COSC 445 TAKE HOME Midterm 2/25/10 NAME:

Open book, notes, internet.
Give yourself as much time as you need.
Have NO contact with anyone in class regarding this test.

If a question is ambiguous or in error, write down your best assumption to "fix" the question and answer that.

Return the test before 3/1/10 at 5pm via email to shaynes@emich.edu.

1. Which of the following is the name of the data structure in a compiler that is responsible for managing information about variables and their attributes? Choose ONE.

(A) Abstract Syntax Tree (AST)

(B) Attribute Grammar

(C) Symbol Table

(D) Semantic Stack

(E) Parse Table

2. Which of the following characteristics of a programming language is best specified using a context-free grammar? Choose ONE best.

(A) Identifier length

(B) Maximum level of nesting

(C) Operator precedence

(D) Type compatibility

(E) Type conversion

3. Draw the state transition diagram that corresponds to the following state transition table (start state: A; accept state: D; '–' means error)

	State	a	b	c
→	A	B	B	C
	B	–	–	B
	C	C	D	–
	(D)	–	–	D

4. Give the DFA for legal bit strings in Java or C/C++. (Table or diagram)

5. Recursive descent parser is a top-down parser.

TRUE FALSE

6. Recursive descent parser is a member of the LL(1) class of parsers.

TRUE FALSE

7. Consider this grammar with terminal symbols, T = { **;** , **s** }

A → B A′
A′ → **;** A | ε
B → **s**

This grammar has the following First and Follow sets

NT	First	Follow
A	**s**	$
B	**s**	**;**
A′	**;** ε	$

Give the LL(1) parsing table.

8. Consider this (already augmented) grammar with T = { + , **n** }

1 E′ → E
2 E → E **+ n**
3 E → **n**

The SLR(1) parsing table is:

State	Action			Goto
	n	+	$	E
0	s2			1
1		s3	accept	
2		r3	r3	
3	s4			
4		r2	r2	

Give the trace of the LR parse of the legal string **n** + **n** + **n**
(i.e., Show the stack, input symbol and action at each step.)

9. Consider this grammar (already augmented) for properly nesting parentheses.

A′ → A
A → **(** A **)**
A → **a**

There are six item sets. Give the item sets.