Mini Frost32 CPU

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Registers

There are 16 general purpose registers: `r0` (always zero), `r1`, `r2`, `r3`, `r4`, `r5`, `r6`, `r7`, `r8`, `r9`, `r10`, `r11`, `r12`, `lr`, `fp`, `sp`

One last register is the program counter, `pc`.

Instructions and Encoding

- **`add rA, rB, rC`**
  - Encoding: `0x0 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`addi rA, rB, simm16`**
  - Encoding: `0x0 a b 0x0 iiii`
- **`rsb rA, rB, rC`**
  - Encoding: `0x1 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`rsbi rA, rB, simm16`**
  - Encoding: `0x1 a b 0x0 iiii`
- **`sltu rA, rB, rC`**
  - Encoding: `0x2 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`sltui rA, rB, simm16`**
  - Encoding: `0x2 a b 0x0 iiii`
- **`slts rA, rB, rC`**
  - Encoding: `0x3 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`sltsi rA, rB, simm16`**
  - Encoding: `0x3 a b 0x0 iiii`
- **`nor rA, rB, rC`**
  - Encoding: `0x4 a b c 0x0000`
  - Encoding Note: `rC != 0`

- **`nori rA, rB, simm16`**
  - Encoding: `0x4 a b 0x0 iiii`
- **`lsl rA, rB, rC`**
  - Encoding: `0x5 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`lsli rA, rB, simm16`**
  - Encoding: `0x5 a b 0x0 iiii`
- **`lsr rA, rB, rC`**
  - Encoding: `0x6 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`lsri rA, rB, simm16`**
  - Encoding: `0x6 a b 0x0 iiii`
- **`asr rA, rB, rC`**
  - Encoding: `0x7 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`asri rA, rB, simm16`**
  - Encoding: `0x7 a b 0x0 iiii`
- **`ldr rA, rB, rC`**
  - Encoding: `0x8 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`ldri rA, rB, simm16`**
  - Encoding: `0x8 a b 0x0 iiii`
- **`str rA, rB, rC`**
  - Encoding: `0x9 a b c 0x0000`
  - Encoding Note: `rC != 0`
- **`stri rA, rB, simm16`**
  - Encoding: `0x9 a b 0x0 iiii`
- Extended Instructions
  - **`lui rA, simm16`**

    - Encoding: `0xf a 0x0 0x0 iiii`
- **`addi rA, pc, simm16`**
    - Encoding: `0xf a 0x0 0x1 iiii`
- **`beq rA, rB, simm16`**
    - Encoding: `0xf a b 0x2 iiii`
- **`bne rA, rB, simm16`**
    - Encoding: `0xf a b 0x3 iiii`
- **`jmp rA`**
    - Encoding: `0xf a 0x0 0x4 0x0000`