3月21日

```
6.  1) nop :            addi x0 , x0 , 0
    2) ret :            jalr  x0 , x1 , 0
    3) call offset :    auipc  x6 , offset [31:12]
                        jalr   x1 , x6 , offset [11:0]
    4) mv rd,rs         addi rd , ~~x0~~ rs , 0 .
    5) rdcycle rd       csrrs   rd , cycle , x0
    6) sext.w rd,rs     addiw   rd , rs , 0 .
```

```
7.  1)      add   t0, t1, t2
            slti  t3, t2, 0
            slt   t4, t0, t1
            bne   t3, t4, overflow

    2)      add   t2 , t0, t1
            ~~sub t2~~
            bgeu  t0, t2, overflow
            bgeu  t1~~t2~~, t2, overflow
```

3) ARM中，通过CPSR状态寄存器反映意奇指令溢出状态

8. 1)

	rs1	rs2	DIVU	REMU	DIV	REM
op rd,rs1,rs2	x	0	$2^{XLEN}-1$	x	-1	

不会引起异常；除以0可认为得到无穷大，故为32bit的1.
取余数同为 $0\times0+x=x$，故结果为x.

2) NV : Invalid operation
DZ : Divide by Zero
OF : overflow
UF : underflow
NX : Inexact.
会陷入系统调用

3) X86，遇除法中除数为0，则会引起异常而中断触发
arm：强制进入管理模式，进入ARM状态，
跳转到绝对地址为0处执行，禁止IRQ中断
和FIQ中断.

11. (1) jal 偏移量范围为 $[-2^{19}, 2^{19}-1]$

(2) 平 bne 偏移范围为 $[-2^{11}, 2^{11}-1]$

(3) 可以 ~~fui offset~~

12.

1) Linux kernel	supervisor mode
2) Boot ROM	Machine mode
3) Boot Loader	Machine mode
4) USB Driver	supervisor mode
5) vim	user mode

13.

```
      addi  a2, x0, 0
      addi  a3, x0, 100

~~bne~~ bge   a2, a3, end.
        slli  a2, a2, 2.
        add   t3, t0, a2
        add   t4. t1, a2
        lw    a4, 0(t2).
        lw    a5, 0(t4).
        mul   a5, ~~t1, t2~~ a4, a5
        sw    a5, 0(t3).
~~end:~~ addi  a2 , a2, 1
  end:  lw    a0, 0(t0)
```

14.
```
~~blt~~ ~~bne~~ beq   a0,a1, 1f
        blt~~beq~~  a0,a1, 1f
          add   a2, a0,a1
          j     2f
          1:
          sub   a2, a0,a1
          2:
```

15.
```
~~ld~~ ~~lw~~sw    t0, 0(t0)
      addi     t1, x0, 3
      ~~addi     t2, x0, 4~~
      ~~mul      t3, t2~~
      sw       t1, 4(t0)
      ~~sw       t1,~~
      sub      ~~t3,~~ t2, t1, 4
     ~~sw~~add      t2, t0, t2
      sw       ~~t2,~~ t1, 0(t2).
```

16.
```
      ~~addi   t2, t0, 0~~
lw ~~add~~     t2, 0(t0)
lw ~~addi~~    t3, 0(t1)
  sw           t3, 0(t0).
  sw           t2, 0(t1)
  ret.
```

7. 0→a0， 1→a1， 30→a2

若 a0 = a2，退出循环

否则（即a0≠a2），a1 ~~[illegible]~~左移1，即乘2，a0加1，循环

因此，~~[illegible]~~功能为，实现运算 2^{30}.