暂停

D-E冲突：

|  |  |  |  |
| --- | --- | --- | --- |
| 当前指令 | 前指令 | 冲突寄存器 | 测试代码 |
| b | r(rd) | rs | ori $4, 4  ori $5, 4  addu $4, $0, $4  beq $4, $5, loop |
|  |  | rt | ori $4, 4  ori $5, 4  addu $4, $0, $4  beq $5, $4, loop |
|  | r\_no\_rs(rd) | rs | ori $5, 4  sll $4, $5, 1  beq $4, $5, loop |
|  |  | rt | ori $5, 4  sll $4, $5, 1  beq $5, $4, loop |
|  | i(rd) | rs | ori $5, 5  addiu $4, $0, 4  beq $4, $5, loop |
|  |  | rt | ori $5, 5  addiu $4, $0, 4  beq $5, $4, loop |
|  | i\_no\_rs(rd) | rs | lui $4, 0xffff  beq $4, $5, loop |
|  |  | rt | lui $4, 0xffff  beq $5, $4, loop |
|  | ld(rt) | rs | ld $4, 0($0)  beq $4, $5, loop |
|  |  | rt | lw $4, 0($0)  beq $5, $4, loop |
|  | mf(rt) | rs | mflo $4  beq $4, $5, loop |
|  |  | rt | mflo $4  beq $5, $4, loop |
| is\_b\_no\_rt | r(rd) | rs | ori $4, 4  ori $5, 4  addu $4, $0, $4  beq $4, $5, loop |
|  | r\_no\_rs(rd) | rs | ori $5, 4  sll $4, $5, 1  beq $4, $5, loop |
|  | i(rd) | rs | ori $5, 5  addiu $4, $0, 4  beq $4, $5, loop |
|  | i\_no\_rs(rd) | rs | lui $4, 0xffff  beq $4, $5, loop |
|  | ld(rt) | rs | lw $4, 0($0)  beq $4, $5, loop |
|  | mf(rt) | rs | mflo $4  beq $4, $5, loop |
| r | ld(rt) | rs | lw $4, 0($0)  addu $4, $4, $5 |
|  |  | rt | lw $4, 0($0)  addu $4, $5, $4 |
| r\_no\_rs | ld(rt) | rt | lw $4, 0($0)  sll $4, $4, 4 |
| i | ld(rt) | rs | lw $4, 0($0)  addiu $4, $4, 4 |
| ld | ld(rt) | rs | lw $4, 0($0)  lw $4, 0($4) |
| s | ld(rt) | rs | lw $4, 0($0)  sw $5, 0($4) |
| jalr(b\_no\_rt) |  |  |  |
| jr(b\_no\_rt) |  |  |  |
| hilo(r) |  |  |  |
| mt(i) |  |  |  |

D-M冲突：

|  |  |  |  |
| --- | --- | --- | --- |
| 当前指令 | 前指令 | 冲突寄存器 | 测试代码 |
| b | ld(rt) | rs | lw $4, 0($5)  beq $4, $5, loop |
|  |  | rt | lw $4, 0($5)  beq $5, $4, loop |
| b\_no\_rt(jalr,jr) | r\_no\_rs(rd) | rs | lw $4, 0($5)  beq $4, $5, loop |

转发

D-E冲突：

|  |  |  |
| --- | --- | --- |
| D | 冲突寄存器 | E |
| b | rs(31) | jal |
| b\_no\_rt | rs(31) | jal |
| r | rs(31) | jal |
| i | rs(31) | jal |
| ld | rs(31) | jal |
| s | rs(31) | jal |
| jalr | rs(31) | jal |
| jr | rs(31) | jal |
| mt | rs(31) | jal |
| hilo | rs(31) | jal |
| b | rs(31) | jalr |
| b\_no\_rt | rs(31) | jalr |
| r | rs(31) | jalr |
| i | rs(31) | jalr |
| ld | rs(31) | jalr |
| s | rs(31) | jalr |
| jalr | rs(31) | jalr |
| jr | rs(31) | jalr |
| mt | rs(31) | jalr |
| hilo | rs(31) | jalr |