流水线覆盖性分析测试用例集构造表

陈麒先

1． addu 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	subu	MEM	rs	subu $1,$2,$3 addu $4,$1,$2
2	R-M-RT	subu	MEM	rt	subu $1,$2,$3 addu $4,$2,$1

3	R-W-RS	subu	WB	rs	subu $1,$2,$3
					nop
					addu $4,$1,$2

4	R-W-RT	subu	WB	rt	subu $1,$2,$3
					nop
					addu $4,$2,$1

5	R-W-RS	subu	WB	rs	subu $1,$2,$3
					nop
					nop
					addu $4,$2,$1

6	R-W-RT	subu	WB	rt	subu $1,$2,$3
					nop
					nop
					addu $4,$2,$1

7	I-M-RS	ori	MEM	rs	ori $1,20 addu $4,$1,$2
8	I-M-RT	ori	MEM	rt	ori $1,20 addu $4,$2,$1
9	I-W-RS	ori	WB	rs	ori $1,20 nop addu $4,$1,$2
10	I-W-RT	ori	WB	rt	ori $1,20 nop addu $4,$2,$1
11	I-W-RS	ori	WB	rs	ori $1,20 nop nop addu $4,$1,$2
12	I-W-RT	ori	WB	rt	ori $1,20 nop nop addu $4,$2,$1
13	LW-M-RS	lw	MEM	rs	lw $1,0($0)

					addu $4,$1,$2
14	LW-M-RT	lw	MEM	rt	lw $1,0($0) addu $4,$2,$1

15	LW-WB-RS	lw	WB	rs	lw $1,0($0)
					nop
					addu $4,$1,$2

16	LW-WB-RT	lw	WB	rt	lw $1,0($0)
					nop
					addu $4,$2,$1

17	LW-W-RS	lw	WB	rs	lw $1,0($0)
					nop
					nop
					addu $4,$1,$2

18	LW-W-RT	lw	WB	rt	lw $1,0($0)
					nop
					nop
					addu $4,$2,$1

19	J-M-RS	jal	MEM	rs	jal loop addu $1,$31,$2 loop:
20	J-M-RT	jal	MEM	rt	jal loop addu $1,$2,$31 loop:
21	J-W-RS	jal	WB	rs	jal loop ori $4,1 loop: addu $1,$31,$2
22	J-W-RS	jal	WB	rt	jal loop ori $4,1 loop: addu $1,$2,$31

2. subu 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	addu $1,$2,$3 subu $4,$1,$2
2	R-M-RT	subu	MEM	rt	subu $1,$2,$3 subu $4,$2,$1

3	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					addu $4,$1,$2

4	R-W-RT	subu	WB	rt	subu $1,$2,$3
					nop
					subu $4,$2,$1

5	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					nop
					addu $4,$1,$2

6	R-W-RT	subu	WB	rt	subu $1,$2,$3
					nop
					nop
					subu $4,$2,$1

7	I-M-RS	ori	MEM	rs	ori $1,10 subu $4,$1,$2
8	I-M-RT	ori	MEM	rt	ori $1,2 subu $4,$2,$1
9	I-W-RS	ori	WB	rs	ori $1,10 nop subu $4,$1,$2
10	I-W-RT	ori	WB	rt	ori $1,2 nop subu $4,$2,$1
11	I-W-RS	ori	WB	rs	ori $1,10 nop nop subu $4,$1,$2
12	I-W-RT	ori	WB	rt	ori $1,2 nop nop subu $4,$2,$1
13	LW-M-RS	lw	MEM	rs	lw $1,0($0) subu $4,$1,$2
14	LW-M-RT	lw	MEM	rt	lw $1,0($0) subu $4,$2,$1

15	LW-W-RS	lw	WB	rs	lw $1,0($0)
					nop
					subu $4,$1,$2

16	LW-W-RT	lw	WB	rt	lw $1,0($0)
					nop
					subu $4,$2,$1

17	LW-W-RS	lw	WB	rs	lw $1,0($0)
					nop
					nop
					subu $4,$1,$2

18	LW-W-RT	lw	WB	rt	lw $1,0($0)
					nop
					nop
					subu $4,$2,$1

19	J-M-RS	jal	MEM	rs	jal loop subu $1,$31,$2 loop:
20	J-M-RT	jal	MEM	rt	jal loop subu $1,$2,$31 loop:
21	J-W-RS	jal	WB	rs	jal loop ori $4,1 loop: subu $1,$31,$2
22	J-W-RT	jal	WB	rt	jal loop ori $4,1 loop: subu $1,$2,$31

