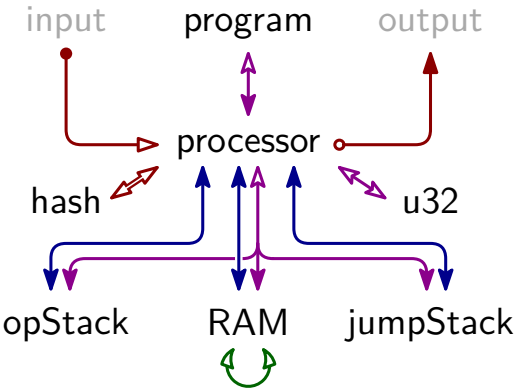


| | | | | |
|-----|-----------------|----------------|---|---|
| 2 | \ominus | pop | - st ₀ | - |
| 1 | \oplus | push + a | - | - a |
| 8 | \oplus | divine | - | - a |
| 9 | \oplus | dup + i | - st ₁₅ ... st ₀ | - st ₁₅ ... st ₀ st _i |
| 17 | \bigcirc^{16} | swap + i | - ... st _i ... st ₀ | - ... st ₀ ... st _i |
| 16 | \bigcirc | nop | - | - |
| 10 | \ominus | skiz | - st ₀ | - |
| 25 | \bigcirc | call + d | - | - |
| 24 | \bigcirc | return | - | - |
| 32 | \bigcirc | recurse | - | - |
| 18 | \ominus | assert | - st ₀ | - |
| 0 | \bigcirc | halt | - | - |
| 40 | \ominus | read_mem | - addr st ₀ | - addr val |
| 26 | \oplus | write_mem | - addr val | - addr val |
| 48 | \bigcirc^{10} | hash | - st ₉ ... st ₀ | - d ₄ ... d ₀ 0 ... 0 |
| 56 | \bigcirc^{11} | divine_sibling | - idx st ₉ ... st ₅ d ₄ ... d ₀ | - idx >> 1 r ₄ ... r ₀ l ₄ ... l ₀ |
| 64 | \bigcirc | assert_vector | - | - |
| 72 | \bigcirc | absorb_init | - | - |
| 80 | \bigcirc | absorb | - | - |
| 88 | \bigcirc^{10} | squeeze | - st ₉ ... st ₀ | - sq ₉ ... sq ₀ |
| 34 | \ominus^1 | add | - st ₁ st ₀ | - sum |
| 42 | \ominus^1 | mul | - st ₁ st ₀ | - prod |
| 96 | \bigcirc^1 | invert | - st ₀ | - st ₀ ⁻¹ |
| 50 | \ominus^1 | eq | - st ₁ st ₀ | - (st ₀ ==st ₁) |
| 4 | \oplus^2 | split | - st ₀ | - hi lo |
| 12 | \ominus^1 | lt | - st ₁ st ₀ | - (st ₀ <st ₁) |
| 20 | \ominus^1 | and | - st ₁ st ₀ | - (st ₀ &st ₁) |
| 28 | \ominus^1 | xor | - st ₁ st ₀ | - (st ₀ ^st ₁) |
| 36 | \bigcirc^1 | log_2_floor | - st ₀ | - ⌊log ₂ (st ₀)⌋ |
| 44 | \ominus^1 | pow | - e b | - b ^e |
| 52 | \bigcirc^2 | div | - denom num | - quot rem |
| 104 | \bigcirc^3 | xxadd | - y ₂ y ₁ y ₀ x ₂ x ₁ x ₀ | - y ₂ y ₁ y ₀ z ₂ z ₁ z ₀ |
| 112 | \bigcirc^3 | xxmul | - y ₂ y ₁ y ₀ x ₂ x ₁ x ₀ | - y ₂ y ₁ y ₀ z ₂ z ₁ z ₀ |
| 120 | \bigcirc^3 | xinvert | - x ₂ x ₁ x ₀ | - y ₂ y ₁ y ₀ |
| 58 | \ominus^3 | xbmul | - x ₂ x ₁ x ₀ b | - y ₂ y ₁ y ₀ |
| 128 | \oplus | read_io | - | - a |
| 66 | \ominus | write_io | - st ₀ | - |

| Table | Base Columns | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--------------|-------------------------------|-------------|----|-------------|--------|-----|--------------------|--------|--------------------|-----|-----------|-----|-----|------|------------|-----|-----|-------------|------------|------|------|---------|------|--|--|
| Program | Address | | | | Instruction | | | LookupMultiplicity | | | | IsPadding | | | | | | | | | | | | | | |
| Processor | CLK | IsPadding | IP | PI | CI | NIA | IB0 | ... | IB7 | JSP | JS0 | JSD | ST0 | ... | ST15 | OSP | OSV | HV0 | ... | HV3 | RAMP | RAMV | cjd_mul | | | |
| OpStack | CLK | IB1 ($\hat{=}$ shrink stack) | | | | | | | | | | | | | | OSP | OSV | | | | | | | | | |
| RAM | CLK | | | | PI | | | bcp0 | bcp1 | | | | | | | | | | | RAMDiffInv | | | RAMP | RAMV | | |
| JumpStack | CLK | | | | CI | | | | | JSP | JS0 | JSD | | | | | | | | | | | | | | |
| Hash | RoundNumber | | | | CI | | | | | | | | ST0 | ... | ST15 | CONSTANT0A | | ... | CONSTANT15B | | | | | | | |
| U32 | CF | Bits | Bits-33_inv | CI | LHS | LhsInv | RHS | RhsInv | Result | LookupMultiplicity | | | | | | | | | | | | | | | | |

| #clk | instruction |
|------|-------------|
| 2 | neg |
| 4 | sub |
| 7 | is_u32 |
| 3 | lsb |

| | base | ext | Σ |
|-----------|------|-----|----------|
| Program | 4 | 1 | 5 |
| Processor | 42 | 11 | 53 |
| OpStack | 4 | 2 | 6 |
| RAM | 7 | 6 | 13 |
| JumpStack | 5 | 2 | 7 |
| Hash | 50 | 3 | 53 |
| U32 | 10 | 1 | 11 |
| Σ | 122 | 26 | 148 |



$$p = 18446744069414584321$$

| i | $\mathbb{F}_p(1/i)$ | $-\mathbb{F}_p(1/i)$ |
|-----|---------------------|----------------------|
| 2 | 092...161 | 922...160 |
| 3 | 122...881 | 614...440 |
| 4 | 138...241 | 461...080 |
| 5 | 147...457 | 368...864 |
| 6 | 153...601 | 307...720 |

| | init | cons | trans | term | Σ |
|-------------|------|------|-------|------|----------|
| Program | 2 | 1 | 3 | | 6 |
| Processor | 37 | 11 | 73 | 1 | 122 |
| OpStack | 5 | | 4 | | 9 |
| Ram | 8 | | 12 | 1 | 21 |
| JumpStack | 6 | | 6 | | 12 |
| Hash | 5 | 40 | 26 | | 71 |
| U32 | 1 | 14 | 21 | 2 | 38 |
| Cross-Table | | | | 1 | 1 |
| Σ | 64 | 66 | 145 | 5 | 280 |