

Homework 6 Part 1

Due: Thursday, May 28th by 6:00 PM

Instructions

Complete the problems on the following pages.

Collaboration policy. You are required to submit your own solutions. You are allowed to discuss the homework with other students. However, you must complete the problems in Grin on your own. Moreover, you must be able to explain your solution at any time. We reserve ourselves the right to ask you to explain your work at any time in the course of this class.

Late policy. You have a total of **three** late days during the quarter, but you can only use one late day on any one homework, giving an additional day on both parts. Please plan ahead.

Solutions submission. Submit your solution at

<http://grin.cs.washington.edu>

- Each part of each task is listed as its own problem.
- You have unlimited attempts on each part.
- All completed parts get full credit and uncompleted parts get no credit.

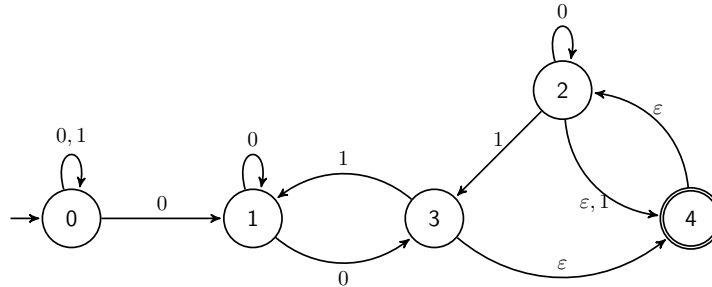
Task 1 – Final Study Mission

[10 pts]

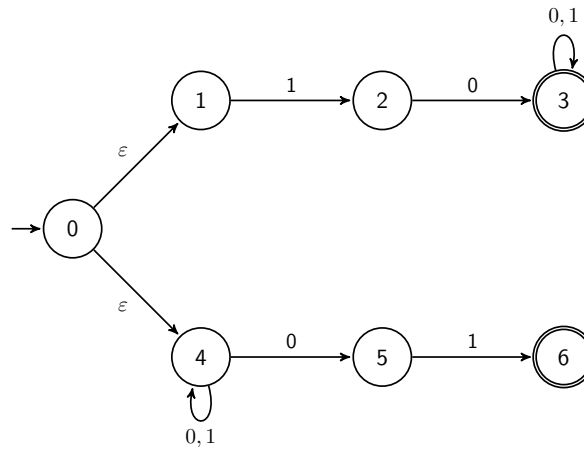
Use the algorithm from lecture to convert each of the following NFAs to DFAs. Label each DFA state with the set of NFA states it represents in the powerset construction.

Important: Grin does not validate whether your state labels are correct. But do not skip them – correct state labels on DFAs will be required on quiz/exam with NFA-DFA conversion problems.

a) The NFA below, which accepts any binary string containing “00” as a substring:



b) The NFA below, which accepts strings starting with “10” or ending in “01”:



Task 2 – A Whole New Small Game

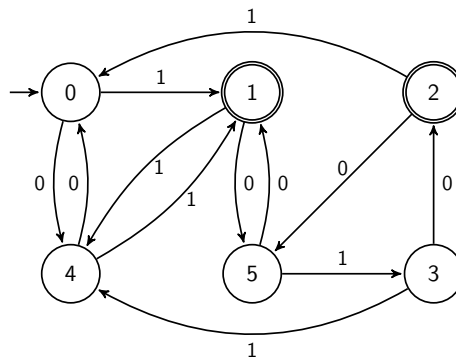
[16 pts]

Use the algorithm from lecture to minimize the each of the following DFAs.

For each step of the algorithm, write down the groups of states, which group was split in that step and the reason for splitting that group. At the end, write down the minimized DFA, with each state named by the set of states of the original machine that it represents (e.g., “ $\{B, C\}$ ”).

Important: Grin does not validate whether your DFA is correctly minimized or whether your state labels are correct. You do not need to separately submit your algorithm steps or state labels for this homework. But do not skip these steps — the full algorithm run and correct state labels will be required on quiz/exam with DFA minimization problems.

a) The following machine:



b) The following machine:

