CSC210: Data Structures and Algorithms
Assignment 2

due: 9:30, on 16.8.2018
Please explain your answers in detail.

1. Prove equation (3.16):
$$a^{\log_b c} = c^{\log_b a}$$

2. Prove equation (3.19):
$$\lg(n!) = \Theta(n \lg n)$$
Also prove that $n! = \omega(2^n)$ and $n! = o(n^n)$.

3. What does FIND-MAXIMUM-SUBARRAY return when all elements of A are negative? (Justify your answer.)

4. Write pseudocode for the brute-force method (checking all subarrays) of solving the maximum-subarray problem. Your procedure should run in $\Theta(n^2)$ time. Justify that this is actually the running time of your procedure.

5. Write pseudocode for Strassen's algorithm.

6. Trace Strassen's algorithm on the input:
$$A = \begin{bmatrix} 1 & 3 \\ 7 & 5 \end{bmatrix} \quad B = \begin{bmatrix} 6 & 8 \\ 4 & 2 \end{bmatrix}$$