CS3133
HW #2

DUE: Friday, September 8

1. (6 points) Describe the language L generated by the following recursive definition:
   i) $\lambda \in L$.
   ii) If $u \in L$, then $aaaub \in L$.
   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*).

2. (6 points) Do **Exercise 5** from Chapter 2 of our text. That is, give a recursive definition of the language $L=\{a^i b^j \mid 0 < i < j\}$.

3. (3 points) Do **Exercise 10** from Chapter 2 of our text.

4. (1 point) Do **Exercise 12** from Chapter 2 of our text.

5. (1 point) Do **Exercise 13** from Chapter 2 of our text.

6. (3 points) Do **Exercise 17** from Chapter 2 of our text.

7. (6 points) For each of the following regular expression identities, tell whether or not it is true for all regular expressions u, v and w? If you claim an identity is false, give an example (instances of u, v and w) for which it doesn't hold.
   a) $u(vu)^* = (uv)^* u$
   b) $u \cup (vw) = (uv) \cup (uw)$
   c) $uv^*(v \cup w^*) = (uv^* v) \cup (uv^* w^*)$