

# tiny编译器使用

Subtitle

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计算阶乘tiny源码：

```
{ Sample program
  in TINY language -
  computes factorial
}
read x; { input an integer }
if 0 < x then { don't compute if x <= 0 }
  fact := 1;
  repeat
    fact := fact * x;
    x := x - 1
  until x = 0;
  write fact { output factorial of x }
end
```

编译生成的目标代码:

```
0:  LD 6,0(0)
1:  ST 0,0(0)
2:  IN 0,0,0
3:  ST 0,0(5)
4:  LDC 0,0(0)
5:  ST 0,0(6)
6:  LD 0,0(5)
7:  LD 1,0(6)
8:  SUB 0,1,0
9:  JLT 0,2(7)
10: LDC 0,0(0)
11: LDA 7,1(7)
12: LDC 0,1(0)
14: LDC 0,1(0)
15: ST 0,1(5)
16: LD 0,1(5)
17: ST 0,0(6)
18: LD 0,0(5)
19: LD 1,0(6)
20: MUL 0,1,0
21: ST 0,1(5)
22: LD 0,0(5)
23: ST 0,0(6)
24: LDC 0,1(0)
25: LD 1,0(6)
26: SUB 0,1,0
27: ST 0,0(5)
28: LD 0,0(5)
29: ST 0,0(6)
30: LDC 0,0(0)
```

```
31: LD 1,0(6)
32: SUB 0,1,0
33: JEQ 0,2(7)
34: LDC 0,0(0)
35: LDA 7,1(7)
36: LDC 0,1(0)
37: JEQ 0,-22(7)
38: LD 0,1(5)
39: OUT 0,0,0
13: JEQ 0,27(7)
40: LDA 7,0(7)
41: HALT 0,0,0
```

执行：

```
$ tm SAMPLE.tm
TM simulation (enter h for help)...
Enter command: h
Commands are:
s(step <n>      Execute n (default 1) TM instructions
g(o           Execute TM instructions until HALT
r(egs         Print the contents of the registers
i(Mem <b <n>> Print n iMem locations starting at b
d(Mem <b <n>> Print n dMem locations starting at b
t(race        Toggle instruction trace
p(rint        Toggle print of total instructions executed ('go' only)
c(lear        Reset simulator for new execution of program
h(elp        Cause this list of commands to be printed
q(uit        Terminate the simulation
Enter command: g
Enter value for IN instruction: 5
OUT instruction prints: 120
HALT: 0,0,0
Halted
Enter command:
```

可以看到输出结果：**OUT instruction prints: 120**

寄存器值：

```
Enter command: r
0: 120 1: 0 2: 0 3: 0
4: 0 5: 0 6: 1023 7: 42
```

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