Ryan Darras, CS 5700 - HW12 7.(1,2,5)

Problem 7.1

Answer each part TRUE or FALSE.

Problem 7.1 Answer

a) $2n = O(n)$ True
b) $n^2 = O(n)$ False
c) $n^2 = O(n\log_2 n)$ False
d) $n\log n = O(n^2)$ True
e) $3^n = 2^{O(n)}$ True
f) $2^{2^n} = O(2^{2^n})$ True

Problem 7.2

Answer each part TRUE or FALSE.

Problem 7.2 Answer

a) $n = o(2n)$ false
b) $2n = o(n^2)$ True
c) $2^n = o(3^n)$ True
d) $1 = o(n)$ True
e) $n = o(\log n)$ False
f) $1 = o(1/n)$ False

Problem 7.5

Is the following formula satisfiable?

$(x \vee y) \wedge (x \vee \bar{y}) \wedge (\bar{x} \vee y) \wedge (\bar{x} \vee \bar{y})$

Problem 7.5 Answer

No. You are using the “AND” operator on 4 separate elements. Every possible setting for these values results in at least one of those elements being false

x	y	problem
T	T	$(\bar{x} \vee \bar{y})$ is false
T	F	$(\bar{x} \vee y)$ is false
F	T	$(x \vee \bar{y})$ is false
F	F	$(x \vee y)$ is false