COMP 301 Analysis of Algorithms
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HW 1

Submit your codes and answers to Canvas for the problems given below.

1. What is the smallest value of n such that an algorithm whose running time is $100n^2$ runs faster than an algorithm whose running time is 2^n on the same machine? Write a simple Java code that tries different values for n and solves this problem. 15

2. 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. Write simple Java codes for $n \log n$ and $n!$, which try different values for n and solves this problem. Assume that the base of the logarithms is 2. Fill the table below.

	60×10^6	36×10^8	864×10^8	2592×10^9
	1 minute	1 hour	1 day	1 month
$\log n$	$2^{60\times10^6}$	$2^{36\times10^8}$	$2^{864\times10^8}$	$2^{2592\times10^9}$
n	60×10^6	36×10^8	864×10^8	2592×10^9
$n\log n$	2801417	133378058	2755147513	71870856404
n^2	$\sqrt{60}\times10^3$	6×10^4	$\sqrt{864}\times10^4$	$\sqrt{25920}\times10^4$
2^n	$\log_2(60\times10^6)$	$\log_2(36\times10^8)$	$\log_2(864\times10^8)$	$\log_2(2592\times10^9)$
$n!$	11	12	13	15