

Repetitive Execution

Mteor 227 – Computational Meteorology

Loops

We will use two types of loops in this class. The type of loop depends on how it is controlled. The two types are loops controlled by:

1. Counters
2. Logical expressions

Counter Controlled DO loops

Number of executions not known before execution of the loop.

Syntax

DO control-variable = initial-value, limit, step

statement-sequence

END DO

- Initial-value, limit, step are integers and must be declared as such.
- Step-size must be non-zero and may be omitted.
- If omitted, step-size will be 1.

Example

```
DO number = 1, 9
  Print *, number, number**2
END DO
```

```
Print *, "Number = ", number
```

Loops Controlled by logical expressions

Number of executions not known before execution of the loop.

DO-EXIT construct

Syntax

DO

statement sequence 1

IF (logical expression) EXIT

statement sequence 2

END DO

Depending on the location of the IF statement, you could have either of the following:

- Pretest loop
- Test-in-the-middle loop
- Posttest loop

Pretest loop syntax

DO

IF (logical-expression) EXIT

statement sequence

END DO

Statements that follow the logical expression (statement sequence) may never be executed.

Test-in-middle loop syntax

DO

statement sequence 1

IF (logical expression) EXIT

statement sequence 2

END DO

Posttest loop syntax

DO

Statement sequence

IF (logical expression) EXIT

END DO

Statement sequence will always execute at least once.

Examples

Preloop test example

```
DO
  IF (Sum > Limit) EXIT
  Number = Number + 1
  Sum = Sum + Number
END DO
```

This example also demonstrates the use of a counter (Number) and an accumulator (Sum).