SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 20CS101-PROGRAMMING FOR PROBLEM SOLVING

I YEAR /I SEMESTER

Unit 2- C-Programming Basics

Topic 4: Datatypes and Storage Classes

UNITII	C PROGRAMMING BASICS	9

Introduction to ‘C’ Programming –Fundamental rules – Structure of a ‘C’ program – Compilation and Linking processes –Constants, Variables, keywords, Identifier, Delimiters – Declaring and Initializing variables – Data Types – Operators and Expressions –Managing Input and Output operations – Decision Making and Branching –Looping statements – Illustrative programs.

Declaration and Initialization

•**Declaration** of a variable in a computer programming language is a statement used to specify the variable name and its data type. Declaration tells the compiler about the existence of an entity in the program and its location. When you declare a variable, you should also initialize it.

•**Initialization** is the process of assigning a value to the Variable. Every programming language has its own method of initializing the variable. If the value is not assigned to the Variable, then the process is only called a Declaration

Basic Syntax

The basic form of declaring a variable is:

data_type variable_name = value;

All declaration statements must end with a semi-colon (;)

```
int a,b,c;    //declare variables
int z=35;   // Initialize variable.
```

Declaration and Initialization

Rules to Declare and Initialize Variables

1.Variable names must begin with a letter, underscore, non-number character.

2.Always use the '=' sign to initialize a value to the Variable.

3.Do not use a comma with numbers.

4.Once a data type is defined for the variable, then only that type of data can be stored in it. For example, if a variable is declared as Int, then it can only store integer values.

5.A variable name once defined can only be used once in the program. You cannot define it again to store another type of value.

6.If another value is assigned to the variable which already has a value assigned to it before, then the previous value will be overwritten by the new value

Declaration and Initialization

Types of Initialization

Static Initialization –

Dynamic Initialization –

Static Initialization –

In this method, the variable is assigned a value in advance. Here, the values are assigned in the declaration statement. Static Initialization is also known as Explicit Initialization.

ex, int z=35;

Declaration and Initialization

Dynamic Initialization –

In this method, the variable is assigned a value at the run-time. The value is either assigned by the function in the program or by the user at the time of running the program. The value of these variables can be altered every time the program runs.

Dynamic Initialization is also known as Implicit Initialization

```
int speed;
printf("Enter the value of speed");
scanf("%d", &speed);
```

Example C Program

```
#include<stdio.h>
void main( )
{
int a, b, sum;
printf("\nEnter two no: ");
scanf("%d %d", &a, &b);
sum = a + b;
printf("Sum : %d", sum);
}
```

OUTPUT:

