CISC 610 Assignment 1

Due Date: September 30, 2016 before midnight

1 Introduction

In this assignment you will be working on examples comparing running times and asymptotic analysis of algorithms. You are required to show your work for each answer.

1. **Comparison of running times**
   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.

	1 second	1 minute	1 hour	1 day	1 month	1 year	1 century
lg n							
$\sqrt{n}$							
n							
n lg n							
n^2							
n^3							
2^n							
$n!$							

   Show your work.

2. **Asymptotic Growths**
   Indicate, for each pair of expressions (A,B) in the table below, whether A is O, o, Ω, ω, or Θ of B. Assume that $k \geq 1$, $\epsilon > 0$, and $c > 1$ are constants. Your answer should be in the form of the table with "yes" or "no" written in each box. Show your work after the table. Show

A	B	O	o	Ω	ω	Θ
$lg^k n$	n^ϵ					
n^k	c^n					
$\sqrt{n}$	$n^{\sin n}$					
2^n	$2^{\frac{n}{2}}$					
$n^{lg\ c}$	$c^{lg\ n}$					
$lg(n!)$	$lg(n^n)$					

   your work.

1.1 Submission

Save all your answers in a .pdf file and submit it through Moodle.

Note: Submitting wrong files or in the wrong format will not be accepted nor will any re-submission be allowed for any such mistake.