

# Selective Execution

## Mteor 227 – Computational Meteorology

### Logical Expressions

#### Relational Operators

- < or .LT. Is less than
- > or .GT. Is greater than
- == or .EQ. Is equal to
- <= or .LE. Is less than or equal to
- >= or .GE. Is greater than or equal to
- /= or .NE. Is not equal to
- Note:
  - == is a relational operator
  - = is an assignment statement

#### Compound operators

- .NOT. (negation)
- .AND. (conjunction)
- .OR. (disjunction)
- .EQV. (equivalence)
- .NEQV. (Non-equivalence)
- Order of operations
  1. Arithmetic operations
  2. Relational operators
  3. Logical operation in the order: .NOT., .AND., .OR., .EQV. (.NEQV.)
  4. Use parentheses to remove any ambiguity.

#### Examples

- (N\*\*2 + 1 > 10) .AND. .NOT. (N < 3)
- Data\_Name == "RAIN\_NON" .OR. "RAIN\_CON"

### IF-Constructs

#### Block IF

IF (logical-expression) THEN

statement-sequence

ENDIF

\*Note indentation of statement sequence. This is important for readability.

\*Statement sequence is executed if logical-expression evaluates to true. If false, it is skipped.

#### Logical IF

IF (logical-expression) statement

\*Only one statement gets executed if logical expression is true.

#### IF-ELSE

IF (logical-expression) THEN

statement-sequence 1

ELSE

statement-sequence 2

ENDIF

#### IF-ELSE-IF

IF (logical-expression) THEN

statement-sequence

ELSE IF (logical-expression) THEN

statement-sequence

ELSE IF (logical-expression) THEN

statement-sequence

ELSE

statement-sequence

ENDIF

## SELECT-CASE Constructs

SELECT CASE (Selector)

CASE (label-list-1)

Statement-sequence 1

CASE (label-list-2)

Statement-sequence 2

.....

CASE (label-list-n)

Statement-sequence n

END SELECT

Selector: Integer, character, or logical expression

Label-list options:

- Value
  - Execute statement sequence if value is true.
- Value-1 : Value-2
  - This represents a range.
- Value-1:
  - this value and everything greater.
- :Value-1
  - This value and everything less than that value.
- Default: what is done if none of the cases are true.

```
IF (x < 50) THEN
    Grade = 'F'
ELSE IF (x < 60) THEN
    Grade = 'D'
ELSE IF (x < 70) THEN
    Grade = 'C'
ELSE IF (x < 80) THEN
    Grade = 'B'
ELSE
    Grade = 'A'
END IF
```

```
SELECT CASE (Wind_Speed)
    CASE (:85)
        Print *, 'EF-0'
    CASE (86:110)
        Print *, 'EF-1'
    CASE (111:135)
        Print *, 'EF-2'
    CASE (136:165)
        Print *, 'EF-3'
    CASE (166:200)
        Print *, 'EF-4'
    CASE (200:318)
        Print *, 'EF-5'
    CASE DEFAULT
        Print *, 'Finger of God'
END SELECT
```

## Examples

```
IF (x .gt. 0) print *, 'x is positive'
```

```
IF (x > 0) THEN
    y = sqrt(x)
    print, y, "squared = ", x
ELSE
    Print *, 'x has no square root'
ENDIF
```

Last updated: 09/23/2019