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Programming in C

✱ Introduction to C.

- 'C' is general purpose, structured programming language, its instructions consist of terms that resemble algebric expressions by certain keywords such as if, for, else, do, while, etc.
- It allow to be used at lower level & hence bridging the gap between machine level language & high level language. Hence it is called mid-level language & allows to be used for system programming & application programming.

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✱ Rules :

1. It includes characters a to z, A to Z, 0 to 9, (_).
2. First character must be alphabets.
3. No space or keywords allowed in identities

eg:

Valid id	Invalid
accounts	1 salary
ACCOUNTS_1	accounts 0
Salary	Salary @ dec.
Sal_dec	

✱ Keywords :

It is also called as reserved word. They are reserved for particular action i.e, they have pre defined meaning in C. These keywords can be used only for their intended purpose.

- They cannot be used as programmer defined identifiers.

conio.h → console input output header file
Comment line or statement line is for user not for computer (It is not executable).

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- Following are the Standard keywords in C.

auto	breaks	case	char
const	continue	default	do
doubt	else	enum	extern
float	for	goto	if
int	long	register	return
short	signed	sized	static
struct	switch	type def	union
unsigned	void	volatile	while.

Simple C Program :

```
/* First demo program of C */ ← comment line.
# include <stdio.h>
# include <conio.h>
  main ()   /* def^n of main function is program */
{
  int sum;
    Sum = 10 + 20;
    printf ("Sum = %d", sum);
    getch ()
}
```

- This is a very simple program.
- The 1st line of program is comment line always included in pair of /* ..... */.
- The 2nd line uses # include as a complier directive and instruct the complier to take some necessary action for input output handling.

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- The 3rd line uses # include conio to direct the complier input output for console (Keyboard & monitor).
- 4th line uses special word main which denotes the starting point for execution of program.
- The complete program must be enclosed in pair of braces {}.
- Each statement in the program must appear on seperat line & must end with semi-comma (;).
- The statement inside the braces are part of main & executed one by one from top to bottom.

- intsum ; → declares the identifier sum as integer type.
- Sum = 10+20; → It calculates addition of 10 & 20 & assign the result to the identifier sum.
- printf ("Sum = %d", sum); → It is an output statement & used to display an message on the screen or value of the identifier.
  Here it display the string "sum =" & the value 30 on the monitor.
- getch () → is a readymade function to take a characters from the user.

* Entering & executing the program :

1. Enter the program into the computer with the help of editor for that click on turbo C icon on desktop.
2. On editor screen type C program
3. Save program with F2 or save as option from file menu
4. jaju_1
5. Compile the program with F9 or compile option from me
6. Run program from run menu by pressing F10.
7. You get output.

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★ Steps to run C program :

1. Click on turbo C icon on desktop.
2. C edition get open.
3. Select New from file menu.
4. Type your C program.
5. Save program by save as from file menu.
6. Give file name without space.
7. Compile the program by pressing F9 key.
8. After getting message successful press F10 key.
9. Select run option from menu.
10. Run the program.
11. Press Alt + F5 to see output.
12. If error edit the program & again compile.

```
/* Sample program to display your name */
# include <stdio.h>
# include <conio.h>
void main ()
{
  printf ("Hello Welcome");
  printf ("\n My name is Dayanand");
  printf ("\n I am in BCS I");
}
```

Output :

```
Hello Welcome
My name is Dayanand
I am in BCS I.
```

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★ Data Types :

C supports several different types of data each of which may be represented differently within the compute memory.
The basic datatypes are listed below :

	Data types	Discription	Memory Requiremen
1.	int	Integer quantity	2byte (−32768 to +32767)
2.	long int	Integer quantity	4 byte
3.	float	floating point no. (or) fractional no.	4byte.
4.	Double	double precision floating point no.	8 byte
5.	Char.	Single character	1 byte.

★ Constant :

There are 4 basic types of constant. They are.

1. Integer Constant :
   → It is an integer value number.
   → It is sequence of digits which are combination of 0 to 9 digits.
   → It does not allow comma or space b/w the digits.
   → Some valid integers are 0, -179, 420.

