

Numeric Data Types

Integers :- The most primitive numeric data type is integers.

Specification :-

C has four different integers specification

int, short, long and char

but Maximal and minimal values depends upon the what bit architecture of hardware is basically and in some languages these values represented as defined constants.

Like in Pascal `maxint`

Types of operations on Integers

1) Arithmetic operation :-

It is of basically two types

Binary operation

Unary operation

BinOp : $\text{integer} \times \text{integer} \rightarrow \text{integer}$

UnaryOP : $\text{integer} \rightarrow \text{integer}$

Eg addition(+), Substraction(-)

Multiplication(*), division(/),

remainders(mod)

negative(-), or
identity(+), absolute

Subscribe to our

You Tube Channel

Computer Science Lectures By ER. Deepak Garg

2) Relational Operations:-

Signature is

RelOp : integer x integer \rightarrow Boolean

Where RelOp may be equal, not equal, less than, greater than, less-than-or-equal, greater-than-or-equal

Relational operation compares the values of its two arguments data values and returns a Boolean (True or false value) data object as its result.

3) Assignment Operations:-

Signature

Assignment : integer x integer \rightarrow integer

and

Assignment : integer x integer \rightarrow integer

4) Bit operations:-

In C, integers also plays the role of Boolean values. Therefore additional bit operation are also defined.

Signature:-

BinOp : integer x integer \rightarrow integer

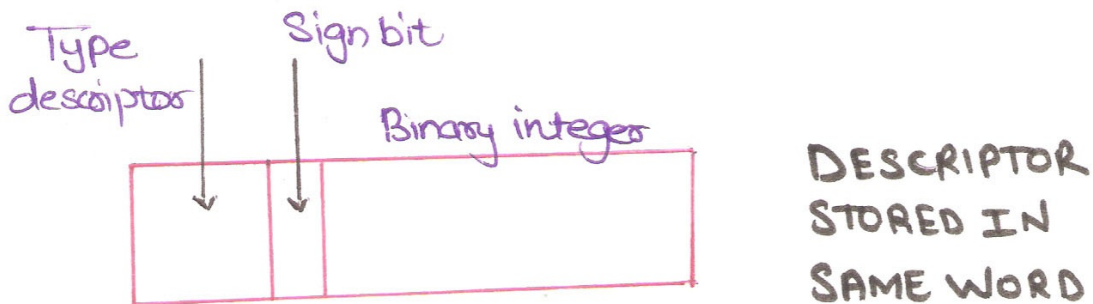
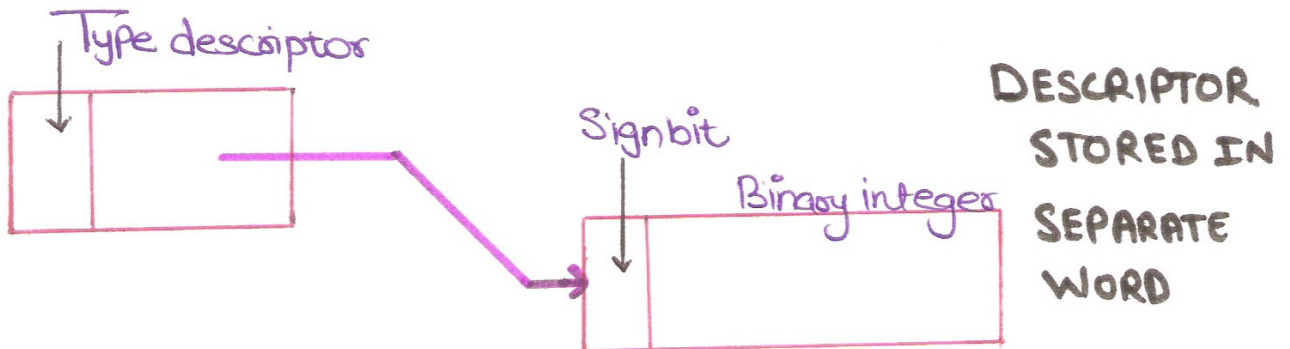
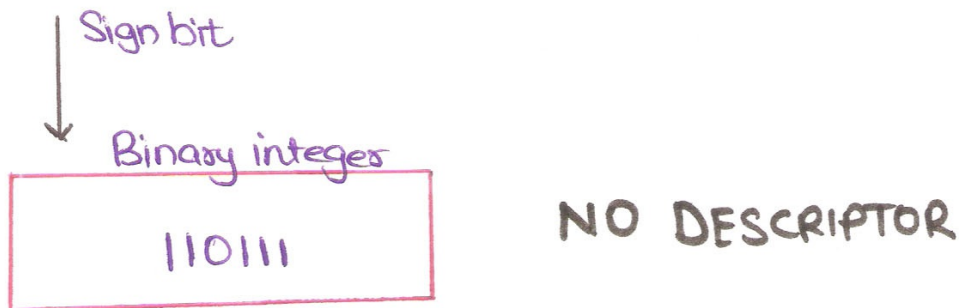
Operator (&) for and the bits together

Operator (|) for or the bits together

Operator (<<) for shift the bit among others.

Implementation of Integer :-

Most often using the hardware-defined integer storage representation and a set of hardware arithmetic and relational operations on integers.



THREE STORAGE REPRESENTATIONS FOR INTEGERS

Subscribe to our

You  **Channel**

Computer Science Lectures By ER. Deepak Garg

Sub Ranges of an Integer

Specification :-

A Subrange of an integer data type is a subtype of the integer data type and consists of a sequence of integer values within some restricted range

Eg

Integers in Range

1 to 10

-500 to 1000

Declaration in Pascal

A: 1..10

Subscribe to our

You Tube Channel

Declaration in ADA

A: integer range 1..10

Implementation :- Its implementation basically has two advantages

(i) Smaller Storage Requirement :- As a smaller range of values,

a subrange value can usually be stored in fewer bits than a general integer value.

2) Better type checking:-

More precise type checking to be performed on the value assigned to that variables

Eg if variable Month is : **Month : 1..12**
then the assignment

Month := 0 is invalid and can be detected at compile time.

If we use assignment

Month : Month + 1

at runtime Compiler checks for range limit that should not be exceeded.

Subscribe to our

You Tube Channel