SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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 INFORMATION TECHNOLOGY

PROGRAMMING FOR PROBLEM SOLVING

I YEAR

UNIT 2 − C PROGRAMMING BASICS
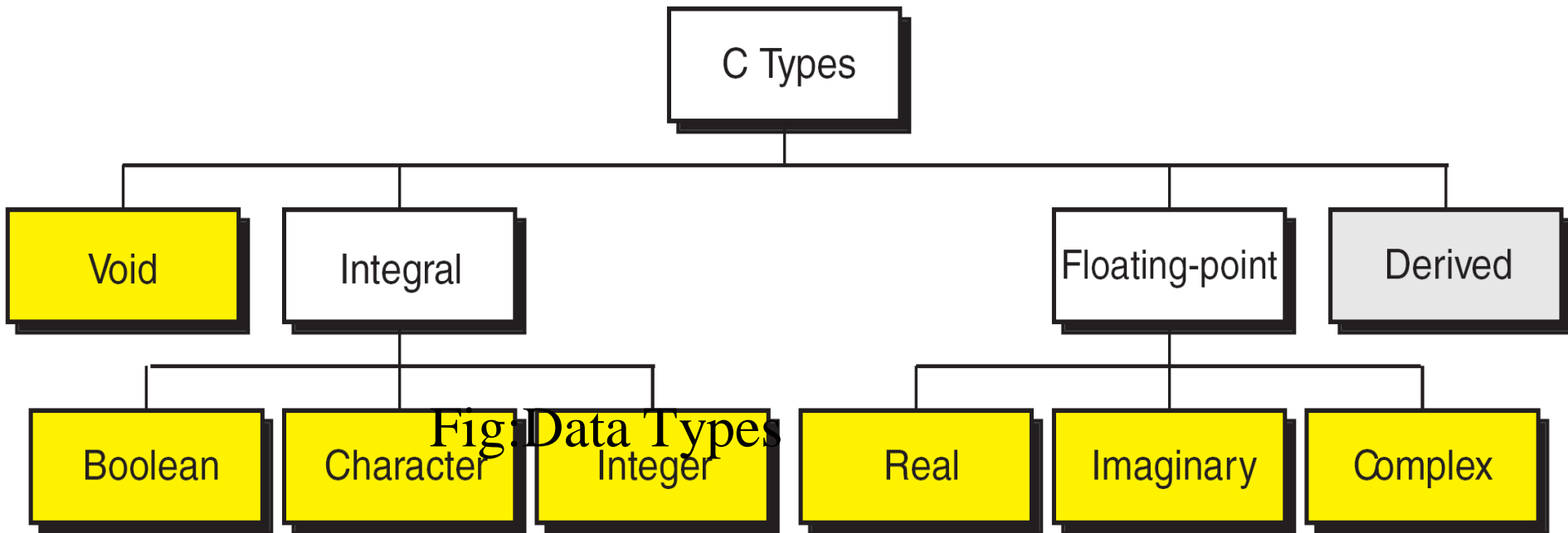
DATA TYPES

DATA TYPES

- A type defines a set of values and a set of operations that can be applied on those values.

    Ex: – Type - light switch
        Values –'ON' or _OFF'
        Operations – _turn on' and _turn off'

Fig:Data Types

Void Type:

- Is identified by the key word _void' and no operations.
- It is used to designate that a function has no parameters.
- It can also be used to define that a function has no return value.

Integral Type:

Boolean:

- Boolean type can represent only two values: *true* or *false*
- Referred by the keyword *Bool*
- Is stored in memory as 0 (false) or 1 (true)

Character:

- A character is any value that can be represented in the computer's alphabet
- It is referred by the keyword *char*
- One byte is used to store *char*. With 8 bits, 256 different values can be possible for the *char* type
- Character can be signed or unsigned.

