CS208 Quiz #2

Time: 20 mins **Date: Mar 12, 2012**

- ***The quiz is open-book, open-notes, open-material-brought-to-class.***
- ***Be brief, complete and stick to what has been asked. If needed, you may cite results/proofs covered in class without reproducing them.***
- ***Do not copy solutions from others***
- ***Penalty for copying: FR grade***

Consider the context-free grammer G shown below, where S is the start symbol, $\{S, X\}$ is the set of non-terminals and $\{0, 1\}$ is the set of terminals.

$$\begin{aligned} S &\rightarrow S \cdot X \mid S \cdot S \mid X \\ X &\rightarrow 0 \cdot X \cdot 1 \mid 0 \cdot 1 \end{aligned}$$

1. *[10 marks]* Show that there exists a string $w \in L(G)$, such that $w \neq \varepsilon$, and there are two distinct derivation trees of w in G. You must give the string w, and also show the two distinct derivation trees.

2. *[10 marks]* Give an alternative grammar G' such that $L(G) = L(G')$, but which is such that for every string $w \in L(G')$, there is exactly one derivation tree of w in G. You need to only give the new grammar G'.