Sept. 19, 2005 **ICS 535-01 (051)** Dr. Mamdouh Najjar

Design and Implementation of Programming Languages

Language Design and Implementation Project (LDIP)
Design: Due Oct. 22, 2005
Implementation: Due Dec. 31, 2005

Part I: Language Design

You are asked to design a programming language and to describe its syntax in BNF. The language must have at least the following primitive data types, constructs, and conventions:

- **Identifier name specification**
- **Primitive data types: (Integer, Real, Boolean, Character)**
- **Enumeration type:**
    - `type days is ( Sat , Sun, Mon, Tue, Wed, Thu, Fri);`
- **Array type**
- **Operations and Expressions**
    - **Arithmetic**
    - **Boolean**
    - **Relational**
- **Type conversions (Integer , Real)**
- **Operator precedence rule**

  ****, abs, not**
  ***, /, mod, rem**
  + , - (unary)
  + , - (binary)
  = , /= , < , > , <= , >= , in , not in
  and, or, xor
- **Assignment statement (simple, mixed-mode)**
- **Compound statements (Blocks)**
- **Selection statement (Two-way, Multiple)**
- **Iterative statements**
    - **Counter-Controlled loops**
    - **Logically-Controlled loops**
- **I/O operations**
- **Nesting to any level for the selection and iterative statements**

Deliverables:

1. **BNF syntax description of your language**
2. **Semantic description and conventions of your language that can not be described in BNF**

Note: Your design must first be approved by me before you start implementation.

Part II: Language Implementation

B. **Your Program**

Your program should read a program written in the ***SimLan V2*** and executes its statements if syntacticaly correct. In case of a syntax error, your program should print the erronous line then an error message indicating the type of error. Error types are:

- unmatched blocks
- type error
- invalid expression
- invalid statement
- no value assigned to variable XX
- Input error

Important notes:

1- Your program must read from an input file and print to an output file.

2- The source file must include the following:

- ■ your name, ID number
- ■ Course title, number, and section number
- ■ the statement of the problem
- ■ a brief summary of your interpreter implementation method
- ■ a dictionary of all global variables (name, type, and usage)
- ■ for each procedure or function include the following:
  - Usage of the procedure or function
  - Meanings of the input variables
  - Meanings of the output variables

3- Late submissi will not be accepted.