

C Language Complete Notes

SEO Meta Description

C Language complete notes in Hindi and English for students and beginners. Learn C programming basics, syntax, variables, loops, functions, arrays, pointers, structures, file handling, MCQs, revision notes, FAQs, and examples.

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C Language Notes

Introduction

C Language दुनिया की सबसे लोकप्रिय programming languages में से एक है। इसका उपयोग operating systems, embedded systems, compilers, databases, networking software और hardware level programming में किया जाता है।

C language को 1972 में Dennis Ritchie ने Bell Labs में विकसित किया था। यह एक procedural और structured programming language है।

आज भी C language का उपयोग modern programming की foundation के रूप में किया जाता है। C सीखने के बाद C++, Java, Python जैसी languages समझना आसान हो जाता है।

Definition of C Language

C Language एक general-purpose, procedural और structured programming language है जिसका उपयोग efficient और fast software development के लिए किया जाता है।

Features of C Language

- Fast execution
- Structured programming support
- Portable language
- Rich standard library

- Hardware access support
 - Low level memory handling
 - Efficient compiler support
 - Modular programming
 - Easy syntax
 - Powerful pointer system
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History of C Language

Year	Development
1967	BCPL language developed
1970	B language developed
1972	C language developed by Dennis Ritchie
1989	ANSI C standard
1999	C99 standard
2011	C11 standard

Applications of C Language

Operating Systems

Linux, UNIX जैसे operating systems C में लिखे गए हैं ।

Embedded Systems

Smart TVs, microwaves, washing machines, robots आदि embedded devices में C का उपयोग होता है ।

Database Systems

MySQL जैसी database technologies में C का उपयोग किया जाता है ।

Game Development

Game engines और graphics software में C का उपयोग होता है ।

Compilers

Programming language compilers बनाने में C महत्वपूर्ण है ।

Networking

Routers, network tools और protocol software में C language का उपयोग होता है ।

Structure of a C Program

```
#include <stdio.h>

int main() {
    printf("Hello World");
    return 0;
}
```

Explanation

Part	Purpose
#include	Header file include करता है
main()	Program execution start point
printf()	Output display करता है
return 0	Successful execution

Tokens in C Language

C program के smallest elements को tokens कहा जाता है ।

Types of Tokens

- Keywords
 - Identifiers
 - Constants
 - Strings
 - Operators
 - Symbols
-

Keywords in C

कुछ important keywords:

- int

- float
- char
- if
- else
- while
- for
- return
- break
- continue
- switch
- case

Variables in C

Variable memory location का नाम होता है ।

Example

```
int age = 20;
```

Rules for Variables

- Variable name number से शुरू नहीं होना चाहिए
- Spaces allowed नहीं होते
- Special symbols allowed नहीं होते
- Keywords variable names नहीं हो सकते

Data Types in C

Data Type	Description	Example
int	Integer values	10
float	Decimal values	12.5
char	Single character	'A'
double	Large decimal values	45.987

Input and Output Functions

printf()

Output display करने के लिए ।

```
printf("Hello");
```

scanf()

Input लेने के लिए ।

```
scanf("%d", &num);
```

Operators in C

Arithmetic Operators

Operator	Meaning
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus

Relational Operators

Operator	Meaning
==	Equal
!=	Not equal
>	Greater than
<	Less than

Logical Operators

Operator	Meaning
&&	AND
!	NOT

Decision Making Statements

if Statement

```
if(a > b) {  
    printf("A is greater");  
}
```

if-else

```
if(a > b)  
    printf("A");  
else  
    printf("B");
```

switch Statement

```
switch(choice) {  
    case 1:  
        printf("One");  
        break;  
}
```

Loops in C

for Loop

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

while Loop

```
while(i<=5) {  
    i++;  
}
```

do while Loop

```
do {  
    i++;  
} while(i<=5);
```

Functions in C

Functions reusable blocks होते हैं।

Example

```
void display() {  
    printf("Hello");  
}
```

Advantages

- Code reuse
- Easy debugging
- Modular programming
- Better readability

Arrays in C

Array similar type data का collection होता है।

Example

```
int arr[5] = {1,2,3,4,5};
```

Strings in C

Character arrays को string कहा जाता है ।

```
char name[] = "Rajendra";
```

Pointers in C

Pointer memory address store करता है ।

Example

```
int x = 10;  
int *p = &x;
```

Advantages of Pointers

- Dynamic memory allocation
 - Fast execution
 - Efficient array handling
 - Hardware level programming
-

