Homework 1

Problem 1

We have introduced HCL in class to design combinatorial logic circuit. Try to write HCL code for the following circuit: Take A, B and C as input, output the median value of them.
E.g. Median (1, 3, 4) = 3.

The following three problems are based on the following code snippet:

```
1    0x000:  30f209000000      irmovl $9, %edx
2    0x006:  30f315000000      irmovl $21, %ebx
3    0x00c:  30f480000000      irmovl $128, %esp          # Prob. 2
4    0x012:  404364000000      rmmovl %esp, 100(%ebx)     # Store
5    0x018:  a02f              pushl %edx                 # Prob. 3
6    0x01a:  b00f              popl %eax                  # Prob. 4
7    0x01c:  7328000000        je done                    # Not taken
8    0x021:  8029000000        call proc
9    0x026:                  done:
10   0x026:  00                halt
11   0x027:                  proc:
12   0x027:  90                ret                        # Return
```

Problem 2

Fill in the right-hand column of the following table, specialize the function of each stage corresponding to the generic form.

Stage	Generic	Specific
	`irmovl V, rB`	`irmovl $128, %esp`
Fetch	icode:ifun ← M_1[PC] rA:rB ← M_1[PC + 1] valC ← M_4[PC + 2] valP ← PC + 6	
Decode		
Execute	valE ← 0 + valC	
Memory		
Write Back	R[rB] ← valE	
Update PC	PC ← valP	

Problem 3

Fill in the right-hand column of the following table, specialize the function of each stage corresponding to the generic form.

Stage	Generic	Specific
	`pushl rA`	`pushl %edx`
Fetch	icode:ifun ← M_1[PC] rA:rB ← M_1[PC + 1] valP ← PC + 2	
Decode	valA ← R[rA] valB ← R[%esp]	
Execute	valE ← valB + (-4)	
Memory	M_4[valE] ← valA	
Write Back	R[%esp] ← valE	
Update PC	PC ← valP	

Problem 4

Fill in the right-hand column of the following table, specialize the function of each stage corresponding to the generic form.

Stage	Generic	Specific
	`popl rA`	`popl %eax`
Fetch	icode:ifun ← M_1[PC] rA:rB ← M_1[PC + 1] valP ← PC + 2	
Decode	valA ← R[%esp] valB ← R[%esp]	
Execute	valE ← valB + 4	
Memory	valM ← M_4[valA]	
Write Back	R[%esp] ← valE R[rA] ← valM	
Update PC	PC ← valP	

That's the end of Homework 1. You may find it easy to finish it. Anyway, enjoy the first weekend of this semester o(∩_∩)o