

HW01-6 Makefile

This program needs 2 files:

1. hw01-6.c
2. Makefile

This Makefile is a script used for automating the compilation and testing of a C program. Makefiles primarily automate common tasks such as compiling and cleaning by defining a series of "rules". Tasks like compilation, testing, and cleaning are defined in the Makefile.

Basic Components

Variable Definitions:

- WARNING, ERROR, GCC: These are variable definitions used to store compiler flags. These flags are passed to the gcc command to control the compilation process. For example, -Wall and -Wshadow are used for enabling all warnings and shadow warnings, while -Wvla and -Werror treat all warnings as errors.

Targets:

- build, test1, test2, clean: These are the rules defined in the Makefile. Each rule has a target name (like build or test1), dependencies (listed after the colon), and a series of commands to execute.

Explanation of Each Rule

build:

- Compiles the hw01-6.c file to produce the executable hw01-6. Uses the compiler flags defined in the GCC variable.

test1 and test2:

- These rules are used for running tests. They first depend on the build rule to ensure the program is compiled.
- Executes the hw01-6 program with two numbers as input (like 4 5 or 987 321) and redirects the output to output1 or output2 files.
- Compares the program's output with the expected results (stored in expected/expected1 or expected/expected2) using the diff command.

clean:

- This rule is used for cleaning up: it removes all files generated by the compilation process, such as executable and output files.

Summary

hw01-6.c is a simple addition program that takes two numbers as input and outputs their sum. The Makefile automates the process of compiling this program, running test cases, and comparing them with expected results, thereby helping to verify the correctness of the program. This approach enhances development efficiency, especially when making frequent modifications and tests. Tests can be easily run with `make test1` or `make test2`, and `make clean` can clean up all generated files.