CS 453 Compiler Construction — Spring 2013	Homework #2
Top Down Parsing	Due February 5, 2013

You may look on the web or ask a friend for help, but make sure you state/cite what help you have had in completing the assignment. Ensure that you could answer similar questions on a test by yourself. Turn in your homework as a pdf file via checkin by Tuesday February 5th at 11:59pm (cs453/bin/checkin HW2 HW2.pdf). Hand-written submissions that have been scanned into a pdf file are fine. Total points: 100

1. [50 Points] FIRST and FOLLOW sets.
   For the following grammar:

   ```
   (1) start -> mesh EOF
   (2) mesh -> NUM nodelist
   (3a) nodelist ->
   (3b) nodelist -> nodelist node

   (4) node -> NODE NUM REAL REAL
   ```

   write a table with the FIRST, FOLLOW, and the nullable sets for each of the nonterminals. Additionally show the predictive parsing table.

2. [50 Points] Given the following dangling else grammar:

   ```
   (1a) S -> if b then S X
   (1b) S -> o
   (2a) X -> epsilon
   (2b) X -> else S
   ```

   where terminal b stands for any boolean expression and terminal o stands for any other statement.

   (a) Augment the grammar with a rule that includes the end of file symbol and produce NULLABLE, FIRST, and FOLLOW sets for each of the nonterminals.

   (b) Produce the predictive parsing table. There will be a slot with with multiple entries (`X -> else S` and `X -> epsilon`). Remove the `X -> epsilon` entry.

   (c) Show the parse trees obtained by predictive parsing

   (c.1) `if b then o else if b then o else o $` and

   (c.2) `if b then if b then o else o $`.