

به نام خدا

معماری کامپیوتر

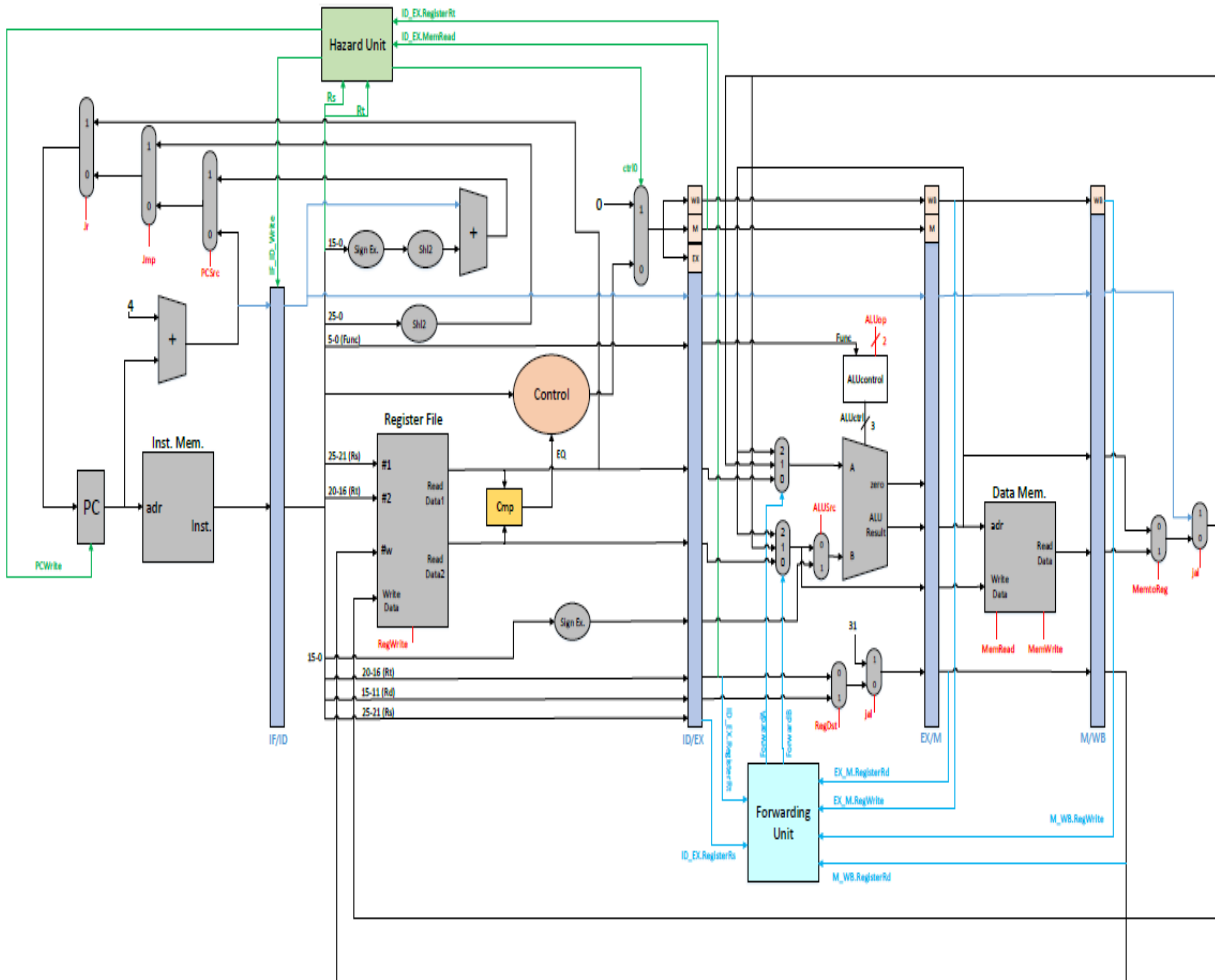
پایپ لاین

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Pipe Line Data Path



Pipe Line ALU Controller Truth Table

OPC	ALUop	Func	ALU Operation
000000	00	000001	Add → 000
000000	00	000010	Sub → 001
000000	00	000100	And → 010
000000	00	001000	Or → 011
000000	00	010000	Slt → 100
000001(addi)	01	-	Add → 000
000010(slti)	10	-	Slt → 100
000011(lw)	01	-	Add → 000
000100(sw)	01	-	Add → 000
000101(beq)	11	-	Sub → 001

Pipe Line Main Controller Truth Table

	RegDst	jal	RegWrite	ALUSrc	ALUop	MemRead	MemWrite	MemtoReg	PCSrc	jmp	jr
R-T	1	0	1	0	00	0	0	0	0	0	0
addi	0	0	1	1	01	0	0	0	0	0	0
slti	0	0	1	1	10	0	0	0	0	0	0
lw	0	0	1	1	01	1	0	1	0	0	0
sw	0	0	0	1	01	0	1	0	0	0	0
j	0	0	0	0	00	0	0	0	0	1	0
jal	0	1	1	0	00	0	0	0	0	1	0
jr	0	0	0	0	00	0	0	0	0	0	1
beq	0	0	0	0	11	0	0	0	EQ	0	0

Algorithm to find the largest data of array with 20 elements

```
array A[19];  
max = A[0];  
index = 0;  
for(int i = 0; i < 20; i++)  
{  
    if(max < A[i])  
    {  
        max = A[i];  
        index = i;  
    }  
}
```

Sample data inputs

The screenshot shows a Notepad window with the title 'Data_inputs - Notepad'. The menu bar includes 'File', 'Edit', 'Format', 'View', and 'Help'. The text content is as follows:

```

xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
xxxxxxxx
00000107
00000040
00000003
00000004
00000005
00000006
00000001
00000008
00000009
0000000a
0000000b
0000000c
0001000d
0000000e
0000000f
00000020
00000011
00000012
01000013
00000015

```

A large red arrow is drawn on the screen, pointing from the right towards the hexadecimal value '0000000c'.

At the bottom right of the window, the status bar indicates 'Ln 1, Col 1'.

Output of Pipe Line computation on above data inputs

A screenshot of a Notepad window titled "Data_Memory - Notepad". The menu bar includes File, Edit, Format, View, and Help. The main text area contains a vertical column of hexadecimal values. Most are "XXXXXXXX", but two stand out: "01000013" and "00000012". A large red arrow points from the right towards the "01000013" value. At the bottom right, the status bar shows "Ln 504, Col 9".

As you see largest of above data inputs and its index is stored in 2000 and 2004 of Memory.