

**Simon Fraser University
School of Computing Science**

CMPT 383

Assignment 2

Due date: October 25, 2005

- 1) Problem 13 (page 172).
- 2) Given the following BNF:

```
<exp> ::= ( <list> ) | a
<list> ::= <list>, <exp> | <exp>
```

 - a) Write EBNF rules and syntax diagrams for the language.
 - b) Draw the parse tree for $((a, a), a, (a))$.
 - c) Compute the FIRST and FOLLOW sets for the nonterminals of the grammar.
 - d) Construct the predictive parsing table.
 - e) Show the sequence of moves (trace) for $((a, a), a, (a))$.
- 3) Design a state diagram to recognize one form of the comments of the C-based programming languages, those that begin with `/*` and end with `*/`
- 4) Problem 19 (page 172).
- 5) Problem 23 (page 173).
- 6) Problem 6 (page 203).
- 7) Is it possible to have a language without any reserved words? Discuss.
- 8) The syntax of the `if` statement in Ada is as follows:

```
<if_statement> ::= if <condition> then <sequence_of_statements>
                { elsif <condition> then <sequence_of_statements> }
                [ else <sequence_of_statements>
                end if;
```

Any number of `elsif` clauses are allowed to avoid deeply nested `if` statements. The keyword `elsif` might be considered aesthetically repugnant. What would be the consequences be of replacing `elsif` with the two keywords `else if`?
- 9) Problem 14 (page 248).
- 10) Problem 4 (page 249).
- 11) Problem 5 (page 249), only C++ and Java.

12) Describe the scopes of the declarations in the following C program. How would the scopes change using dynamic instead of static scoping? What does the program print in each case?

```
int a, b;

int p(void) {
    int a, p;

    a = 0;  b = 1;  p = 2;
    return p; }

void print(void) {
    printf("%d\n%d\n", a, b); }

void q(void) {
    int b;
    a = 3;  b = 4;
    print(); }

void main(void) {
    a = p();
    q(); }
```