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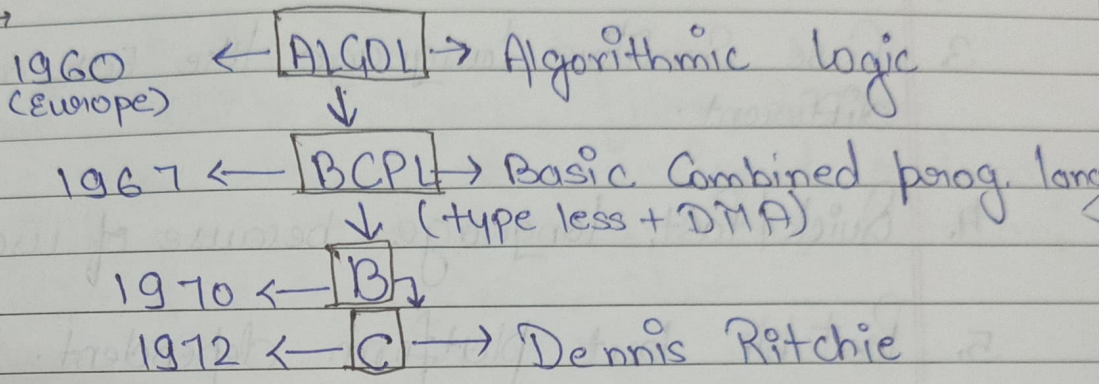
C PROGRAMMING

Developed by Dennis Ritchie at A·T & T Bell Labs (USA) in 1972.

∴ History →



∴ Uses →

1. Mostly used in designing system Software like OS, utilities drivers, libraries, kernal etc.
2. For porogramming Embedded Systems, IOT divices and Gaming.
3. Less frequently used for Application Programming (
4. Serves as a intermediate language for new languages like C++, C#, Java etc.

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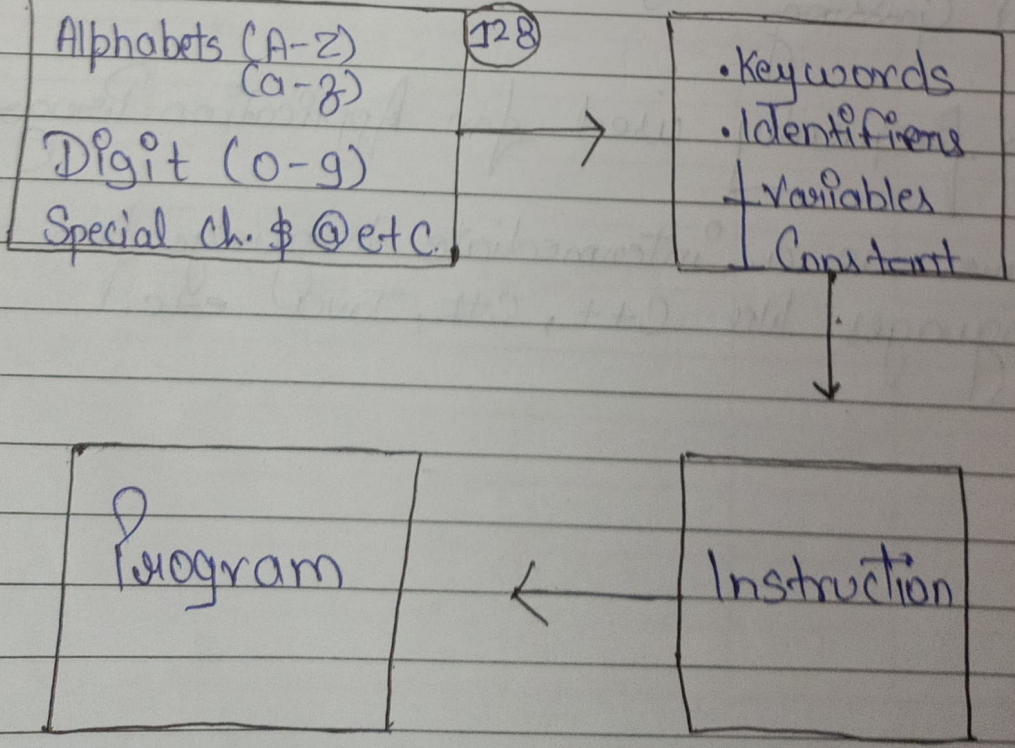
∴ Features / Characteristics :→

1. High level language and hence easy to understand, read, write, debug etc.
2. Small Size language → 32 Keywords.
3. Case Sensitive language like Eat and eat both are different.
4. Quick / fast language because of use of pointer.
5. Portable but platform dependent.
6. Functional language / Procedure / Structured language
7. Extensible language.
8. C is tightly coupled with datatype.

∴ How to learn C ?

⇒ C character Set.



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→ Keyword:

These are reserved words, they convey a specific meaning.

There are 32 keyword

int, long, switch, for, break, void signed, case, while, short, float, double, if, else, goto, default, do, unsigned, return, auto, register, static, volatile, typedef, union, struct, const, extern, char, char.

