOT a misprint!!!)**

$$\sum_{a=0}^{n}(\sum_{b=a}^{a} 4b)$$

$$\sum_{a=0}^{n}(\sum_{b=a}^{a} 4b) = \sum_{a=0}^{n} 4a = \frac{4n(n+1)}{2} = 2n(n+1)$$

Grading: 2 pts for getting that the sum of 4b is just 4a. 2 pts for the sum of a, 1 pt for multiplying by 4 and simplifying. (Polynomial form also accepted.)

Computer Science Foundation Exam

August 28, 2021

Section II B

SOLUTION

ALGORITHMS AND ANALYSIS TOOLS

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

Question #	Max Pts	Category	Score
1	5	DSN	
2	10	DSN	
3	10	DSN	
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.