

Overview of C

INTRODUCTION TO C LANGUAGE

C is a general-purpose programming language that is closely related to how computer machines work. Although often considered difficult to learn, C is actually a simple language with vast capabilities.

Here are some key points to note in C:

- **Case-sensitive:** C distinguishes between uppercase and lowercase letters. For example, `printf` and `Printf` are two different things.
- **Space-insensitive:** Separators such as spaces, tabs, or new lines do not affect the program.
- **Semicolon:** Every statement must end with a semicolon (`;`).
- **Multiple Statements:** Several statements can be written on the same line.

SIMPLE C PROGRAM: PRINTING A LINE OF TEXT

The simplest C program is a program that prints text. Here is an example:

```
#include <stdio.h>

int main() {
    printf("Hello, World!\n");
    return 0;
}
```

Output:

```
Hello, World!
```

Parts of the Program

1. Comment:

- Single-line comments use `//`, while multi-line comments use `/* ... */`.

```
// This is a single-line comment
/*
  This is a
  multi-line comment
*/
```

2. Header File:

- Header files like `stdio.h` are required to use functions such as `printf()` or `scanf()`.

```
#include <stdio.h>
```

3. Main Function:

- The `main()` function is the program's entry point.
- `int main()` indicates that the function returns an integer (0 for success, 1 or more for failure).

```
int main() {
  // Program code
  return 0; // Indicates successful program execution
}
```

4. The `printf()` Function:

- This function is used to print output to the screen.
- `\n` is an escape sequence meaning newline (new row).

```
printf("Hello, World!\n");
```

VARIABLES AND DATA TYPES

Variables are "containers" for storing values. The data type determines the kind of value that can be stored in a variable.

Types of Data in C

1. **int** - For integer values.

```
int number1; // Variable without initialization (random value)
int number2 = 20; // Variable initialized with value 20
```

2. **float** - For decimal values.

```
float decimal = 3.14;
```

3. **char** - For storing a single character.

```
char letter = 'A';
```

Here is a complete diagram of data types in C:

All text found or type unknown

Naming Variables

- Variable names must start with a letter or an underscore (`_`).
- Spaces or punctuation marks (such as `?`, `!`, etc.) are not allowed.
- Case-sensitive: `name` and `Name` are different variables.

Example:

```
int age = 20; // Valid
float height = 170; // Valid
char initial = 'A'; // Valid
int ageOfFather = 45; // Valid

int 2age = 20; // Invalid (cannot start with a number)
```

Complete Example

Here is an example program using variables and data types:

```
#include <stdio.h>
```

```
int main() {  
    int age = 25;  
    float height = 170.5;  
    char initial = 'A';  
  
    printf("Age: %d years\n", age);  
    printf("Height: %.2f cm\n", height);  
    printf("Initial: %c\n", initial);  
  
    return 0;  
}
```

Output:

```
Age: 25 years  
Height: 170.50 cm  
Initial: A
```

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