

**CS-302 Theory of Computation
Assignment 12**

Name: _____

1. Prove that the class of context-free languages is closed under concatenation.

2. Use the construction proof of the Closure Theorem for Context-Free Languages to find a context-free grammar for each of the following context-free languages.

a) $L_1 = (011 \cup 1)^*(01)^*$

b) $L_2 = \{0^n 1^n \mid n \geq 0\} \cup \{1^n 0^n \mid n \geq 0\}$

c) $L_3 = \{0^i 1^j 0^k \mid j > i + k\}$