2. Octal integer constant :
→ Its 1st digit must be '0'.
eg: 045, 0657.

3. Hexadecimal Integer Constant represented as
Eg: 0X4A7, 0X45, 0XAB5.

4. floating point constant:
The no. which content decimal point or exponent are called floating point constant.
Eg: 0 ; 1.0 ; 100.99 ; 16E+7 ; 82.7.3072 ;
Invalid no : 1 ; 1000 ; 1,000.10 ; 3E10

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5. Character Constant :
It is single character encloses in single quotation mark (' ').
Eg: 'A', 'x', '@', '8'.
Character constant have integer value that are determined by computers particular character set (generally used ASCII or EBCDIC).
for eg:

Character	ASCII.
'A'	65.
'x'	120
Space → ' '	32.

These integer values get ~~connecte~~ converted into binary value for computer processing in the 8 bit form.
$2^8 = 256$.

6. String Constant :
It consist of any no. of consecutive character including space or blank, enclosed in double quotation mark.
Eg: "Dayanand College"
"I am fine!"

★ Escape Sequence :
There are certain non-printing be characters as well as the back slash (\) & (') can be expressed in term of escape sequence.
following are commonly used escape sequence.

Character	Escape seq.	ASCII
bell char.	\a	007
blank space	\b	008
new line	\n	
tab	\t	
apostrope	\'	
back slash	\\	

★ Variable & arrays :
Variable is an identifier used to represent some specified type of information within a designated portion of program.
The data item must be assigned to a variable at some point in program.
A data item can than be accessed later in the program simply by referring to variable name.
for eg: a = 3 ; b = 5 ; c = a + b.
Here a, b, c are variable which hold the values 3, 5 & 8 resp. A given variable can be assign different data items at various places within the program.

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★ Declaration :

A declaration associates a group of variable with specific data type. All variables must be declare before they can appear in executable statement. A declaration consist of data type followed by one or more variable name, ending with semi-colon (;)

for eg: Variable name

int → a b c

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★ Expressions :

An expression represents a single data item, such as a no. or a character. The expression may consist of single entity, such as constant, variable, array element or reference to a function or combination of all these.

These all are interconnected by one of more operators.

for eg : c = a+b

x = y

x = y+5-c.

★ Statement :

A statement causes a computer to carry out some action. There are 3 different classes of statements. They are expression statements, compound statement & control statement.

An expression statement consist of a expression followed by an semicolon. During the execution an expression statement causes the expression to be evaluated.

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Compound statement consist of several individual stateme enclosed with a pair of braces.

The individual statement may themselves be expression statement, compound statement or control statement.

```
{
  pi = 3.14;
  area = 3.14 * r * r;
  circum = 2 * 3.14 * r;
  printf ("%f", area); printf ("%d", a);
  printf (" circumference = %f", circum);
}
```

Control statement are used to create special program features such as logical test, loops & branches.

Many contrd statement require that other statement be embedded within them as illustrated in the following example.

```
while (count <5)
{
  printf ("count = %d", count);
  count = count + 1;
}
```

★ Symbolic Constant :

A symbolic constant is name that substitutes for a sequence of characters.

The characters may be present numeric constant,

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character constant or string constant.
They are usually defined at a beginning of the program.
for eg: # define pi = 3.14

Q. Which character comprise the C character set?
Q. What are keywords in C & what restriction is applied to their use?
Q. Write a special rule to define an identifiers.
Q. Name & describe the 4 data type qualifiers with their examples.

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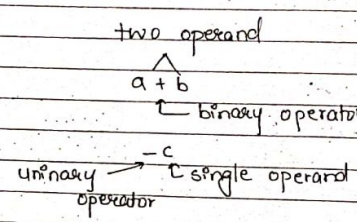
Operators and Expressions

- Operators and a special symbol which operate on data items called operanand.
- Some operators require 2 operand & they are called binary operators.
  for eg: + operator : Requires 2 operanant to make the addition.
- Some operator act upon only one operant are called uninary operator.
  for eg: - (negation symbol) operate on single operand.



- C language includes a large no of operators which fall into several different categories, they are
  i) Arithematic Operators:

operator	Purpose
+	Addition
-	Substraction
*	Multiplication
/	Division → gives quotent.
%	remainder after integer division also called as modulus operator.