Fortran Notes

Website : <http://www.fortrantutorial.com/files-precision/index.php>

Introduction

* FTN95 is a plato extension which checks the program for errors

Worksheet 1: Basics

* \* - in a statement it means a value (or multiplication)
* A program is made up of numerous statements (lines).
* A statement is made up of variable names, operators, keywords
* Each statement are executed sequentially
* Program ‘hanging’ – when a program is waiting for the user to enter in a value
* The program is also user-unfriendly. The program waits for input without telling the user what is needed.
* Things are given to 6 decimal place precision
* Character variable: the maximum length of the string follows \* after the variable name. e.g. character name\*10 so the variable name has 10 characters
* Implicit none: This checks the incorrect of variables, without fortran just continues

Worksheet 2: Decisions

* x=2: store the value 2 in the memory location that we have given the name x
* x+y=z: expression is meaningless. There is no memory location "x+y" and so it would lead to a compiler error.
* +: Addition
* - : Subtraction
* \* : Multiplication
* / : Division
* \*\*: Exponentiation (raise to the power)
* We can override the order of evaluation by use of brackets

|  |  |  |  |
| --- | --- | --- | --- |
| **Function Name** | **Type of Argument** | **Type of Result** | **Definition** |
| sin(x) | Real | Real | Sine |
| cos(x) | Real | Real | Cosine |
| tan(x) | Real | Real | Tagent |
| atan(x) | Real | Real | Arctangent |
| abs(x) | Real/Integer | Real/Integer | Absolute Value |
| sqrt(x) | Real | Real | Square Root |
| exp(x) | Real | Real | E^x |
| log10(x) | Real | Real | Log 10^x |

* A good program:
* Uses comments appropriately to explain what is happening.
* Uses indentation to make the program easier to read.
* Uses meaningful variable names.
* Uses sensible prompts to let the user know what is going on.
* Uses implicit none at the start of every program.
* Is efficient!

Worksheet 3: Loops

* y=x/3 : FORTRAN evaluates the right hand side of the assignment first using integer arithmetic, because both x and 3 are integer. 1 divided by 3 cannot be stored as an integer, and so the value 0 is returned. The result, 0, is then converted to a real number and the assigned to y.
* All the statements within the do and end do are executed.
* The third argument of the do statement, is the increment step. If omitted, the value is taken as 1.

Worksheet 4: Files and Precision

* The trouble with print is that the programmer has no control over the number of digits output irrespective of the selected precision
* Use a loop counter in order to avoid the risk of the program looping forever.

Worksheet 5: Arrays &IO