# C Instructions

IN 1101 PROGRAMMING FUNDAMENTALS

# C Instructions

- A program is a set of instructions.
- Different instructions help us achieve different tasks in a program
- Basic types of instructions,
  - Type Declaration Instructions
    - Used to declare the type of variables used in a C program.
  - Arithmetic Instructions
    - Used to perform arithmetic operations on constants and variables.
  - Control Instructions
    - Used to control the sequence of execution of various statements in a C program.

# Type Declaration Instructions

- Type declaration is used to declare the type of variables being used in the program.

E.g. : int num ;

float rs, grosssal ;

char name, code ;

- Any variable used in the program must be declared before using it in any statement.

# Type Declaration Instructions Cont.

- There are several subtle variations of the type declaration instructions.

  - While declaring the type of variable, it can also initialize.

    E.g. int i = 10, j = 25 ;

  - The order in which we define the variables is sometimes important sometimes not.

    int i = 10, j = 25 ; ✓

    int j = 25, i = 10 ; ✓

    float a = 1.5, b = a + 3.1 ; ✓

    float b = a + 3.1, a = 1.5 ; ×

**?** Will these statements work?

1. int a, b, c, d ;

   a = b = c = 10 ;

2. int a = b = c = d = 10 ;

# Arithmetic Instruction

- An arithmetic instruction consists of a variable name on the left hand side of = and variable names and constants on the right hand side of =.
- The variables and constants appearing on the right hand side of = are connected by arithmetic operators like +, -, *, and /.

E.g.: deta = alpha * beta / gamma + 3.2 * 2 / 5 ;

Here,

***, /, -, +** are the arithmetic operators.

**=** is the assignment operator.

2, 5 are integer constants.

3.2 is real constants.

# Integer and Float Conversions

- An arithmetic operation between an integer and integer always yields an integer result.
- An operation between a real and real always yields a real result.
- An operation between an integer and real always yields a real result.

| Operation | Results |
|---|---|
| 5/2 | 2 |
| 5.0/2 | 2.5 |
| 5/2.0 | 2.5 |
| 5.0/2.0 | 2.5 |

# Type Conversion in Assignments

- The variable type of the expressions in left and right side of an assignment operator may not be same.
- In such cases, the value of the expression is promoted or demoted depending on the type of the variable on left hand side of assignment operator.

E.g. : int i ;

float b ;

i = 3.5 ; → What gets stored in I is 3

b = 30 ; → What gets stored in b is 30.0

# Hierarchy of Operations

- Precedence in which the operations in an arithmetic statement are performed is called the hierarchy of operations.

E.g : Does the expression 2 * x - 3 * y correspond to (2x)-(3y) or to 2(x-3y)?

Does A / B * C correspond to A / (B * C) or to (A / B) * C?

| Priority | Operators | Description |
|---|---|---|
| 1 | ++ -- | Increment , Decrement |
| 2 | * / % | Multiplication, Division, Modular division |
| 3 | + - | Addition, Subtraction |
| 4 | = | Assignment |

# Control Instructions

- Control instructions enable us to specify the order in which the various instructions in a program are to be executed by the computer.
- Sequence Control Instructions - Ensures the instructions are executed in the same order in which they appear in the program.
- Decision and Case Control Instructions - Allow the computer to take a decision as to which instruction is to be executed next.
- Loop Control Instructions - Execute a group of statements repeatedly.

# Questions?