# 指令级验证

143条指令，全部验证正确

1.3.1 (and): 133ms correctness

1.3.2 (and.): 74ms correctness

1.3.3 (andc): 51ms correctness

1.3.4 (andc.): 57ms correctness

1.3.5 (andi.): 53ms correctness

1.3.6 (andis.): 44ms correctness

1.3.7 (nand): 48ms correctness

1.3.8 (nand.): 52ms correctness

1.3.9 (nor): 49ms correctness

1.3.10 (nor.): 46ms correctness

1.3.11 (or): 45ms correctness

1.3.12 (or.): 40ms correctness

1.3.13 (orc): 43ms correctness

1.3.14 (orc.): 43ms correctness

1.3.15 (ori): 54ms correctness

1.3.16 (oris): 38ms correctness

1.3.17 (xor): 40ms correctness

1.3.18 (xor.): 38ms correctness

1.3.19 (xori): 43ms correctness

1.3.20 (xoris): 34ms correctness

1.3.21 (eqv): 42ms correctness

1.3.22 (eqv.): 45ms correctness

1.4.1 (add): 36ms correctness

1.4.2 (add.): 37ms correctness

1.4.3 (addo): 43ms correctness

1.4.4 (addo.): 48ms correctness

1.4.5 (addc): 39ms correctness

1.4.6 (addc.): 77ms correctness

1.4.7 (addco): 39ms correctness

1.4.8 (addco.): 38ms correctness

1.4.9 (adde): 50ms correctness

1.4.10 (adde.): 41ms correctness

1.4.11 (addeo): 48ms correctness

1.4.12 (addeo.): 48ms correctness

1.4.13 (addi): 49ms correctness

1.4.14 (addic): 41ms correctness

1.4.15 (addic.): 41ms correctness

1.4.16 (addis): 52ms correctness

1.4.17 (addme): 37ms correctness

1.4.18 (addme.): 36ms correctness

1.4.19 (addmeo): 55ms correctness

1.4.20 (addmeo.): 37ms correctness

1.4.21 (addze): 60ms correctness

1.4.22 (addze.): 36ms correctness

1.4.23 (addzeo): 37ms correctness

1.4.24 (addzeo.): 48ms correctness

1.4.25 (neg): 39ms correctness

1.4.26 (neg.): 54ms correctness

1.4.27 (nego): 37ms correctness

1.4.28 (nego.): 36ms correctness

1.4.29 (subf): 40ms correctness

1.4.30 (subf.): 47ms correctness

1.4.31 (subfo): 34ms correctness

1.4.32 (subfo.): 38ms correctness

1.4.33 (subfc): 44ms correctness

1.4.34 (subfc.): 35ms correctness

1.4.35 (subfco): 44ms correctness

1.4.36 (subfco.): 37ms correctness

1.4.37 (subfe): 40ms correctness

1.4.38 (subfe.): 31ms correctness

1.4.39 (subfeo): 40ms correctness

1.4.40 (subfeo.): 39ms correctness

1.4.41 (subfic): 49ms correctness

1.4.42 (subfme): 35ms correctness

1.4.43 (subfme.): 33ms correctness

1.4.44 (subfmeo): 48ms correctness

1.4.45 (subfmeo.): 31ms correctness

1.4.46 (subfze): 35ms correctness

1.4.47 (subfze.): 37ms correctness

1.4.48 (subfzeo): 42ms correctness

1.4.49 (subfzeo.): 39ms correctness

1.5.1 (divw): 43ms correctness

1.5.2 (divw.): 28ms correctness

1.5.3 (divwo): 31ms correctness

1.5.4 (divwo.): 32ms correctness

1.5.5 (divwu): 49ms correctness

1.5.6 (divwu.): 32ms correctness

1.5.7 (divwuo): 32ms correctness

1.5.8 (divwuo.): 32ms correctness

1.5.9 (mulhw): 33ms correctness

1.5.10 (mulhw.): 35ms correctness

1.5.11 (mulhwu): 37ms correctness

1.5.12 (mulhwu.): 32ms correctness

1.5.13 (mulli): 45ms correctness

1.5.14 (mullw): 33ms correctness

1.5.15 (mullw.): 34ms correctness

1.5.16 (mullwo): 31ms correctness

1.5.17 (mullwo.): 29ms correctness

1.6.1.1 (b): 31ms correctness