→ Identifier:

A name given to any object / entity for identification / registration purpose.

∴ Rules for Naming Identifiers -

1.) Alphabets + digit + underscore (_) only as special character → 63
(A-Z) (a-z) (0-9)

2.) Keywords are not allowed.

3.) first character of identifier cannot be a digit.

4.) Spaces are not allowed.

5.) We can have max. upto 32 character length.
(32-64)

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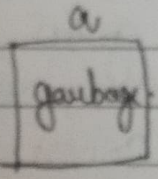
Variable -

Named memory location that can store some value and that value can change time to time

- Variable declaration -

Syntax - datatype variable name1, var. name2;

Example - ① int a;



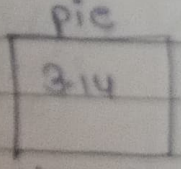
Constant -

Named memory location that store fixed value

- declaration / initialisation -

Syntax - Const datatype Const. name = value;

Example - ① Const float pie = 3.14;



Datatypes in C :

note → 1 bit → 0 (OFF)
1 (ON)
1 Nibble = 4 bits
1 Byte = 8 bits = 2 Nibble
1 KB = 1024 B
1 MB = 1024 KB
1 GB = 1024 MB
1 TB = 1024 GB

note → IECC → Institute of Electrical & Electronics Engineering

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S.no	Datatype	Keyword	Size	Range
1.	Valueless/no type	void	— NA —	— NA —
2.	Character	Char / Signed Char	1B = 8 bits	-2^7 to $+2^7-1$ -128 to +127
		unsigned char	1B	0 to 2^8-1 → 0 to 255
3.	Integer	Short int / Short / Signed Short	2B	-32768 to 32767
		unsigned short	2B	0 to 65535
		unsigned short int		
		int / signed int	2B / 4B	-32768 to 32767 -2^{31} to $-2^{31}-1$
		unsigned int	2B / 4B	0 to 65535 / 0 to $2^{32}-1$
		long int / Signed long int	4B (16 or 32)	-2^{31} to $+2^{31}-1$
		long int / long long int	8B (64)	-2^{63} to $+2^{63}-1$
		unsigned long int	4B / 8B	0 to $2^{31}-1$ / 0 to $2^{64}-1$
		long long int	8B (16-32)	-2^{63} to $+2^{63}-1$
		Signed long long	12B (64)	-2^{96} to $+2^{96}-1$
		unsigned long long	8B	0 to $2^{64}-1$
		long int	12B	0 to $2^{96}-1$
4.	floating point	float	4B	$-3.4E+38$ to $-3.4E-38$ $+3.4E-38$ to $+3.4E+38$
		double	8B	$-1.7E+308$ to $-1.7E-308$ $+1.7E-308$ to $+1.7E+308$
		log double	12B	$-3.4E+4932$ to $-3.4E-4932$ $+3.4E-4932$ to $+3.4E+4932$

ASCII Table:-
(American Standard code for Information Interchange.

- 0 to 47 → Special Character
- 48 to 57 → 0 to 9 digit
- 58 to 64 → Special character
- 65 to 90 → A to Z
- 91 to 96 → Special Character
- 97 to 122 → a to z
- 123 to 127 → Special Character

Decimal to Binary:-

$(65)_{10} \rightarrow (\ )_2$

2	65	
2	32	1
2	16	0
2	8	0
2	4	0
2	2	0
2	1	0
	0	1

$= (1000001)_2$

8 bit = Most sig. bit | Data (7 bits) | Last sig. bit

Sign bit [+ve → 0, -ve → 1

-2^7 to $+2^7 - 1$

-128 to +128 - 1

-128 to +127.

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Comments - (to make the code user friendly)
∴ Compiler will not read the comments only for user.

- Single line Comment -

Syntax → // comment
OR
/* comment */

Eg → // pie is constant
float pie = 3.14, // pie is constat
float A = pie * 3 / * 3 //area of circle
printf ("%.F", A);

- Multi° line Comment -

Syntax → // ---
// ---
// ---

OR

/* ---

--- */

Eg → /* NOD = Name
DO D = 2|10|21
Client = SBI */

Decimal to Hexadecimal -

(315) 10 = ( ) 16

16 → 0-15
0-9
10 → A or a
11 → B or b
12 → C or c
13 → D or d
14 → E or e.
15 → f or f

16	315	
16	19	11
16	1	3
	0	1

13 11
13 B.

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Octal to Hexadecimal -

$(318)_{10} = (\quad)_8$

8	318	
8	39	3
8	4	7
	0	4

473.

$(\overset{2}{4}\overset{1}{7}\overset{0}{3})_8 = (\quad)_{10}$

$\Rightarrow 3*8^2 + 1*8^1 + 7*8^0$

$\Rightarrow 208.$

$(208)_{10} = (\quad)_{16}$

CD.

16	208	
16	12	13 ↑
	0	12 ↑