Integer

- An integer type is a number without a fraction part
- C supports four different sizes of the integer type and is denoted by the keyword   int
  - » short int
  - » int $\text{sizeof (short)} \leq \text{sizeof (int)} \leq \text{sizeof (long)} \leq \text{sizeof (long long)}$
  - » long int
  - » long long int
- Each integer size can be signed or unsigned integer. If the integer is signed, one bit is used for signed(0 is plus, 1 is minus). An unsigned integer can store a positive number that is twice as large as the signed integer of the same size.
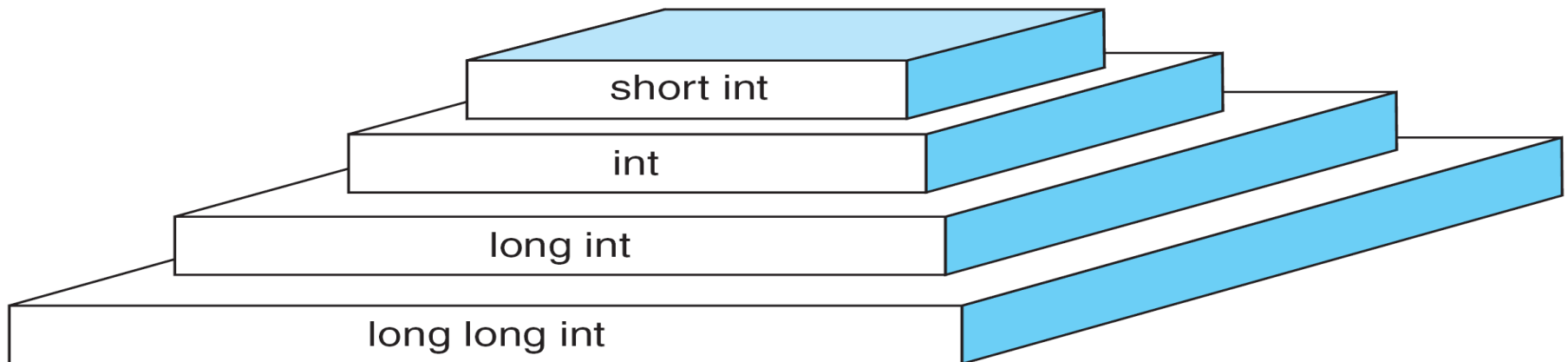
short int

int

long int

long long int

Fig: Integer Types

Floating-point type:

Real

- Real type holds values that consists of integral and fractional part.
- C support types float and double.
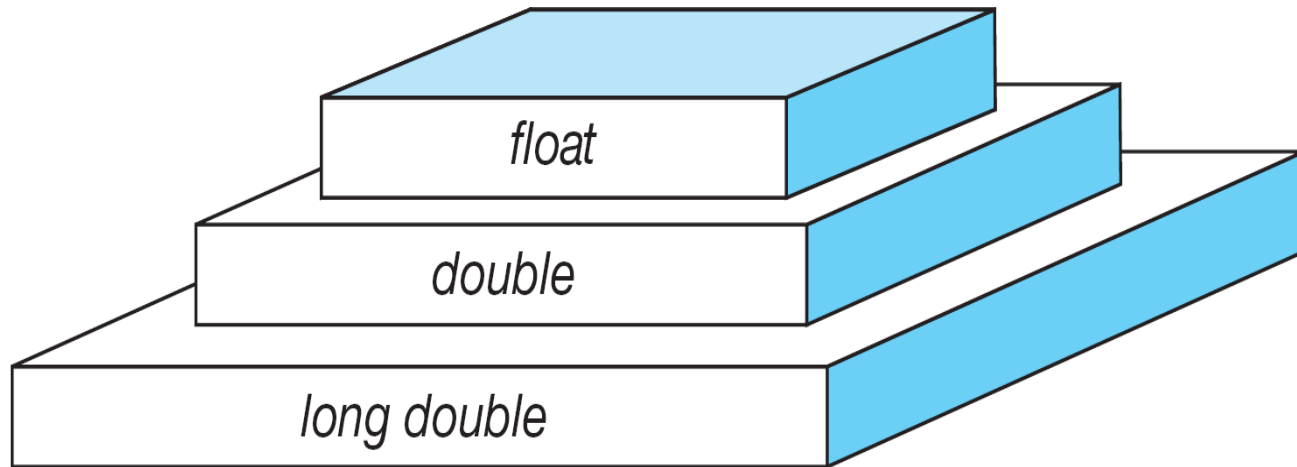- Real type values are always signed.

Fig : Floating-Point Types

sizeof (float) ≤ sizeof (double) ≤ sizeof (long double)

- Data Types

	Data Type	Abbreviation	Size (byte)	Range
char	`char`		**1**	**-128 ~ 127**
	`unsigned char`		**1**	**0 ~ 255**
int	`int`		**2 or 4**	**$-2^{15} \sim 2^{15}\text{-}1$ or $-2^{31} \sim 2^{31}\text{-}1$**
	`unsigned int`	`unsigned`	**2 or 4**	**$0 \sim 65535$ or $0 \sim 2^{32}\text{-}1$**
	`short int`	`short`	**2**	**-32768 ~ 32767**
	`unsigned short int`	`unsigned short`	**2**	**0 ~ 65535**
	`long int`	`long`	**4**	**$-2^{31} \sim 2^{31}\text{-}1$**
	`unsigned long int`	`unsigned long`	**4**	**$0 \sim 2^{32}\text{-}1$**
float			**4**	
double			**8**	

Note: $2^7 = 128$, $2^{15} = 32768$, $2^{31} = 2147483648$

THANK YOU