C

1.	ADD R1,R2,R3					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	11	X	X	X	х	X
2	11	X	0	0	X	X
3	11	0	0	0	X	X
4	11	0	0	0	X	0
5	11	0	0	0	1	0
5	11	U	O	O	-	U
2.	ADDI R3,IMM					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	10	X	X	X	X	Χ
2	10	X	0	1	X	Χ
3	10	0	0	1	X	Χ
4	10	0	0	1	X	0
5	10	0	0	1	1	0
		-	-			-
3.	SUB R1,R2,R3					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	11	Χ	X	X	X	Χ
2	11	Χ	0	0	X	Χ
3	11	1	0	0	X	Χ
4	11	1	0	0	X	0
5	11	1	0	0	1	0
4.	SUBI R1,IMM					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	10					
2	10	X	X 0	X 1	X	X
3	10	х 1	0	1	X	X
4	10	1	0	1	X	х 0
5	10	1	0	1	x 1	0
J	10	1	U	1	1	U
5.	AND R1,R2,R3					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	11	X	X	X	X	X
2	11	X	0	0	X	X
3	11	101	0	0	X	X
4	11	101	0	0	X	0
=	_ _		_	-	-	-
			Page 1			

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۱۲.	100	-,

6. ANDI	R1,IMM					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 101 101	MUXA1 x 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 1	MUXWB x x x 0
7. OR R1	,R2,R3					
1 2 3 4 5	Readreg 11 11 11 11	ALUop x x 111 111 111	MUXA1 x 0 0 0	MUXA2 x 0 0 0	Wreg x x x x 1	MUXWB X X X 0
8. OR R1	,IMM					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 111 111 111	MUXA1 x 0 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 1	MUXWB x x x 0
9. XOR R	1,R2,R3					
1 2 3 4 5	Readreg 11 11 11 11 11	ALUop x x 1000 1000	MUXA1 x 0 0 0	MUXA2 x 0 0 0	Wreg x x x x 1	MUXWB x x x 0
10. XORI	R1,IMM					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB

1 2 3 4 5	10 10 10 10 10	X X 1000 1000 1000	Sheet1 X 0 0 0 0	x 1 1 1	x x x x 1	x x x 0 0
11. NOT	R1					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 110 110 110	MUXA1 x 0 0 0	MUXA2 X X X X	Wreg x x x x 1	MUXWB x x x 0
12. SLA	R1,R2					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 11 11	MUXA1 x 0 0 0	MUXA2 X X X X	Wreg x x x x 1	MUXWB X X X 0
13. SLAI	R1,IMM					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 11 11	MUXA1 x 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 1	MUXWB x x x 0
14. SRA	R1,R2					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 1001 1001	MUXA1 x 0 0 0	MUXA2 x x x x	Wreg x x x x 1	MUXWB x x x 0

15. SRAI R1,IMM

			Sheet1			
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 1001 1001 1001	MUXA1 x 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 1	MUXWB x x x 0 0
16. SRL	R1,R2					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 100 100	MUXA1 x 0 0 0	MUXA2 x x x x x	Wreg x x x x 1	MUXWB x x x 0 0
17. SRLI	R1,IMM					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 100 100	MUXA1 x 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 1	MUXWB x x x 0
18. LD R	R1,SHAMT(R	2)				
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 0 0	MUXA1 x 0 0 0	MUXA2 X 1 1 1	Wreg x x x x 1	MUXWB x x x 1
19. ST R	R1,SHAMT(R	2)				
1 2 3 4 5	Readreg 11 11 11 11 11	ALUop x x 0 0	MUXA1 x 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 0	MUXWB X X X X

20. LDSP SP,SHAMT(R2)

1 2 3 4 5	Readreg 10 10 10 10 10 SP,SHAMT	x x 0 0	MUXA1 X 0 0 0	MUXA2 X 1 1 1	Wreg X X X X 1	MUXWB X X X X
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 0 0	MUXA1 X 0 0 0	MUXA2 x 1 1 1	Wreg x x x x 0	MUXWB X X X X
22. BR I	MM					
1 2 3 4 5	Readreg 0 0 0 0 0	ALUop x x x x x	MUXA1 x x x x x	MUXA2 X X X X	Wreg x x x x 0	MUXWB X X X X
23. BMI	R1, IMM					
1 2 3 4 5	Readreg 10 10 10 10 10	ALUop x x 10 10	MUXA1 × 0 0 0	MUXA2 x x x x	Wreg x x x x 0	MUXWB X X X X
24. BPL	R1, IMM					
1 2	Readreg 10 10	ALUop x x	MUXA1 × 0	MUXA2 x x	Wreg x x	MUXWB x x

			Sheet1			
3	10	10	0	Х	X	X
4	10	10	0	Χ	X	X
5	10	10	0	Χ	Θ	X
25. BZ F	R1, IMM					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	10	X	Χ	Χ	X	X
2 3	10	X	0	Χ	Χ	Χ
3	10	10	0	X	X	X
4 5	10 10	10 10	0 0	X X	х 0	X X
5	10	10	O	^	U	^
26. PUSH	l R1					
20. 1031	1 111					
	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	1	X	X	Χ	Χ	Χ
2	1	X	1	X	X	X
3 4	1 1	X	1 1	X	X	X
5	1	X X	1	X X	х 0	X X
J	_	^	-	X	· ·	~
27. POP	R1					
_						
	Readreg		MUXA1	MUXA2	Wreg	MUXWB
1 2	0	X	x 1	x 1	X	X
2	0 0	X 0	1	1	X X	X X
3 4	0	0	1	1	X	1
5	0	0	1	1	1	1
28. CALI	_ IMM					
-	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB

