

- * History
- * Languages
- * Compiled / Interpreted
- * Compilation $\rightarrow .c \rightarrow .obj \rightarrow .exe$
- * runtimes / lib $\rightarrow gcc / mingw$
- * Software / HW / Architecture
- * Data Types $\rightarrow \textcircled{C}$
- * Format Specifiers $\%d, \%f, \%e$
($\%d$ or $\%i$) numbers $\%s$ integer

float $f = 2.5;$ $[a - A = 32]$

o/p $\rightarrow 2.500000$

ASCII values:

$A = 65$ $a = 97$

Table $[a \text{ is ahead of } A \text{ by } 32 \text{ units}]$

$A = 65$

$a = 97$

$B = 66$

$b = 98$

Convert lc to uc $\rightarrow a \rightarrow A$
 $a - 32$

Operators \rightarrow

$a + b = e;$
 $\swarrow \quad \quad \searrow$
 variables operators terminating semicolon
 $\swarrow \quad \quad \searrow$
 operands expression

* Arithmetic Operators: $+, -, /, *, \%$

* Assignment Operators: $=, +=, -=, /=, *=, \%$

\rightarrow Augmented \checkmark

\rightarrow Short-hand \checkmark

$a = a + 2 \checkmark$

$a += 2 \checkmark$

$a = a * 20$

$a * = 20$

$R = 5$

* Logical Operators: $\&\&, ||, !$

$(3 > 4) \&\& (4 > 2) \rightarrow$ Pipe Symbol

$F \&\& T = F$

$!0 \text{ vdi} = \text{challan}$

* Relational / Comparison Operators:

$>, <, >=, <=, ==, !=$

$[\text{Boolean: T/F}]$

* Unary Operators \rightarrow

Prefix / Postfix

Inc / Dec

$++a$ or $a++$
 $--a$ or $a--$
 same line it is given priority
 prefix

* Ternary Operator

\Rightarrow Short-hand if else

operator

\Rightarrow Conditional Operator

$(\text{Condition}) ? \text{true Value} : \text{false Value};$

$cond ? tv : fv;$

* Bitwise Operators \rightarrow

Keyword Symbol

* Bitwise AND $\rightarrow \&$

Ampersand

* " OR $\rightarrow |$

Pipe

* " XOR $\rightarrow \wedge$

Caret

* " Right Shift $\rightarrow >>$

Angular braces

* " Left Shift $\rightarrow <<$

Tilde or Negation

* " Not $\rightarrow \sim$

$7 \& 8$

$0111 \& 1000$

$7 \& 8 = 0$

0111

1000

$0000 = 0$

$5 = 0101$

$6 = 0110$

$5 \& 6 = 0100 = 4$

$10 \rightarrow 1010$
 $3 \rightarrow 0011$
 $10/3 \rightarrow 1011 = 11$

XOR
 $4 \rightarrow 0100$
 $11 \rightarrow 1011$

$\{5-0\}$
 $\{0-1\}$
 1111
 15

Left & Right Bitwise Shift Operations \rightarrow (Bit Masking)

* value = 10 w

* step/unit = 2 w

$\textcircled{11} 10 \ll 2$

$10 \ll 2 = 40$

$10 \gg 2 = 2$

discarded

added

discarded

* Bitwise NOT Operator \rightarrow

$\begin{matrix} 1 & 0 \\ 0 & 1 \end{matrix}$

$\begin{matrix} T & F \\ F & T \end{matrix}$

$5 = 0101$

$\sim 5 = 1010$

$= 10$

-6

$\textcircled{-6} = \text{abs}(-6) = 6$

BIN = 0110

1's com = 1001

+1 = 0001

$1010 = 10$

1's com +1

2's com

negation

Bit NOT of 2

MCQ:

~ 5

a) 10 (TV)

b) 3

c) 2

d) -6 (PV)

General Formula: Bitwise Not (PV)

$\sim n = -n - 1$

$\sim 5 = -5 - 1 = -6$

$\sim (-10) = -(-10) - 1 = 10 - 1 = 9$

\Rightarrow Power of 2 (Use Bitwise) (Hamming Weight)

$4 = 2^2$

0100

2×0011

0000

9×1001

81000

01000

$1 = 2^0$

$16 = 2^4$

10000

15×01111

00000

7×0111

60110

0110

$2 = 8$

1000

7×0111

0000

$3 \times$

0011

20010

0010

AND $(n \& (n-1) == 0)$