CS 3100 – Models of Computation – Fall 2011
This assignment is worth 8% of the total points for assignments
100 points total

September 6, 2011

Assignment 3, Posted on: 9/6 Due: 9/15 Thursday 11:59pm

1. (**20 points**) Write a Python function `recognizes(D, N)` that returns all strings of length $0 \leq i \leq N$ recognized by the given DFA `D`. Assume that $N \geq 0$. Test it out on the the DFA that recognizes all strings ending in 0101 that you constructed in Assignment 2 for $N = 5$. Submit the function in a file `recognizes.py` as well as an ASCII record of your testing session as file `recognizes_tests.out`.

2. (**40 points**) Define a DFA that accepts all strings over {0,1} such that every block of five consecutive positions contains at least two 0s. Call this language L_{00}. Build this DFA using the `mk_dfa` call (we will supply you a working `mk_dfa` for this assignment). Next, use `dot_dfa` and print this DFA out. Submit the PDF drawing of this DFA, as file `L00.pdf`. Test this DFA on 12 strings including two (2) strings of length < 5, five (5) strings that are accepted and of length ≥ 6 and five (5) strings that are rejected and of length ≥ 6. Submit an ASCII record of your testing session as file `L00_tests.out`.

3. (**20 points**) Draw a DFA for Question 3 of `notes5.pdf`. Next, enter this DFA and generate a PDF drawing for it. Argue why this DFA works (in about 3-4 sentences), and also use function `accepts` to demonstrate that indeed it works on five (5) strings in the language and five (5) strings not in the language. Submit your PDF as `notes5_qn3_DFA.pdf` and your writeup as `notes5_qn3_DFA.out`.

4. (**20 points**) Draw a DFA for Question 5 of `notes5.pdf`. Next, enter this DFA and generate a PDF drawing for it, and submit it. Argue why this DFA works (in about 3-4 sentences), and also use function `accepts` to demonstrate that indeed it works on five (5) strings in the language and five (5) strings not in the language. Submit your PDF as `notes5_qn5_DFA.pdf` and your writeup as `notes5_qn5_DFA.out`.