

**CS453 Spring 12 Homework 2**  
**Predictive Parsing**  
**Due: Thursday week 5: Feb 16, in class**

1. Given grammar 3.12 from the Tiger book:

$$Z \rightarrow d \mid X Y Z$$
$$X \rightarrow Y \mid a$$
$$Y \rightarrow \varepsilon \mid c$$

produce an unambiguous grammar for it

hint: what is the language of the above grammar?

2. Given the dangling else grammar:

$$S \rightarrow \text{if } b \text{ then } S \ X \mid o$$
$$X \rightarrow \varepsilon \mid \text{else } S$$

where terminal  $b$  stands for any Boolean expression, and terminal  $o$  stands for any other statement  $S$

a) Augment the grammar and produce NULLABLE, FIRST, and FOLLOW for the augmented grammar

b) Produce the predictive parse table. There will be a slot with multiple entries:

$$X \rightarrow \text{else } S$$

and

$$X \rightarrow \varepsilon$$

Remove the  $X \rightarrow \varepsilon$  entry.

c) Show the parse trees obtained by predictive parsing:

c1) if b then o else o \$

c2) if b then if b then o else o \$

c3) if b then o else if b then o else o \$