1.6.1.2 (ba): 39ms correctness

1.6.1.3 (bl): 30ms correctness

1.6.1.4 (bla): 30ms correctness

1.7.1 (cmp): 28ms correctness

1.7.2 (cmpi): 32ms correctness

1.7.3 (cmpl): 46ms correctness

1.7.4 (cmpli): 32ms correctness

1.8.1 (slw): 35ms correctness

1.8.2 (slw.): 38ms correctness

1.8.3 (sraw): 28ms correctness

1.8.4 (sraw.): 35ms correctness

1.8.5 (srawi): 32ms correctness

1.8.6 (srawi.): 29ms correctness

1.8.7 (srw): 32ms correctness

1.8.8 (srw.): 31ms correctness

1.9.1 (lbz): 35ms correctness

1.9.2 (lbzu): 34ms correctness

1.9.3 (lbzux): 26ms correctness

1.9.4 (lbzx): 25ms correctness

1.9.5 (lha): 26ms correctness

1.9.6 (lhau): 28ms correctness

1.9.7 (lhaux): 25ms correctness

1.9.8 (lhax): 28ms correctness

1.9.9 (lhbrx): 26ms correctness

1.9.10 (lhz): 30ms correctness

1.9.11 (lhzu): 30ms correctness

1.9.12 (lhzux): 29ms correctness

1.9.13 (lhzx): 27ms correctness

1.9.14 (lwbrx): 29ms correctness

1.9.15 (lwz): 28ms correctness

1.9.16 (lwzu): 31ms correctness

1.9.17 (lwzux): 26ms correctness

1.9.18 (lwzx): 26ms correctness

1.10.1 (stb): 24ms correctness

1.10.2 (stbu): 26ms correctness

1.10.3 (stbux): 28ms correctness

1.10.4 (stbx): 24ms correctness

1.10.5 (sth): 30ms correctness

1.10.6 (sthbrx): 27ms correctness

1.10.7 (sthu): 26ms correctness

1.10.8 (sthux): 29ms correctness

1.10.9 (sthx): 31ms correctness

1.10.10 (stw): 26ms correctness

1.10.11 (stwbrx): 30ms correctness

1.10.12 (stwu): 29ms correctness

1.10.13 (stwux): 29ms correctness

1.10.14 (stwx): 31ms correctness

1.12.1 (crand): 74ms correctness

1.12.2 (crandc): 54ms correctness

1.12.3 (creqv): 52ms correctness

1.12.4 (crnand): 42ms correctness

1.12.5 (crnor): 47ms correctness

1.12.6 (cror): 65ms correctness

1.12.7 (crxor): 42ms correctness

# CPU结构级验证（2条指令综合）

CPU结构：and和lbz两条指令综合

验证143条指令的指称语义，and和lbz验证正确，其余错误

总时间7615ms

Initializing system: 493ms

1.3.1 (and): 308ms correctness

1.3.2 (and.): 85ms incorrectness

1.3.3 (andc): 88ms incorrectness

1.3.4 (andc.): 81ms incorrectness

1.3.5 (andi.): 80ms incorrectness

1.3.6 (andis.): 65ms incorrectness

1.3.7 (nand): 91ms incorrectness

1.3.8 (nand.): 78ms incorrectness

1.3.9 (nor): 71ms incorrectness

1.3.10 (nor.): 57ms incorrectness

1.3.11 (or): 61ms incorrectness

1.3.12 (or.): 67ms incorrectness

1.3.13 (orc): 60ms incorrectness

1.3.14 (orc.): 54ms incorrectness

1.3.15 (ori): 62ms incorrectness

1.3.16 (oris): 62ms incorrectness

1.3.17 (xor): 57ms incorrectness

1.3.18 (xor.): 56ms incorrectness

1.3.19 (xori): 78ms incorrectness

1.3.20 (xoris): 51ms incorrectness

1.3.21 (eqv): 48ms incorrectness

1.3.22 (eqv.): 50ms incorrectness

1.4.1 (add): 50ms incorrectness

1.4.2 (add.): 56ms incorrectness

1.4.3 (addo): 57ms incorrectness

1.4.4 (addo.): 66ms incorrectness

1.4.5 (addc): 58ms incorrectness

1.4.6 (addc.): 52ms incorrectness

1.4.7 (addco): 65ms incorrectness

1.4.8 (addco.): 64ms incorrectness

1.4.9 (adde): 61ms incorrectness

1.4.10 (adde.): 68ms incorrectness

1.4.11 (addeo): 50ms incorrectness

