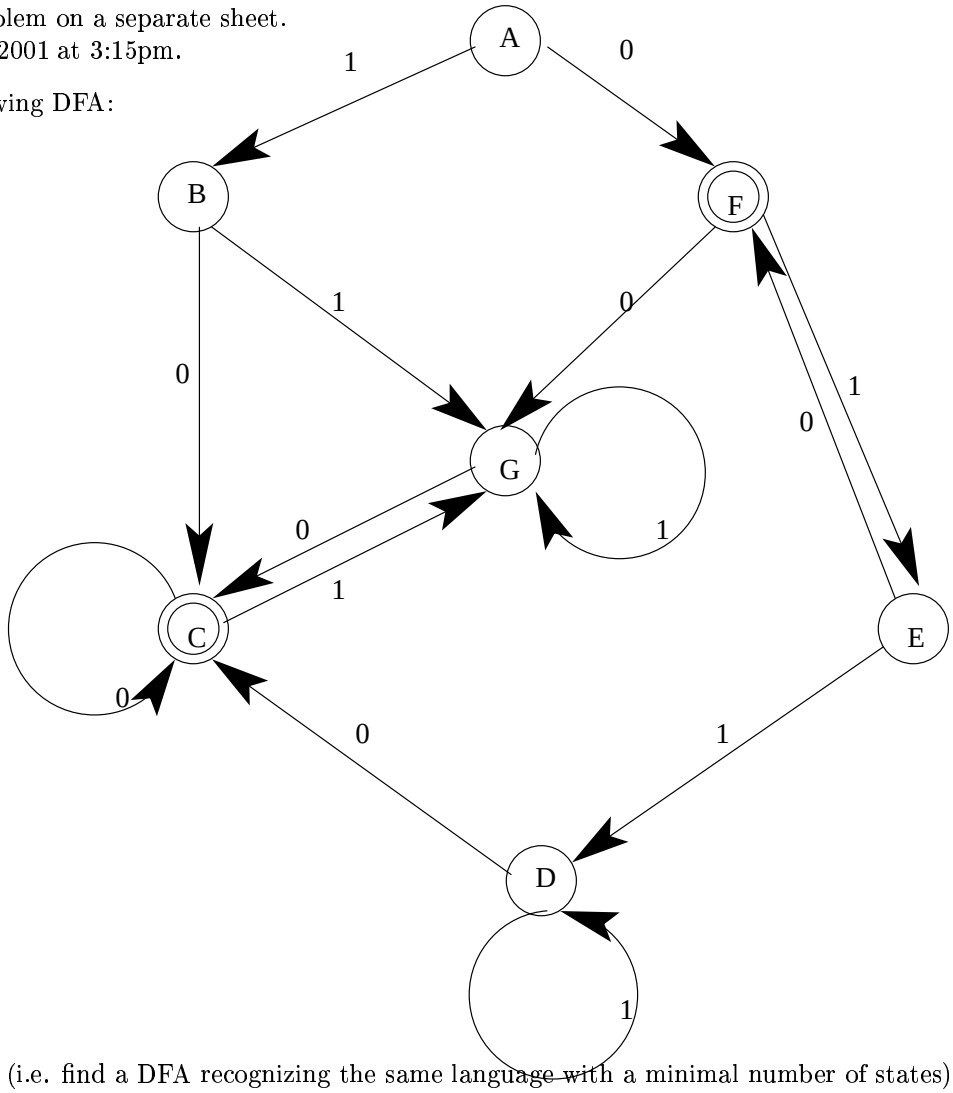
CS154 Assignment 3

January 24, 2001

The homework should be done without collaboration!
Please submit every problem on a separate sheet.
Assignment due: 01/31/2001 at 3:15pm.

1. Minimize the following DFA:



(i.e. find a DFA recognizing the same language with a minimal number of states).

2. Show that the following languages are not regular:
   (a) the set of all palindromes over the alphabet $\{a, b\}$ (a *palindrome* is a word that reads the same forwards and backwards);
   (b) $\{0^i 1^j \mid i \neq j\}$.
3. Show that the two languages above are context-free.
4. Present an algorithm to determine whether or not a context-free grammar generates a language with infinitely many strings. (An informal presentation or pseudo-code will suffice.)

Extra credit problem (optional): Prove that the language of all strings that are **not** of the form ww (where w is a string) is context-free.