

C Programming Notes

1) History and Evolution of C Programming

C language was developed by Dennis Ritchie in the early 1970s at Bell Laboratories. It evolved from B and BCPL languages to develop the UNIX operating system. C is efficient, portable, and flexible. It influenced many modern languages like C++, Java, and C#. It is still used in operating systems, embedded systems, and system software, known as the 'mother of all programming languages.'

2) Installing C Compiler and IDE

To install GCC: On Windows, install MinGW/TDM-GCC and add to PATH. On Linux/macOS, use 'sudo apt install gcc' or 'brew install gcc'. IDEs: Dev C++, Code::Blocks, and VS Code can be used for writing and running C programs.

3) Basic Structure of a C Program

Example:

```
#include  
int main() { int a=10,b=20; int sum=a+b; printf('Sum=%d',sum); return 0; }  
Includes headers, main function, comments, data types, and variables.
```

4) Types of Operators

Arithmetic (+,-,*./,%); Relational (==,!>,<,>=,<=); Logical (&&,||,!); Assignment (=,+=,-=); Increment/Decrement (++,-); Bitwise (&,|,^,<<,>>); Conditional (?):

5) Decision-Making Statements

if, if-else, nested if-else, and switch are used for decision-making. Example:
if(a>b) printf('A greater'); else printf('B greater');

6) Loops in C

while, for, and do-while loops repeat code. while checks before loop, do-while checks after, and for is used when count is known.

7) break, continue, goto

break exits loop, continue skips iteration, and goto jumps to labeled code section.

8) Functions in C

Functions have declaration, definition, and call. Example:
int add(int a,int b){return a+b;} int result=add(5,10);

9) Arrays

Used to store multiple same-type values. Example: int marks[5]={50,60,70,80,90};
Multi-dimensional: int matrix[2][3]={{1,2,3},{4,5,6}}.

10) Pointers

Store address of another variable. Example: int a=10; int *p=&a; printf('%d', *p); Important for memory management and functions.

11) String Handling Functions

strlen() length, strcpy() copy, strcat() join, strcmp() compare, strchr() find character.

12) Structures

Group different data types. Example: struct Student{int roll; char name[50]; float marks;}; struct Student s1={1,'Manan',85.5}; printf('%s',s1.name);

13) File Handling

Used to read/write files. Example:

FILE *fp; fp=fopen('data.txt','w'); fprintf(fp,'Hello'); fclose(fp); Modes: 'r', 'w', 'a' for read, write, append.