

Problem 1:

Please write down the byte codes of the following y86 instructions

Y86 instructions	Byte codes
<code>rrmovq %rbx, %rdx</code>	<code>2032</code>
<code>jmp 0xabc</code>	<code>70 bc0a0000 00000000</code>
<code>addq %rbx, %rax</code>	<code>6030</code>
<code>call 0x1234</code>	<code>80 34120000 00000000</code>
<code>rmmovq %rcx, 0x12(%rbx)</code>	<code>4013 12000000 00000000</code>
<code>jle 0x280</code>	<code>71 80020000 00000000</code>
<code>pushq %rax</code>	<code>a00f</code>

Problem 2:

We have introduced HCL in class to design combinatorial logic circuit. Try to write HCL code for the following circuit:

- 1) Take A, B, C and D as input, output the max value of them.
E.g. $\text{Max}(1,2,3,4) = 4$.
- 2) Take A, B, and C as input, output the secondary biggest value of them
E.g. $\text{Median}(3,2,1) = 2$.

```
int Max = {  
    A >= B && A >= C && A >= D: A;  
    B >= A && B >= C && B >= D: B;  
    C >= A && C >= B && C >= D: C;  
    1 : D;  
}
```

```
int Median = {  
    (A >= B && A <= C) || (A >= C && A <= B) : A;  
    (B >= A && B <= C) || (B >= C && B <= A) : B;  
    1 : C;  
}
```

Problem 3:

Please explain the pros and cons of RISC compared with CISC.

Cons for early RISC

- More instructions

- Not multiple cycles

- Exposing implementation artifacts to machine level programs

Pros for RISC

- Well suited for pipeline (high efficient implementation)