1.4.12 (addeo.): 50ms incorrectness

1.4.13 (addi): 56ms incorrectness

1.4.14 (addic): 53ms incorrectness

1.4.15 (addic.): 57ms incorrectness

1.4.16 (addis): 55ms incorrectness

1.4.17 (addme): 54ms incorrectness

1.4.18 (addme.): 55ms incorrectness

1.4.19 (addmeo): 71ms incorrectness

1.4.20 (addmeo.): 60ms incorrectness

1.4.21 (addze): 69ms incorrectness

1.4.22 (addze.): 52ms incorrectness

1.4.23 (addzeo): 54ms incorrectness

1.4.24 (addzeo.): 63ms incorrectness

1.4.25 (neg): 55ms incorrectness

1.4.26 (neg.): 77ms incorrectness

1.4.27 (nego): 128ms incorrectness

1.4.28 (nego.): 58ms incorrectness

1.4.29 (subf): 57ms incorrectness

1.4.30 (subf.): 64ms incorrectness

1.4.31 (subfo): 62ms incorrectness

1.4.32 (subfo.): 62ms incorrectness

1.4.33 (subfc): 95ms incorrectness

1.4.34 (subfc.): 53ms incorrectness

1.4.35 (subfco): 51ms incorrectness

1.4.36 (subfco.): 50ms incorrectness

1.4.37 (subfe): 51ms incorrectness

1.4.38 (subfe.): 71ms incorrectness

1.4.39 (subfeo): 53ms incorrectness

1.4.40 (subfeo.): 47ms incorrectness

1.4.41 (subfic): 51ms incorrectness

1.4.42 (subfme): 55ms incorrectness

1.4.43 (subfme.): 43ms incorrectness

1.4.44 (subfmeo): 44ms incorrectness

1.4.45 (subfmeo.): 45ms incorrectness

1.4.46 (subfze): 45ms incorrectness

1.4.47 (subfze.): 47ms incorrectness

1.4.48 (subfzeo): 50ms incorrectness

1.4.49 (subfzeo.): 45ms incorrectness

1.5.1 (divw): 43ms incorrectness

1.5.2 (divw.): 51ms incorrectness

1.5.3 (divwo): 55ms incorrectness

1.5.4 (divwo.): 49ms incorrectness

1.5.5 (divwu): 51ms incorrectness

1.5.6 (divwu.): 49ms incorrectness

1.5.7 (divwuo): 43ms incorrectness

1.5.8 (divwuo.): 47ms incorrectness

1.5.9 (mulhw): 68ms incorrectness

1.5.10 (mulhw.): 46ms incorrectness

1.5.11 (mulhwu): 42ms incorrectness

1.5.12 (mulhwu.): 44ms incorrectness

1.5.13 (mulli): 47ms incorrectness

1.5.14 (mullw): 50ms incorrectness

1.5.15 (mullw.): 42ms incorrectness

1.5.16 (mullwo): 41ms incorrectness

1.5.17 (mullwo.): 40ms incorrectness

1.6.1.1 (b): 40ms incorrectness

1.6.1.2 (ba): 43ms incorrectness

1.6.1.3 (bl): 42ms incorrectness

1.6.1.4 (bla): 45ms incorrectness

1.7.1 (cmp): 44ms incorrectness

1.7.2 (cmpi): 40ms incorrectness

1.7.3 (cmpl): 46ms incorrectness

1.7.4 (cmpli): 39ms incorrectness

1.8.1 (slw): 44ms incorrectness

1.8.2 (slw.): 43ms incorrectness

1.8.3 (sraw): 40ms incorrectness

1.8.4 (sraw.): 41ms incorrectness

1.8.5 (srawi): 44ms incorrectness

1.8.6 (srawi.): 43ms incorrectness

1.8.7 (srw): 38ms incorrectness

1.8.8 (srw.): 40ms incorrectness

1.9.1 (lbz): 48ms correctness

1.9.2 (lbzu): 41ms incorrectness

1.9.3 (lbzux): 38ms incorrectness

1.9.4 (lbzx): 39ms incorrectness

1.9.5 (lha): 53ms incorrectness

1.9.6 (lhau): 40ms incorrectness

1.9.7 (lhaux): 39ms incorrectness

1.9.8 (lhax): 39ms incorrectness

1.9.9 (lhbrx): 37ms incorrectness

1.9.10 (lhz): 43ms incorrectness

1.9.11 (lhzu): 38ms incorrectness

1.9.12 (lhzux): 37ms incorrectness

1.9.13 (lhzx): 39ms incorrectness

