CS3133
HW #2 SOLUTIONS

1. $L = \{a^{3n}b^n \mid n \in N\}$.

2. *i*) $abb \in L$.
   ii) If $u \in L$, then $aub \in L$ and $ub \in L$.
   iii) A string *u* belongs to *L* only if it can be obtained by a finite number of applications of rule *ii*) to rule *i*).

3. *a*) $XY = \{aa, aab, aaab, bb, bbb, bbab\}$
   b) $\{\lambda, b, ab, bb, bab, abb, bbb\}$
   c) 2^3=8

4. $a^*b^*c^*$

5. $aa^*b^*c^* \cup a^*bb^*c^* \cup a^*b^*cc^*$

6. $\left((b \cup c)^+ a\right)^* \cup \left(a(b \cup c)^+\right)^* \cup (b \cup c)^*$

7. *a*) true
   b) false Let *u*={*a*}, *v*=*w*={*bb*}, so that $a \in u \cup (vw) = \{a, bbbb\}$ but $a \notin (uv) \cup (uw) = \{abb\}$.
   c) true