Readreg	ALUop	MUXA1	MUXA2	Wreg
0	X	X	X	X
0	X	1	X	X
Θ	X	1	Χ	X
	Readreg 0 0 0	Readreg ALUop 0 x 0 x 0 x	Readreg ALUop MUXA1 0	Readreg ALUop MUXA1 MUXA2 0 x x x 0 x 1 x 0 x 1 x

x x x x x 4 5 0 1 1 X X X X х 0

29. RET

	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	0	Χ	X	X	X	X
2	0	X	1	1	X	Χ
3	0	0	1	1	X	Χ
4	0	0	1	1	X	X
5	0	0	1	1	0	X

30. MOVE R1,R2

	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	11	X	X	X	X	Χ
2	11	X	0	0	X	Χ
3	11	0	0	0	X	Χ
4	11	0	0	0	X	0
5	11	0	0	0	1	0

31. HALT

	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	0	X	X	X	X	Χ
2	0	X	Χ	Χ	Χ	X
3	0	X	Χ	Χ	Χ	X
4	0	X	X	X	X	Χ
5	0	X	Χ	Χ	0	Χ

32. NOP

	Readreg	ALUop	MUXA1	MUXA2	Wreg	MUXWB
1	0	X	X	Χ	Χ	X
2	Θ	X	X	Χ	X	X
3	0	X	X	Χ	Χ	X
4	0	X	X	X	X	X
5	0	X	X	X	0	X

ONTROL SIGNALS

RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0	LoadSP 0 0 0	MUXMemWrite x x x x	branch 0 0 0 0

0 0 x 0

RWMem	LoadSP	MUXMemWrite	branch
Χ	Θ	X	0
Χ	0	Χ	0
Χ	0	Χ	0
0	0	Χ	0
0	0	X	0

RWMem	LoadSP	MUXMemWrite	branch
X	Θ	Χ	0
Χ	Θ	X	0
X	Θ	Χ	0
0	Θ	Χ	0
0	0	X	0

inch

LoadSP	MUXMemWrite	branch
0	X	0
0	X	0
0	X	0
0	X	0
0	Χ	0
	0 0 0	0 x 0 x 0 x

RWMem LoadSP MUXMemWrite branch

x x x 0 0	0 0 0 0	X X X X	Sheet1 0 0 0 0 0
RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0 0
RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0

RWMem	LoadSP	MUXMemWrite	branch
Χ	0	Χ	0
Χ	0	Χ	0
Χ	0	Χ	0
0	0	Χ	0
0	0	Χ	0

RWMem x x x 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	Sheet1 branch 0 0 0 0 0
RWMem x x x 0 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 0 0	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0 0
RWMem x x x 10 10	LoadSP 0 0 0 0	MUXMemWrite x x x x x	branch 0 0 0 0
RWMem x x x 1	LoadSP 0 0 0 0	MUXMemWrite x x x 0	branch 0 0 0 0

RWMem	LoadSP	MUXMemWrite	branch
Χ	11	Χ	0
Χ	11	Χ	0
Χ	11	Χ	0
10	11	X	0
10	11	Χ	0

RWMem	LoadSP	MUXMemWrite	branch
Χ	0	X	0
X	0	Χ	0
Χ	0	Χ	0
1	0	1	0
1	0	1	0
x 1 1	0	x 1 1	0

RWMem	LoadSP	MUXMemWrite	branch
Χ	Θ	X	1
Χ	Θ	X	1
Χ	0	Χ	1
0	0	Χ	1
0	0	Χ	1

RWMem	LoadSP	MUXMemWrite	branch
Χ	0	Χ	10
Χ	0	Χ	10
Χ	0	Χ	10
0	0	Χ	10
0	0	Χ	10

RWMem	LoadSP	MUXMemWrite	branch
Χ	Θ	X	10
Χ	Θ	X	10

			Sheet1
X	0	X	10
0	Θ	X	10
0	0	X	10

RWMem	LoadSP	MUXMemWrite	branch
Χ	0	X	10
Χ	0	Χ	10
Χ	0	Χ	10
0	0	Χ	10
0	0	X	10

RWMem	LoadSP	MUXMemWrite	branch
Χ	10	X	0
Χ	10	X	0
Χ	10	X	0
1	10	0	0
1	10	0	0

RWMem	LoadSP	MUXMemWrite	branch
X	1	X	0
X	1	X	0
X	1	X	0
10	1	X	0
10	1	X	0

RWMem	LoadSP	MUXMemWrite	branch
Χ	10	Χ	11
Χ	10	Χ	11
Χ	10	Χ	11
1	10	1	11
1	10	1	11

RWMem	LoadSP	MUXMemWrite	branch
Χ	1	Χ	100
Χ	1	Χ	100
Χ	1	Χ	100
10	1	Χ	100
10	1	Χ	100

RWMem	LoadSP	MUXMemWrite	branch
Χ	0	Χ	0
Χ	0	Χ	0
Χ	0	Χ	0
0	0	Χ	0
0	0	Χ	0

RWMem	LoadSP	MUXMemWrite	branch
Χ	Θ	Χ	101
X	0	X	101
X	0	X	101
0	Θ	Χ	101
0	Θ	X	101

RWMem	LoadSP	MUXMemWrite	branch
Χ	Θ	X	0
Χ	0	X	0
X	Θ	X	0
0	0	Χ	0
Θ	0	Χ	0