1.9.14 (lwbrx): 37ms incorrectness

1.9.15 (lwz): 41ms incorrectness

1.9.16 (lwzu): 39ms incorrectness

1.9.17 (lwzux): 38ms incorrectness

1.9.18 (lwzx): 36ms incorrectness

1.10.1 (stb): 40ms incorrectness

1.10.2 (stbu): 38ms incorrectness

1.10.3 (stbux): 44ms incorrectness

1.10.4 (stbx): 41ms incorrectness

1.10.5 (sth): 40ms incorrectness

1.10.6 (sthbrx): 44ms incorrectness

1.10.7 (sthu): 37ms incorrectness

1.10.8 (sthux): 40ms incorrectness

1.10.9 (sthx): 39ms incorrectness

1.10.10 (stw): 38ms incorrectness

1.10.11 (stwbrx): 41ms incorrectness

1.10.12 (stwu): 39ms incorrectness

1.10.13 (stwux): 40ms incorrectness

1.10.14 (stwx): 40ms incorrectness

1.12.1 (crand): 41ms incorrectness

1.12.2 (crandc): 42ms incorrectness

1.12.3 (creqv): 39ms incorrectness

1.12.4 (crnand): 40ms incorrectness

1.12.5 (crnor): 39ms incorrectness

1.12.6 (cror): 44ms incorrectness

1.12.7 (crxor): 42ms incorrectness

Total Time: 7615ms

# CPU结构级验证（143条指令综合）

CPU结构：143条指令综合

验证143条指令的指称语义，部分验证正确，其余错误

总时间81130ms

Initializing system: 506ms

1.3.1 (and): 15198ms incorrectness

1.3.2 (and.): 629ms correctness

1.3.3 (andc): 508ms incorrectness

1.3.4 (andc.): 632ms correctness

1.3.5 (andi.): 591ms correctness

1.3.6 (andis.): 508ms correctness

1.3.7 (nand): 500ms incorrectness

1.3.8 (nand.): 462ms correctness

1.3.9 (nor): 463ms incorrectness

1.3.10 (nor.): 456ms correctness

1.3.11 (or): 464ms incorrectness

1.3.12 (or.): 496ms correctness

1.3.13 (orc): 483ms correctness

1.3.14 (orc.): 456ms correctness

1.3.15 (ori): 472ms incorrectness

1.3.16 (oris): 450ms correctness

1.3.17 (xor): 445ms incorrectness

1.3.18 (xor.): 488ms correctness

1.3.19 (xori): 475ms incorrectness

1.3.20 (xoris): 491ms correctness

1.3.21 (eqv): 458ms incorrectness

1.3.22 (eqv.): 457ms correctness

1.4.1 (add): 465ms incorrectness

1.4.2 (add.): 456ms correctness

1.4.3 (addo): 454ms correctness

1.4.4 (addo.): 463ms correctness

1.4.5 (addc): 456ms correctness

1.4.6 (addc.): 452ms correctness

1.4.7 (addco): 470ms correctness

1.4.8 (addco.): 650ms correctness

1.4.9 (adde): 454ms correctness

1.4.10 (adde.): 456ms correctness

1.4.11 (addeo): 453ms correctness

1.4.12 (addeo.): 452ms correctness

1.4.13 (addi): 463ms incorrectness

1.4.14 (addic): 497ms correctness

1.4.15 (addic.): 450ms correctness

1.4.16 (addis): 457ms correctness

1.4.17 (addme): 449ms correctness

1.4.18 (addme.): 453ms correctness

1.4.19 (addmeo): 459ms correctness

1.4.20 (addmeo.): 455ms correctness

1.4.21 (addze): 470ms correctness

1.4.22 (addze.): 494ms correctness

1.4.23 (addzeo): 452ms correctness

1.4.24 (addzeo.): 452ms correctness

1.4.25 (neg): 463ms correctness

1.4.26 (neg.): 448ms correctness

1.4.27 (nego): 459ms correctness

1.4.28 (nego.): 464ms correctness

1.4.29 (subf): 440ms incorrectness

1.4.30 (subf.): 450ms correctness

1.4.31 (subfo): 496ms correctness

1.4.32 (subfo.): 456ms correctness

1.4.33 (subfc): 448ms correctness

1.4.34 (subfc.): 461ms incorrectness

1.4.35 (subfco): 459ms correctness