Structures in C

Structure different data types को एक साथ store करता है ।

Example

```
struct Student {  
    int roll;  
    char name[20];  
};
```

File Handling in C

C language files create, read और write कर सकती है ।

File Functions

Function	Purpose
fopen()	Open file
fclose()	Close file
fprintf()	Write data
fscanf()	Read data

Dynamic Memory Allocation

Functions:

- malloc()
 - calloc()
 - realloc()
 - free()
-

Advantages of C Language

- Fast performance
 - Small memory usage
 - Portable
 - Efficient
 - Hardware interaction possible
 - Widely used
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Disadvantages of C Language

- No built-in OOP
 - Manual memory management
 - No automatic garbage collection
 - Security issues possible
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Comparison: C vs C++ vs Python

Feature	C	C++	Python
Speed	Very Fast	Fast	Moderate

Feature	C	C++	Python
OOP	No	Yes	Yes
Syntax	Medium	Complex	Easy
Hardware Access	Excellent	Good	Limited
Usage	System Programming	Software Development	AI/Web

Human Brain Comparison

जिस प्रकार मानव मस्तिष्क instructions को process करके निर्णय लेता है, उसी प्रकार C program compiler के माध्यम से instructions execute करता है।

Variables memory की तरह कार्य करते हैं और conditions मानव decision making की तरह कार्य करती हैं।

Memory Tricks

Remember Data Types

"I Float Carefully Daily"

- I = int
- Float = float
- Carefully = char
- Daily = double

Loop Trick

"For known loops, While unknown loops"

Important Exam Points

- Dennis Ritchie developed C language
 - C developed in 1972
 - main() is entry point
 - printf() for output
 - scanf() for input
 - Pointer stores address
 - Array stores multiple values
 - Structure stores mixed data types
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Revision Notes

Quick Revision

- C is procedural language
 - C supports structured programming
 - Compiler converts source code to machine code
 - Loops reduce repetitive work
 - Functions improve modularity
 - Pointers improve memory handling
 - Arrays store multiple values
 - Strings are character arrays
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MCQ Section

Multiple Choice Questions

1. Who developed C language?
2. Dennis Ritchie
3. James Gosling
4. Guido van Rossum
5. Bjarne Stroustrup

Answer: Dennis Ritchie

1. Which function is the entry point of C program?
2. start()
3. execute()
4. main()
5. run()

Answer: main()

1. Which symbol is used before header files?
2. @
- 3.
4. \$
5. &

Answer: #

1. Which function is used for output?
2. scanf()
3. input()
4. printf()
5. cin

Answer: printf()

1. Which data type stores decimal values?
2. int
3. char
4. float
5. short

Answer: float

1. Which operator is used for logical AND?
2. &&
3. ||
4. !
5. ==

Answer: &&

1. Which loop executes at least once?
2. for
3. while
4. do while
5. none

Answer: do while

1. Which symbol is used for address operator?
2. *
3. &
- 4.
5. @

Answer: &

1. Which keyword is used to return value?
2. stop
3. end
4. return
5. finish

Answer: return

1. Which feature makes C fast?
 - Compiler
 - Low-level access
 - Efficient memory usage
 - All of these

Answer: All of these

FAQ Section

What is C language?

C is a general-purpose programming language used for system and application programming.

Is C language easy?

Yes, beginners can learn C step-by-step.

Why is C called mother language?

Because many modern languages are influenced by C.

Is C still used today?

Yes, C is widely used in embedded systems and operating systems.

Can I build apps using C?

Yes, many software applications can be developed using C.

Is C useful for hacking and cybersecurity?

C helps understand low-level systems and security concepts.

Which compiler is used for C?

GCC and Turbo C are commonly used.

What is pointer?

Pointer stores memory address.

Related Topics

- Introduction to Programming
 - Algorithms and Flowcharts
 - Data Types in C
 - Operators in C
 - Loops in C
 - Functions in C
 - Arrays in C
 - Pointers in C
 - Structures in C
 - File Handling in C
 - Dynamic Memory Allocation
 - C++ Language
 - Compiler Design
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Suggested SVG Diagram Idea

- Flowchart of C Program Compilation Process
 - Memory Layout Diagram
 - Pointer Address Diagram
 - Loop Working Flowchart
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