	PcSrc	ALUop(2)	RegDst	Ch_31	Regwrite	ALUsrc	MemRead	MemWrite	MemtoReg	PctoReg	IF_flush	HazardEn	CondHazd
Add	00	10	1	0	1	0	0	0	0	0	0	1	0
Sub	00	10	1	0	1	0	0	0	0	0	0	1	0
Slt	00	10	1	0	1	0	0	0	0	0	0	1	0
Lw	00	00	0	0	1	1	1	0	1	0	0	1	0
Sw	00	00	0	0	0	1	0	1	0	0	0	1	0
Addi	00	00	0	0	1	1	0	0	0	0	0	1	0
Slti	00	11	0	0	1	1	0	0	0	0	0	1	0
J	10	01	0	0	0	0	0	0	0	0	1	0	0
Jal	10	01	0	1	1	0	0	0	0	1	1	0	0
Jr	11	10	0	0	0	0	0	0	0	0	1	1	1
beq	01	01	0	0	0	0	0	0	0	0	1	1	1
bneq	01	01	0	0	0	0	0	0	0	0	1	1	1

	ALUop(2) input	Function bits	ALUoperation	Extra_bit
Add	10	100000	010	0
Sub	10	100010	110	0
Slt	10	101010	111	0
Lw	00	XXXXXX	010	0
Sw	00	XXXXXX	010	0
Addi	00	XXXXXX	010	0
Slti	11	XXXXXX	111	0
J	01	XXXXXX	110	0
Jal	01	XXXXXX	110	0
Jr	10	001000	111	1
beq	01	XXXXXX	110	0
bneq	01	XXXXXX	110	0

Description of Hazard Unit :

```
if(hazard_en) // if the inst before lw or R_type or immediate is not : j or jal
    if(cond_hazard) //if the inst before them is : jr or beq or bne
        if((ID/EX.MemRead | ID/EX.RegWtrite) & (ID/EX.Rd == IF/ID.Rs | ID/EX.Rd==IF/ID.Rt) & ID/EX.Rd!=5'b0000)
            {IF/IDWrite, PCWrite, ControlSignalsSrc} = 3'b000

        else if(EX/MEM.RegWrite & (EX/MEM.Rd == IF/ID.Rs | EX/MEM.Rd == IF/ID.Rt) & EX/MEM.Rd != 5'b0000)
            {IF/IDWrite, PCWrite, ControlSignalsSrc} = 3'b000

    else //if not
        if(ID/EX.MemRead & (ID/EX.Rd == IF/ID.Rs | ID/EX.Rd == IF/ID.Rt) & ID/EX.Rd != 5'b0000)
            {IF/IDWrite, PCWrite, ControlSignalsSrc} = 3'b000
```

Description of Forwarding Unit:

ForwardA :

```
      if(EX/MEM.RegWrite & EX/MEM.Rd == ID/EX.Rs & EX/MEM.Rd != 5'b00000) forwardA = 2'b01 //FWD srcA :
MEM to EX

      else if (MEM/WB.RegWrite & MEM/WB.Rd == ID/EX.Rs & MEM/WB.Rd != 5'b00000) forwardA = 2'b10 //FWD srcA :
WB to EX
      else forwardA = 2'b00
```

ForwardB:

```
      if(EX/MEM.RegWrite & EX/MEM.Rd == ID/EX.Rt & EX/MEM.Rd != 5'b00000) forwardB = 2'b01 //FWD srcB : MEM to E
X
      else if (MEM/WB.RegWrite & MEM/WB.Rd == ID/EX.Rt & MEM/WB.Rd != 5'b00000) forwardB = 2'b10 //FWD srcb :  W
B to  EX
      else forwardB = 2'b00
```