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Lab3报告

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实验目标

1.实现指令beq bne blt bge bltu bgeu slti sltiu slli srli srai sll slt sltu srl sra slliw srliw sraiw sllw srlw sraw auipc jalr jal

实验过程

- 1.首先修改译码部分, 这个的实现很简单, 和前两个lab一致。
- 2.修改pcselect部分。原本只有pc+4,现在要根据跳转指令考虑跳转的地址。这个用简单的选择分支就可以实现。
- 3.对于位移指令,要扩展alu功能,添加位移计算:

4.为了解决跳转指令导致的数据冒险,在原本的bubble判断条件上增加了这个:

```
assign hazard_jalr = (~stall && dataD.ctl.op == JALR)
&&((~dataM.stall && ra1 == dataE.dst) ||
(~dataM.stall && ra1 == dataM.dst) ||
(~dataW.stall && ra1 == dataW.dst));
```

JALR指令使用寄存器值作为跳转目标地址,必须确保读取的是最新值。为了防止前面指令可能还在 EX/MEM/WB阶段未写回寄存器,增加了这类bubble。

实验结果

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hit good trap。能顺利执行测试指令。

```
Run conwaygame
Play Conway's life game for 200 rounds.
seed=6132187
                                  **
[src/cpu/cpu-exec.c:393,cpu_exec] nemu: HIT GOOD TRAP at pc = 0x000000000000000152c0
[src/cpu/cpu-exec.c:394,cpu_exec] trap code:0
[src/cpu/cpu-exec.c:74,monitor_statistic] host time spent = 10012615 us
[src/cpu/cpu-exec.c:76,monitor_statistic] total guest instructions = 59247580
[src/cpu/cpu-exec.c:77,monitor_statistic] simulation frequency = 5917293 instr/s
Program execution has ended. To restart the program, exit NEMU and run again.
sh: 1: spike-dasm: not found
====== Commit Group Trace (Core 0) ========
commit group [0]: pc 00800152bc cmtcnt 1
commit group [1]: pc 00800152c0 cmtcnt 1
commit group [2]: pc 00800152c4 cmtcnt 1 <--
commit group [3]: pc 0080010270 cmtcnt 1
```