1.4.36 (subfco.): 451ms correctness

1.4.37 (subfe): 471ms correctness

1.4.38 (subfe.): 472ms correctness

1.4.39 (subfeo): 449ms correctness

1.4.40 (subfeo.): 474ms correctness

1.4.41 (subfic): 455ms correctness

1.4.42 (subfme): 514ms correctness

1.4.43 (subfme.): 467ms incorrectness

1.4.44 (subfmeo): 455ms correctness

1.4.45 (subfmeo.): 463ms correctness

1.4.46 (subfze): 489ms correctness

1.4.47 (subfze.): 470ms correctness

1.4.48 (subfzeo): 496ms correctness

1.4.49 (subfzeo.): 468ms correctness

1.5.1 (divw): 460ms correctness

1.5.2 (divw.): 445ms correctness

1.5.3 (divwo): 462ms correctness

1.5.4 (divwo.): 457ms correctness

1.5.5 (divwu): 447ms correctness

1.5.6 (divwu.): 473ms correctness

1.5.7 (divwuo): 449ms correctness

1.5.8 (divwuo.): 450ms correctness

1.5.9 (mulhw): 471ms correctness

1.5.10 (mulhw.): 450ms correctness

1.5.11 (mulhwu): 446ms correctness

1.5.12 (mulhwu.): 457ms correctness

1.5.13 (mulli): 445ms correctness

1.5.14 (mullw): 468ms correctness

1.5.15 (mullw.): 456ms incorrectness

1.5.16 (mullwo): 447ms correctness

1.5.17 (mullwo.): 472ms correctness

1.6.1.1 (b): 453ms incorrectness

1.6.1.2 (ba): 455ms correctness

1.6.1.3 (bl): 450ms incorrectness

1.6.1.4 (bla): 466ms correctness

1.7.1 (cmp): 445ms incorrectness

1.7.2 (cmpi): 480ms correctness

1.7.3 (cmpl): 452ms incorrectness

1.7.4 (cmpli): 450ms correctness

1.8.1 (slw): 450ms correctness

1.8.2 (slw.): 461ms incorrectness

1.8.3 (sraw): 446ms correctness

1.8.4 (sraw.): 467ms correctness

1.8.5 (srawi): 448ms correctness

1.8.6 (srawi.): 457ms correctness

1.8.7 (srw): 464ms correctness

1.8.8 (srw.): 451ms correctness

1.9.1 (lbz): 442ms incorrectness

1.9.2 (lbzu): 461ms incorrectness

1.9.3 (lbzux): 450ms correctness

1.9.4 (lbzx): 446ms correctness

1.9.5 (lha): 456ms incorrectness

1.9.6 (lhau): 447ms incorrectness

1.9.7 (lhaux): 447ms correctness

1.9.8 (lhax): 461ms correctness

1.9.9 (lhbrx): 449ms correctness

1.9.10 (lhz): 442ms incorrectness

1.9.11 (lhzu): 454ms incorrectness

1.9.12 (lhzux): 475ms correctness

1.9.13 (lhzx): 449ms correctness

1.9.14 (lwbrx): 457ms correctness

1.9.15 (lwz): 438ms incorrectness

1.9.16 (lwzu): 440ms incorrectness

1.9.17 (lwzux): 457ms correctness

1.9.18 (lwzx): 447ms correctness

1.10.1 (stb): 441ms incorrectness

1.10.2 (stbu): 448ms incorrectness

1.10.3 (stbux): 462ms correctness

1.10.4 (stbx): 451ms correctness

1.10.5 (sth): 453ms incorrectness

1.10.6 (sthbrx): 447ms correctness

1.10.7 (sthu): 444ms incorrectness

1.10.8 (sthux): 451ms correctness

1.10.9 (sthx): 444ms correctness

1.10.10 (stw): 458ms incorrectness

1.10.11 (stwbrx): 476ms correctness

1.10.12 (stwu): 445ms incorrectness

1.10.13 (stwux): 445ms correctness

1.10.14 (stwx): 475ms correctness

1.12.1 (crand): 443ms correctness

1.12.2 (crandc): 448ms correctness

1.12.3 (creqv): 456ms correctness

1.12.4 (crnand): 460ms correctness

1.12.5 (crnor): 441ms correctness

1.12.6 (cror): 472ms correctness

1.12.7 (crxor): 450ms correctness

Total Time: 81130ms