Introduction to Computer Programming Using FORTRAN 77

The Computer

- is a tool
- vary in size , shape , speed , capacity , and usage
- fast
- do only what it is instructed to do

Computer System Components

- **Central Processing Unit (CPU)**
  - the computer brain and main worker
- **Memory**
  - where the computer store needed information
- **Input devices**
  - devices to receive input from user (e.g., keyboard , mouse)
- **Output devices**
  - show results to the user (e.g., monitor , printer)

What does the Computer Understand

- The computer only understands electrical signals
- These electrical signals are interpreted as ones and zeros
- Machine language programs are programs that are written in ones and zeros

High Level Languages

- Languages that are more sophisticated than machine language. They are easier to write , test , and fix
  - e.g., FORTRAN , PASCAL , C

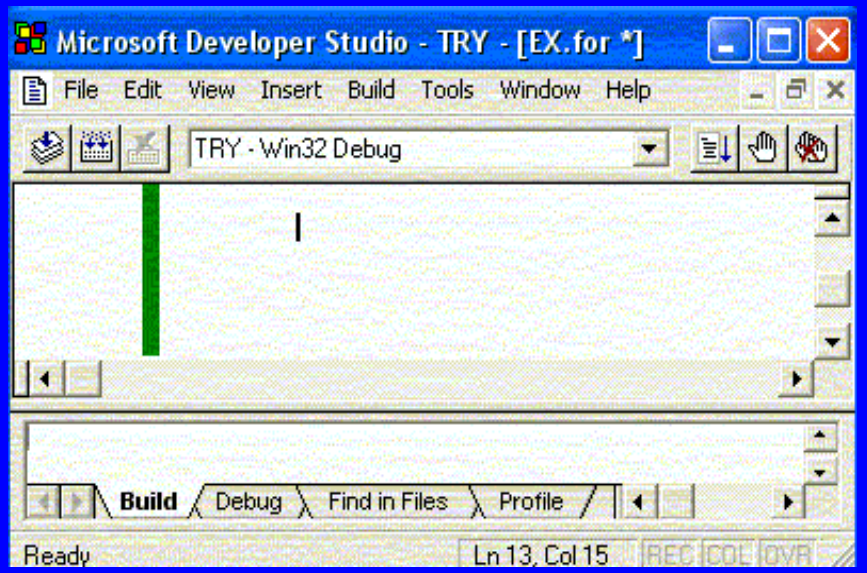
- Compiler

  a compiler translates a program from a high level language to a machine language

Programs

- a program
  - a solution to a given problem written in a computer programming language
- Software
  - the collection of programs that run in a computer and determine the operations that are valid in the computer

FORTRAN Programs



- specific Structure
- each line (80 columns)
- program statements from columns 7 - 72
  - program statements have to be valid FORTRAN statements
- statement number from columns 1 - 5
- column 6 (continuation if any)
- * or C in column 1 indicates a comment line
- FORTRAN compiler ignores columns 73 - 80

Writing a Program

- Understand the problem
- Analyze the problem and break it into smaller pieces
- Write step by step solution
- Write the code (the actual program in a computer language)
- Test that the program works
  - fix errors that you discover during testing

Exercises

1. Indicate the following statements as either TRUE or FALSE:

    1. Syntax errors are detected during compilation.
    2. A compiler is a hardware component that translates programs written in a high level language to a machine language.
    3. The input unit is the part of the computer that controls all the other parts.
    4. The last statement in a FORTRAN program should be the END statement.
    5. FORTRAN is a high level language.
    6. A comment statement is used for documentation purposes.
    7. Dividing by zero will cause a compilation error.
    8. If a FORTRAN statement exceeds column 72, then '+' at column # 6 in the next line can be used to continue the statement on that line.
    9. A computer is a machine used to solve problems only.
    10. A compiler checks the syntax of the program and converts the program into machine language
    11. A program is a set of computer instructions.
    12. One can use as many 'STOP' and 'END' statements as he/she wishes in a single program.

2. Which of the following statement(s)is /are correct according to FORTRAN:

A. Only column 1 is used for the statement label.

B. Column 6 is used for comment.

C. Column 1-5 is used for the statement label.

D. Column 7 is used for the continuation line.

E. Characters C or * in Column 1 is used to comment a line.

3. For each item of list (A) , choose the correct definition from list (B):

List A	List B
Assembler Compiler Software Hardware	1. A machine that converts an assembly language program into machine language. 2. The physical components of a computer. 3. A machine that converts a high level language program into machine language. 4. A fundamental computer component that controls the operations of the other parts of the computer. 5. Programs used to specify the operations in a computer. 6. A fundamental computer component that performs all arithmetic and logic operations. 7. A program that converts an assembly language program into machine language. 8. A program that converts a high level language program into machine language.

4. For each term in list (A) , choose the correct definition from list (B):

List A	List B
A program	1. is a FORTRAN statement that indicates the logical end of the program.
A Computer	2. is a machine that can solve all problems.
END	3. translates programs written in an assembly language to machine language.
STOP	4. is a machine that uses instructions given by the user to solve a problem.
	5. is a sequence of instructions which, when performed, will do a certain task.
	6. is a FORTRAN statement that indicates the physical end of a program.