

# CHAPTER 11: PROGRAMMING FUNDAMENTALS

## 11.1 PROGRAMMING BASICS

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### 11.1.1 Variables and Constants

#### Variable Declaration:

<TEXT>

```
DECLARE variable : TYPE
```

#### Constant Declaration:

<TEXT>

```
CONSTANT name ← value
```

#### Assignment:

<TEXT>

```
variable ← value
```

### 11.1.2 Input/Output

#### Input:

<TEXT>

```
INPUT variable
```

#### Output:

<TEXT>

```
OUTPUT "message". variable
```

### 11.1.3 Arithmetic Operators

Operator	Description
+	Addition
-	Subtraction
*	Multiplication
/	Division
DIV	Integer division
MOD	Remainder

### 11.1.4 Logical Operators

Operator	Description
AND	Both true
OR	Either true
NOT	Negation

## 11.2 CONSTRUCTS

### 11.2.1 Selection Statements

#### IF Statement:

<TEXT>

```
IF condition THEN
  statements
ELSE
  statements
END IF
```

### **Nested IF:**

**<TEXT>**

```
IF condition1 THEN
  IF condition2 THEN
    statements
  ELSE
    statements
END IF
ELSE
  statements
```

### **CASE Statement:**

**<TEXT>**

```
CASE OF variable
  value1 : statement
  value2 : statement
  OTHERWISE : statement
END CASE
```

## **11.2.2 Loop Structures**

### **Count-Controlled (FOR):**

**<TEXT>**

```
FOR counter ← start TO end
  statements
NEXT counter
```

### **Pre-Condition (WHILE):**

**<TEXT>**

```
WHILE condition
  statements
END WHILE
```

### **Post-Condition (REPEAT):**

**<TEXT>**

REPEAT

statements

UNTIL condition

### Choice of Loop:

- FOR: When number of iterations known
- WHILE: When condition checked before first iteration
- REPEAT: When condition checked after at least one iteration

## 11.3 STRUCTURED PROGRAMMING

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### 11.3.1 Procedures

**Definition:** A reusable block of code that performs a specific task.

#### Declaration:

**<TEXT>**

PROCEDURE name(parameter1, parameter2)

statements

END PROCEDURE

#### Call:

**<TEXT>**

CALL name(argument1, argument2)

#### Parameters:

- Passed by value: Copy of data passed
- Passed by reference: Actual data passed (can be modified)

### 11.3.2 Functions

**Definition:** Returns a value; used in expressions.

#### Declaration:

**<TEXT>**

FUNCTION name(parameter) RETURN type

statements

RETURN value

END FUNCTION

**Use:**

**<TEXT>**

result ← name(arguments)

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