QUIZ -2

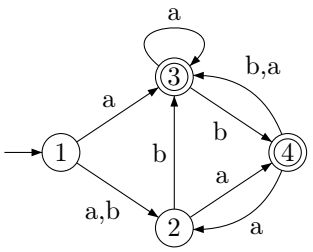
Theory of Computation

9/9/2016

1. *[1 mark]* Let L be any language (not necessarily regular). Prove that, if $u \equiv_L v$ then $u^{-1}L = v^{-1}L$.

2. *[2 marks]* Let L be any language (not necessarily regular). Let $\mathsf{Prefix}(L) = \{w \mid wx \in L \text{ for some } x \in \Sigma^*\}$. Prove that $\equiv_L$ refines $\equiv_{\mathsf{Prefix}(L)}$.

3. *[4 marks]* Give the minimal DFA equivalent to the following NFA.



4. *[3 marks]* The ith Fibonacci number, denoted $f(i)$, is given by:

$$f(0) = 0$$

$$f(1) = 1$$

$$f(i) = f(i-1) + f(i-2) \text{ , if } i > 1$$

Consider the unary language $L_{\text{FIB}} = \{a^n \mid n = f(i) \text{ for some } i\}$. Is L_{FIB} recognizable? Justify.