

# Computer Organization: Homework 1

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## 1 General

### 1.1 程序的结束

在模拟器中，代表程序结束的是RET (0xFFFF)，但汇编器并不能产生这个代码。所以我们在每个代码的最后一行加上了一句NOP，然后用十六进制编辑工具手动修改成RET (0xFFFF)。

## 2 The Fibonacci Sequence

代码如下：

```
; Calculate the first 50 Fibonacci numbers. F1 = 1, F2 = 1
; The result is stored in 0x8500
LI R1 0x01
LI R2 0x01
LI R3 0x85
SLL R3 R3 0x00
LI R4 0x19
SW R3 R1 0x00
SW R3 R2 0x01
ADDU R1 R2 R1
ADDU R1 R2 R2
ADDIU R3 0x02
ADDIU R4 0xff
BNEZ R4 0xf9
```

程序运行结果如图 1，我们输出了0x33=51个数，前50个是Fibonacci，最后一个未被修改，所以为0。

### 3 ASCII Printable Characters

ASCII中可打印的字符集从0x20到0x7F。代码如下。

```
; Print all ascii printable characters: from 20 to 7E
; Author:      Jianfei CHEN
; Date:        2012-9-18
```

```
LI R6 0xBF          ; R6 is the IO port
SLL R6 R6 0x00
```

```
LI R1 0x20          ; Set initial value: print r1
```

```
loop:
SW R6 R1 0x00        ; PRINT R1
ADDIU R1 0x01
CMPI R1 0x80
BTNEZ loop
NOP
```

```
finish:
JR R6                ; Crash the machine
NOP
```

程序运行结果如图 2。

### 4 实验完成情况

### 5 实验体会

```

>>v 8500 33
[8500] 0000000000000001 <0001>
[8501] 0000000000000001 <0001>
[8502] 0000000000000010 <0002>
[8503] 0000000000000011 <0003>
[8504] 0000000000000101 <0005>
[8505] 0000000000001000 <0008>
[8506] 0000000000001101 <000d>
[8507] 0000000000010101 <0015>
[8508] 000000000100010 <0022>
[8509] 000000000110111 <0037>
[850a] 0000000001011001 <0059>
[850b] 0000000010010000 <0090>
[850c] 0000000011101001 <00e9>
[850d] 0000000101111001 <0179>
[850e] 0000001001100010 <0262>
[850f] 0000001111011011 <03db>
[8510] 0000011000111101 <063d>
[8511] 0000101000011000 <0a18>
[8512] 0001000001010101 <1055>
[8513] 0001101001101101 <1a6d>
[8514] 0010101011000010 <2ac2>
[8515] 0100010100101111 <452f>
[8516] 011011111110001 <6ff1>
[8517] 1011010100100000 <b520>
[8518] 0010010100010001 <2511>
[8519] 1101101000110001 <da31>
[851a] 1111111101000010 <ff42>
[851b] 1101100101110011 <d973>
[851c] 1101100010110101 <d8b5>
[851d] 1011001000101000 <b228>
[851e] 1000101011011101 <8add>
[851f] 0011110100000101 <3d05>
[8520] 1100011111100010 <c7e2>
[8521] 0000010011100111 <04e7>
[8522] 1100110011001001 <ccc9>
[8523] 110100010110000 <d1b0>
[8524] 1001111001111001 <9e79>
[8525] 0111000000101001 <7029>
[8526] 0000111010100010 <0ea2>
[8527] 0111111011001011 <7ech>
[8528] 1000110101101101 <8d6d>
[8529] 0000110000111000 <0c38>
[852a] 1001100110100101 <99a5>
[852b] 1010010111011101 <a5dd>
[852c] 001111110000010 <3f82>
[852d] 1110010101011111 <e55f>
[852e] 0010010011100001 <24e1>
[852f] 0000101001000000 <0a40>
[8530] 0010111100100001 <2f21>
[8531] 0011100101100001 <3961>
[8532] 0000000000000000 <0000>

```

图 1: Runtime result of the Fibonacci Number program

```

>>c
!"#$%&'(>)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOpqrstuvwxyz[\]^_`abcdefghijklmnop
pqrstuvwxyz{|}~Δ

```

图 2: Runtime result of the ASCII Printable Characters