C Programming Basics

Chapter 1: Introduction to C

C is a powerful, general-purpose programming language. It was developed by Dennis Ritchie in 1972 at Bell Labs. C is known for its speed and efficiency and is widely used in system programming and embedded systems.

Chapter 2: Structure of a C Program

A basic C program consists of the following structure:

```
#include <stdio.h>
int main() {
   printf("Hello, World!");
   return 0;
}
```

The program starts with a header file, followed by the main function, and ends with a return statement.

Chapter 3: Variables

Variables are used to store data in a program. They must be declared before use.

Example:

int number = 10;

float price = 99.99;

Chapter 4: Data Types

C supports several basic data types:

- int: for integers
- float: for floating-point numbers
- char: for characters
- double: for large floating-point numbers

Chapter 5: Operators

C uses operators to perform operations:

- Arithmetic: +, -, *, /, %
- Relational: ==, !=, >, <, >=, <=
- Logical: &&, ||, !

Chapter 6: Conditional Statements

if-else statements are used to make decisions in a program.

Example:

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

Chapter 7: Loops

C provides three types of loops:

- for loop
- while loop
- do-while loop

Example:

```
for (int i = 0; i < 5; i++) {
   printf("%d\n", i);
}
```

This loop will print numbers 0 to 4.

Chapter 8: Conclusion

C is a foundation language that is essential for learning advanced programming concepts. It is fast, efficient, and forms the base for many modern languages.