Enter two no:5 6

Sum:11

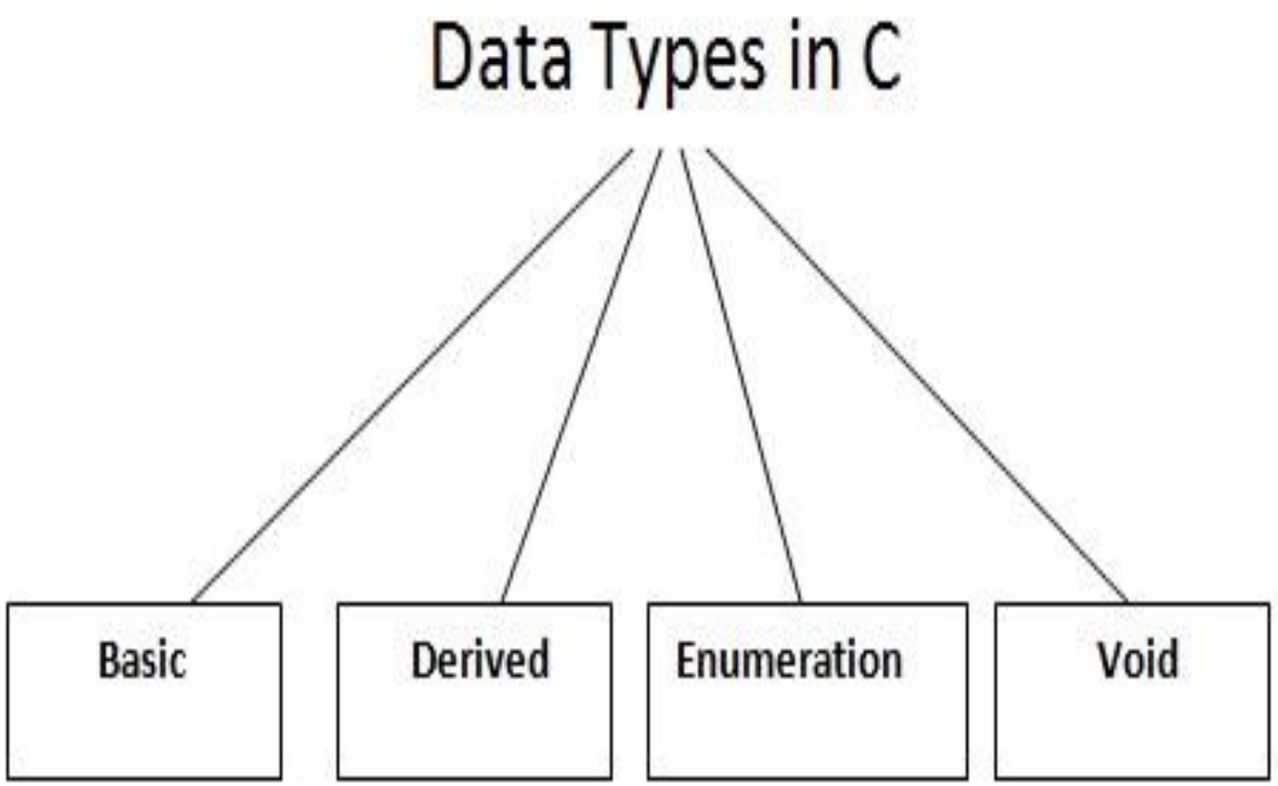
Data Types in C

In C programming, data types are declarations for variables. This determines the type and size of data associated with variables. ie what kind of value is hold by the variable

For example, datatype Variable_name

eg int a

Data Types in C



Conti...

Types	Data Types
Basic Data Type	int, char, float, double
Derived Data Type	array, pointer, structure, union
Enumeration Data Type	enum
Void Data Type	void

Basic Data Types

- The memory size of the basic data types may change according to 32 or 64-bit operating system.
- Let's see the basic data types. Its size is given **according to 32-bit architecture**.

SIGNED AND UNSIGNED

•**Signed** data types can represent **both positive and negative numbers**.
•They use one bit (usually the most significant bit) to indicate the **sign** (positive or negative).

Example:

•A **signed 1-byte (char)** can store values from **-128 to 127**.
•A **signed 4-byte (int)** can store values from **-2,147,483,648 to 2,147,483,647**.

SIGNED AND UNSIGNED

•**Unsigned** data types can represent **only positive numbers (including zero)**.
•They do not have a sign bit, so all bits are used to store the magnitude of the number, effectively doubling the positive range.

Example:
•An **unsigned 1-byte (char)** can store values from **0 to 255**.
•An **unsigned 4-byte (int)** can store values from **0 to 4,294,967,295**.

Data type	Size in bytes	Range
char	1	–128 to 127
unsigned char	1	0 to 255
signed char	1	–128 to 127
int	2	–32768 to 32767
unsigned int	2	0 to 65535
signed int	2	–32768 to 32767
short int	2	–32768 to 32767
unsigned short int	2	0 to 65535
signed short int	2	–32768 to 32767
long int	4	–2147483648 to 2147483647
unsigned long int	4	0 to 4294967295
signed long int	4	–2147483648 to 2147483647
float	4	3.4E–38 to 3.4E+38
double	8	1.7E–308 to 1.7E+308
long double	10	3.4E–4932 to 1.1E+4932

Format Specifier

Data Types	Format Specifier
int	%d
short	%d
long	%ld
char	%c
float	%f
double	%lf
long double	%Lf

Assessment 1

1. What is C Program?

Ans : _____

2. What are all the Features of C Program?

Ans : _____

References

TEXT BOOKS

1.E.Balagurusamy, “Fundamentals of Computing and Computer Programming”, 2nd Edition Tata McGRaw-Hill Publishing Company Limited, (2012). (UNIT – I, II, III, IV, V)

2.Ashok.N.Kamthane,“ Computer Programming”, Pearson Education (India) (2010). (UNIT –II, III IV, V)

3.Reema Thareja, “Programming in C”, 2nd Edition, Oxford University Press,(2015). (UNIT –I,II, III, IV, V)

REFERENCES

1.Byron Gottfried, “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH Publications, (2006). (Unit II, III, IV)

2.Stephan G kochan, “Programming in C” Pearson Education (2008), (UNIT II, III, IV, V)

3.P.Sudharson, “Computer Programming”, RBA Publications (2008), (UNIT I, II, III, IV)

4.Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2014.(Unit II, III, IV, V)

5.Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011. (UNIT – I, II, III, IV, V)

Thank You