

## 问题解答

### 1) 理解基础设施

$500 \times 90\% \times 30 \times 20 = 270000s = 75h$

一学期将要花费 75 个小时的时间在调试上。

$500 \times 90\% \times 20 \times 20 = 180000s = 50h$

一学期可以节省 50 个小时调试的时间。

### 2) 查阅 i386 手册

CF 为进位标志位。

ModR/M 字节对于不定长指令用于指定操作的寄存器号和内存。

mov 指令 eg: 88 01

88 位 opcode 指定指令为 mov 指令, 01 位 ModR/M 字节 00000001, Mod=00

指定 1 字节, Reg=000 即 eax/ax/al, R/M=001 即 ecx, 最后的指令即为

mov ecx, al

### 3) shell 命令

执行 `find . "(" -name "*.h" -or -name "*.c" ")" -print | xargs wc -l` 指令, 即可统计代码总行数, 统计结果如下:

```
306 ./tools/qemu-diff/src/protocol.c
121 ./tools/qemu-diff/src/diff-test.c
48 ./include/debug.h
8 ./include/monitor/expr.h
9 ./include/monitor/monitor.h
20 ./include/monitor/watchpoint.h
82 ./include/memory/mmu.h
18 ./include/memory/memory.h
21 ./include/util/c_op.h
73 ./include/cpu/reg.h
16 ./include/cpu/cc.h
212 ./include/cpu/rtl.h
27 ./include/cpu/relop.h
41 ./include/cpu/exec.h
40 ./include/cpu/rtl-wrapper.h
116 ./include/cpu/decode.h
13 ./include/macro.h
35 ./include/common.h
8 ./include/nemu.h
14 ./include/device/mmio.h
10 ./include/device/port-io.h
31 ./src/misc/logo.c
141 ./src/monitor/monitor.c
66 ./src/monitor/cpu-exec.c
23 ./src/monitor/diff-test/ref.c
6 ./src/monitor/diff-test/diff-test.h
75 ./src/monitor/diff-test/diff-test.c
77 ./src/monitor/debug/watchpoint.c
253 ./src/monitor/debug/ui.c
321 ./src/monitor/debug/expr.c
28 ./src/memory/memory.c
43 ./src/cpu/reg.c
330 ./src/cpu/decode/decode.c
114 ./src/cpu/decode/modrm.c
76 ./src/cpu/exec/data-mov.c
216 ./src/cpu/exec/arith.c
8 ./src/cpu/exec/all-instr.h
254 ./src/cpu/exec/exec.c
62 ./src/cpu/exec/logic.c
9 ./src/cpu/exec/prefix.c
62 ./src/cpu/exec/system.c
49 ./src/cpu/exec/special.c
44 ./src/cpu/exec/control.c
32 ./src/cpu/exec/cc.c
20 ./src/cpu/exec/relop.c
13 ./src/cpu/intr.c
12 ./src/main.c
28 ./src/device/serial.c
28 ./src/device/timer.c
63 ./src/device/keyboard.c
87 ./src/device/io/port-io.c
74 ./src/device/io/mmio.c
102 ./src/device/device.c
40 ./src/device/vga.c
4247 total
```

和统计代码工具包统计结果基本一致

```
ladlod ~/H/c/i/nemu (pa1)> sloc _  
  
----- Result -----  
  
      Physical : 4248  
      Source : 3227  
      Comment : 525  
Single-line comment : 192  
      Block comment : 333  
      Mixed : 241  
Empty block comment : 0  
      Empty : 737  
      To Do : 62  
  
Number of files read : 58  
-----
```