# Homework Week 2

(due February 8, 2021 via D2L)

You need to submit your work using type-setting (Word, Word-Perfect, Pages, Latex (preferred)).

(1) Determine with proof the asymptotic relationship using Landau notation of the following pairs of functions:

1. $\log_e(n)$ (the natural logarithm) and $\log_2(n)$

2. $\log_2(\log_2(n))n$ and $\log_2(n)^2 \cdot n$

3. $\sqrt{n}$ and $\log_2(n)$

(2) Give with explanation the equivalent DFA (transition table and naming of start state and final states suffices, no picture needed) of the following NFA
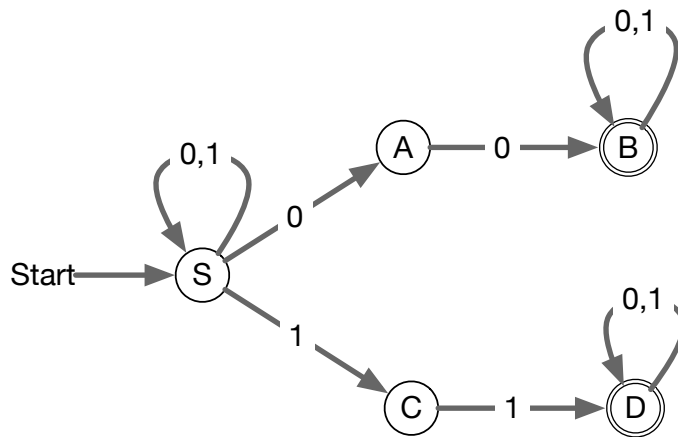
(3) Calculate the ϵ-closures of the states of the following NFA. Show the resulting NFA without ϵ-transitions.