ECE368 Non-Programming Homework Exercise #2

Due Friday, January 25, 2019, 4:30pm (MSEE 268)

IMPORTANT: Write your user (login) ID at the TOP of EACH page. Also, be sure to **read and sign** the **Academic Honesty Statement** that follows:

"In signing this statement, I hereby certify that the work on this exercise is my own and that I have not copied the work of any other student while completing it. I understand that, if I fail to honor this agreement, I will be subject to disciplinary action as outlined in the course policy."

Printed Name:

login:

Signature:

I have discussed this homework with:

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1. For each function $f(n)$ and time t in the following table, determine the largest size n of a problem that can be solved in time t, assuming that the algorithm to solve the problem takes $f(n)$ microseconds. Assume that a month has 30 days and a year has 365 days.

$f(n)$	1 second	1 minute	1 hour	1 day	1 month	1 year	1 century
$\log_2 n$							
$\sqrt{n}$							
n							
$n \log_2 n$							
n^2							
n^3							
2^n							
$n!$							

2. Rank the following functions by order of growth, i.e., $g_i = O(g_{i+1})$:

- $n\sqrt{n}$

- $n!$

- $(\log_2 n)^n$

- $\log_2(n!)$

- $2^{\log_2 n}$

Justify your answer.

3. Let n be the problem size.

    (a) True or False: $\log_2 2^n = O(\log_2 2^{n/2})$? Justify your answer.

    (b) True or False: $2^n = O(2^{n/2})$? Justify your answer.

    (c) True or False: $2^{n+1} = O(2^n)$? Justify your answer.