3.ori 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	addu $1,$2,$3 ori $4,$1,7
3	R-W-RS	addu	WB	rs	addu $1,$2,$3 nop ori $4,$1,7
5	I-M-RS	ori	MEM	rs	ori $1,$2,2 ori $3,$1,8
6	I-W-RS	ori	WB	rs	ori $1,$2,2 nop ori $3,$1,8
7	LW-M-RS	lw	MEM	rs	lw $1,0($0) ori $3,$1,2
8	LW-W-RS	lw	WB	rs	lw $1,0($0) nop ori $3,$1,2
9	LW-W-RS	lw	WB	rs	lw $1,0($0) nop nop ori $3,$1,2
10	J-M-RS	jal	MEM	rs	jal loop ori $31,$31,1 loop:
11	J-W-RS	jal	WB	rs	jal loop ori $1,$1,1 loop: ori $31,$31,1

4. j 测试样例表

用例编号	测试类型	测试样例
1	J	ori $2,5 ori $1,1 addu $1,$1,$2 j exit ori $3,1 exit:

5. lw 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	addu $1,$2,$3 lw $4,0($1)

2	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					lw $4,0($1)

3	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					nop
					lw $4,0($1)

4	I-M-RS	ori	MEM	rs	ori $1,8 lw $4,0($1)
5	I-W-RS	ori	WB	rs	ori $1,8 nop lw $4,0($1)
6	I-W-RS	ori	WB	rs	ori $1,8 nop nop lw $4,0($1)
7	LW-M-RS	lw	MEM	rs	lw $1,4($0) lw $4,0($1)

8	LW-W-RS	lw	WB	rs	lw $1,4($0)
					nop
					lw $4,0($1)

9	LW-W-RS	lw	WB	rs	lw $1,4($0)
					nop
					nop
					lw $4,0($1)

10	J-M-RS	jal	MEM	rs	jal loop lw $1,0($31) loop:
11	J-M-RT	jal	WB	rs	jal loop loop:

					lw $1,0($31)

6. sw 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	addu $1,$2,$3 sw $2,0($1)

2	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					sw $2,0($1)

3	R-W-RS	addu	WB	rs	addu $1,$2,$3
					nop
					nop
					sw $2,0($1)

4	I-M-RS	ori	MEM	rs	ori $1,8 sw $2,0($1)
5	I-W-RS	ori	WB	rs	ori $1,8 nop sw $2,0($1)
6	I-W-RS	ori	WB	rs	ori $1,8 nop nop sw $2,0($1)
7	LW-M-RS	lw	MEM	rs	lw $1,4($0) sw $2,0($1)

8	LW-W-RS	lw	WB	rs	lw $1,4($0)
					nop
					sw $2,0($1)

9	LW-W-RS	lw	WB	rs	lw $1,4($0)
					nop
					nop
					sw $2,0($1)

10	J-M-RS	jal	MEM	rs	jal loop sw $1,0($31) loop:
11	J-M-RT	jal	WB	rs	jal loop loop: sw $1,0($31)

7. beq 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	addu $1,$3,$0 beq $1,$3,exit ori $4,1

					ori $4,2 exit:
2	R-M-RT	addu	MEM	rt	addu $1,$3,$0 beq $3,$1,exit ori $4,1 ori $4,2 exit:
3	R-W-RS	addu	WB	rs	addu $1,$3,$0 nop beq $1,$3,exit ori $4,1 ori $4,2 exit:
4	R-W-RT	addu	WB	rt	addu $1,$3,$0 nop beq $3,$1,exit ori $4,1 ori $4,2 exit:
5	R-W-RS	addu	WB	rs	addu $1,$3,$0 nop nop beq $1,$3,exit ori $4,1 ori $4,2 exit:
6	R-W-RT	addu	WB	rt	addu $1,$3,$0 nop nop beq $3,$1,exit ori $4,1 ori $4,2 exit:
7	I-M-RS	ori	MEM	rs	ori $1,3 beq $1,$3,exit ori $4,1 ori $4,2 exit:
8	I-M-RT	ori	MEM	rt	ori $1,3 beq $3,$1,exit ori $4,1 ori $4,2 exit:

9	I-W-RS	ori	WB	rs	ori $1,3 nop beq $1,$3,exit ori $4,1 ori $4,2 exit:
10	I-W-RT	ori	WB	rt	ori $1,3 nop beq $3,$1,exit ori $4,1 ori $4,2 exit:
11	I-W-RS	ori	WB	rs	ori $1,3 nop nop beq $1,$3,exit ori $4,1 ori $4,2 exit:
12	I-W-RT	ori	WB	rt	ori $1,3 nop nop beq $3,$1,exit ori $4,1 ori $4,2 exit:

13	LW-M-RS	lw	MEM	rs	addu $4,$2,$3
					lw $1,8($0)
					beq $1,$4,exit
					ori $5,1
					ori $5,2
					exit:

14	LW-M-RT	lw	MEM	rt	addu $4,$2,$3
					lw $1,8($0)
					beq $4,$1,exit
					ori $5,1
					ori $5,2
					exit:

15	LW-WB-RS	lw	WB	rs	addu $4,$2,$3
					lw $1,8($0)
					nop
					beq $1,$4,exit
					ori $5,1
					ori $5,2

					exit:

16	LW-WB-RT	lw	WB	rt	addu $4,$2,$3
					lw $1,8($0)
					nop
					beq $4,$1,exit
					ori $5,1
					ori $5,2
					exit:

17	LW-W-RS	lw	WB	rs	addu $4,$2,$3
					lw $1,8($0)
					nop
					nop
					beq $1,$4,exit
					ori $5,1
					ori $5,2
					exit:

18	LW-W-RT	lw	WB	rt	addu $4,$2,$3
					lw $1,8($0)
					nop
					nop
					beq $4,$1,exit
					ori $5,1
					ori $5,2
					exit:

8. jr 测试样例表

用例编号	测试类型	前序指令	冲突位置	冲突寄存器	测试样例
1	R-M-RS	addu	MEM	rs	ori $1,4 jal loop addu $31,$31,$1 ori $2,1 ori $3,1 j exit ori $8,1 loop: jr $31 ori $4,1 exit:
2	R-W-RS	addu	WB	rs	ori $1,4 jal loop addu $31,$31,$1 ori $2,1 ori $3,1 j exit

					ori $8,1 loop: ori $5,1 jr $31 ori $4,1 exit:
3	R-W-RS	subu	WB	rs	ori $1,4 jal loop addu $31,$31,$1 ori $2,1 ori $3,1 j exit ori $8,1 loop: ori $5,1 ori $6,1 jr $31 ori $4,1 exit:
4	I-M-RS	ori	MEM	rs	ori $1,4 ori $1,4 ori $1,4 jal loop ori $31,8 ori $2,1 ori $3,1 j exit ori $8,1 loop: jr $31 ori $4,1 exit:
5	I-W-RS	ori	WB	rs	ori $1,4 ori $1,4 ori $1,4 jal loop ori $31,8 ori $2,1 ori $3,1 j exit ori $8,1 loop: ori $5,1 jr $31

					ori $4,1 exit:
6	I-W-RS	ori	WB	rs	ori $1,4 ori $1,4 ori $1,4 jal loop ori $31,8 ori $2,1 ori $3,1 j exit ori $8,1 loop: ori $5,1 ori $6,1 jr $31 ori $4,1 exit:

7	LW-M-RS	lw	MEM	rs	ori $1,4
					ori $2,0x301c
					sw $2,0($0)
					jal loop
					lw $31,0($0)
					ori $2,1
					ori $3,1
					j exit
					ori $8,1
					loop:
					jr $31
					ori $4,1
					exit:

8	LW-WB-RS	lw	WB	rs	ori $1,4
					ori $2,0x301c
					sw $2,0($0)
					jal loop
					lw $31,0($0)
					ori $2,1
					ori $3,1
					j exit
					ori $8,1
					loop:
					ori $5,1
					jr $31
					ori $4,1
					exit:

9	LW-W-RS	lw	WB	rs	ori $1,4
					ori $2,0x301c
					sw $2,0($0)
					jal loop
					lw $31,0($0)
					ori $2,1
					ori $3,1
					j exit
					ori $8,1
					loop:
					ori $5,1
					ori $6,1
					jr $31
					ori $4,1
					exit:

10	J-M-RS	jal	WB	rs	ori $1,4 jal loop addu $31,$31,$1 ori $2,1 ori $3,1 j exit ori $8,1 loop: jr $31 ori $4,1 exit:
11	J-W-RS	jal	WB	rs	ori $1,4 jal loop addu $31,$31,$1 ori $2,1 ori $3,1 j exit ori $8,1 loop: ori $5,1 jr $31 ori $4,1 exit: