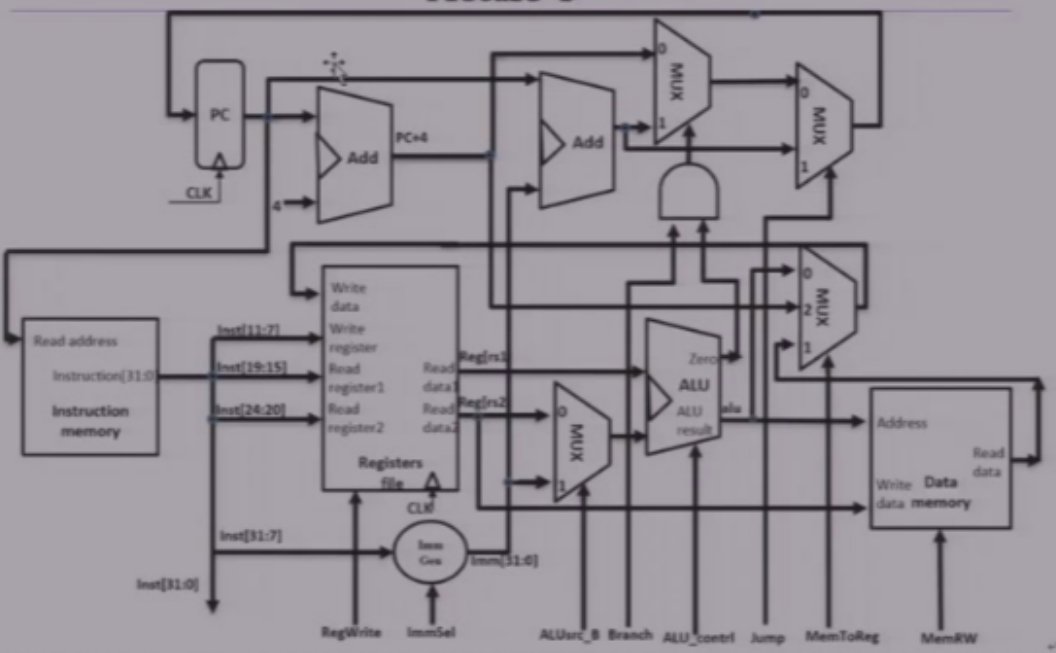
5. (20%)Examine the difficulty of adding a proposed
ss rs2, rs1, imm (Store Sum) instruction to RISC-V.
Interpretation: **Mem[Reg[rs2]]=Reg[rs1]+immediate**

Picture 1



1) (3%)Which new functional blocks(if any) do we need for this instruction?

some additional muxes

2) (2%)Which existing functional blocks(if any) require modification?

No functional blocks need to be modified

4.2 (20%) Implement the following C code in RISC-V assembly. Hint: Remember that the stack pointer must remain aligned on a multiple of 16:

```
int fun(int i){
   if (i==0)
      return 0;
   else if (i == 1)
      return 1;
   else
      return fun(i-1) + fun(i-2);
}
```

4.1(10%)Assume the following register contents:

t0 = 0x1234567812345678 t6 = 0x0000000AAAAAAAAA

For the register values shown above, what is the value of S2 for the following sequence of instructions?

```
Slli   s1,t6,0x4
Srai   s2,t0,0x8
xor    s1,s1,t0
or     s2,s2,s1
```

s1 = 0x123456D2B89EFCD8

s2 = 0x123676D6F89EFCDE

3. (15%)、To convert the pseudoinstruction(left) into the shortest sequence of **RISCV** instructions.

Pseudoinstruction	Function	RISCV instructions
Bnez rs, Lable	if(rs!=0)goto Lable	bne rs,x0,L
J Lable	goto Lable	jal x0,Lable; /beq x0,x0,lable
Mv rd, rs	rd = rs copy the register	addi rd,rs,0; /or rd,rs,x0 /add rd rs x0
Not rd,rs	rd = ~rs	xori rd,rs,-1;
Snez rd,rs	Rd = (rs!=0)?1:0	Sltu rd,x0,rs

2.(15%)Assemble:To convert the RISCV instructions into machine code.

Address(Hex)	RISCV Assembly Instruction	Machine Code(Hex)
200000	Loop: jal x0, L1	0x0700006F

200004	add s2, s3, s4	0x01498933
200008	beq t3, t4, Loop	0xFFDE0CE3
.....		–
200070	L1:	–

1.2(8%)A and B are the floating-point number with IEEE754 single precision. Write down the Binary representation of c.

A=C20E6666

B=25.1 C=A+B

A = C20E6666 = $(-1)^1 * (1+0.1125) * 2^{(132-127)}$=-35.6

31	30 23	22 0
	10000100	0 0011 1001 1001 1001 1001 10

B = 25.1

C = -10.5=C1280000= $(-1)^1 * (1+0.3125) * 2^{(130-127)}$

31	30 23	22 0
1	10000010	0 1010 0000 0000 0000 0000 00

1.1(12%)The data have no inherent meaning. Given the pattern:

$(04\ C0\ 00\ 6F)_{16}$

What does it represent, assuming that it is:

1)a two's complement integer	04C0006F
2)signed and magnitude integer	04C0
3)A IEEE754 single precision floating-point number	$2^{-118} \times (1.100\ 0000\ 0000\ 0000\ 0110\ 1111)_2 =$
4)A RISCV instruction	Jal x0,76 or jal x0,0x4c

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1	10000010	0 1010 0000 0000 0000 0000 00