FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Structured Programming

Structured programming is a programming paradigm aimed at improving the clarity, quality, and development time of a computer program by making extensive use of the structured control flow constructs of selection (if/then/else) and repetition (while and for), block structures, and subroutines in contrast to using simple tests and jumps such as the go to statement, which can lead to "**spaghetti code**" that is potentially difficult to follow and maintain.

Discussion

One of the most important concepts of programming is the ability to control a program so that different lines of code are executed or that some lines of code are executed many times. The mechanisms that allow us to control the flow of execution are called **control structures**. Flowcharting is a method of documenting (charting) the flow (or paths) that a program would execute. There are three main categories of control structures:

- **Sequence** – Very boring. Simply do one instruction then the next and the next. Just do them in a given sequence or in the order listed. Most lines of code are this.

- **Selection** – This is where you select or choose between two or more flows. The choice is decided by asking some sort of question. The answer determines the path (or which lines of code) will be executed.

- **Iteration** – Also known as repetition, it allows some code (one to many lines) to be executed (or repeated) several times. The code might not be executed at all (repeat it zero times), executed a fixed number of times or executed indefinitely until some condition has been met. Also known as looping because the flowcharting shows the flow looping back to repeat the task.

Variables:-
A variable is something that may change in value. A variable might be the number of words on different pages of this booklet, the air temperature each day, or the exam marks given to a class of school children.
A variable could be likened to a storage box whose contents may often change. The box, or variable must be given a name to distinguish it from others.

According to FORTRAN rules, the variable name must begin with a letter and may be followed by up to five characters.

If the variable declarations are omitted, the compiler will make certain assumptions, for example, that any variables beginning with the letters I, J, K, L, M, N are INTEGER. The lack of specification often leads to program errors and it is strongly recommended that variable types are always declared. Numerical data may be separated into integer and real numbers.

Constants:-

Constants are quantities whose values do not change during program execution.

Double Precision:-

Real data values are commonly called single precision data because each real constant is stored in a single memory location. This usually gives seven significant digits for each real value. In many calculations, particularly those involving iteration or long sequences of calculations, single precision is not adequate to express the precision required. To overcome this limitation, FORTRAN provides the **double precision** data type. Each double precision is stored in two memory locations, thus providing twice as many significant digits.

For Example:- DOUBLE PRECISION namel, name2

Characters:-

Character variables contain one or more characters, (for example G or OXFORD).

For Example:-

CHARACTER namel,name2   where name1 and name2 are 1 character each.

CHARACTER*n namel,name2   where name1 and name2 are n characters in length each.

Complex Constants

A *complex constant* is a pair of real or integer constants. The two constants are separated by a comma and enclosed in parentheses. The first constant

represents the real part of that number; the second constant represents the imaginary part.

LOGICAL:-

A variable that can hold one of the logical values is a logical variable and it is of type LOGICAL. To declare a LOGICAL variable, do it as what you did for INTEGER and REAL variables. But, use the type name LOGICAL instead. LOGICAL constants can have aliases declared with the PARAMETER attribute. LOGICAL variables can be initialized when they are declared and can be assigned a logical value.