

Preprocessor & qualifiers

C Reference

Preprocessor, const, static, enum

The preprocessor 预处理器 runs before compiling. **#define** makes a macro 宏 — plain text replaced everywhere. **const** makes a constant 常量 that cannot change. **static** inside a function keeps a variable's value between calls. An **enum** (enumeration 枚举) names a set of integers starting at 0.

```
#include <stdio.h>

#define MAX 100                // macro: text replaced before
↪  compiling

enum Color { RED, GREEN, BLUE }; // named integers 0, 1, 2

int next_id(void) {
    static int count = 0;       // keeps its value between calls
    count++;
    return count;
}

int main(void) {
    const double PI = 3.14;     // cannot be changed
    printf("%d %.2f\n", MAX, PI); // 100 3.14
    printf("%d %d %d\n", RED, GREEN, BLUE); // 0 1 2
    int a = next_id();
    int b = next_id();
    printf("%d %d\n", a, b);    // 1 2
    return 0;
}
```

Bigger programs split across files: declarations go in a header 头文件 file (**mine.h**), included with **#include "mine.h"** — quotes mean your own file, **< >** means the standard library. An include guard (**#ifndef MINE_H / #define MINE_H / #endif**) stops a header being included twice.

Common mistakes

- **#define** does plain text replacement with no type checking; wrap macro bodies and arguments in parentheses.
- A **const** value cannot be changed after it is set.

- A **static** local variable keeps its value between calls to the function.

#define	const	enum	static
text macro	cannot change	named int list	keeps value between calls

Exam tip: preprocessor runs first; enum values start at 0 unless set

#define, const, enum, and static keep code clear