ECE366 Project 2, Group 17, Yihua PU

FAST (Fast Assembly Super Turbo)

ISA

## 1. Name

FAST (stands for Fast Assembly Super Turbo) ISA

## 2. Instruction

|  |  |  |  |
| --- | --- | --- | --- |
| Instruction | PC | Machine Code Format | Functionality |
| init Rx, imm | PC++ | 000 xx ii | Rx = imm  imm: [-2,1] |
| ld Rx, (Ry) | PC++ | 001 xx yy | Rx = Mem[Ry] |
| st Rx, (Ry) | PC++ | 010 xx yy | Mem[Ry] = Rx |
| add Rx, Ry | PC++ | 011 xx yy | Rx = Rx + Ry |
| and Rx, Ry | PC++ | 100 xx yy | Rx = Rx & Ry |
| xor Rx, Ry | PC++ | 101 xx yy | Rx = Rx xor Ry |
| rsf Rz, imm | PC++ | 111 z iii | z: {0,1}  imm: [1, 8] |
| beqR imm | if R0==R3:  PC = PC + imm  else:  PC++ | 110 iiii | imm: [-10, 5] |

## 3. Register

|  |  |
| --- | --- |
| Register Name | Number |
| R0 | 00 |
| R1 | 01 |
| R2 | 10 |
| R3 | 11 |

## 4. Memory

#### 4.1 Data Memory

* 16-bit double-byte addressable
* 110 memory units in total
* using 7-bit address.

|  |  |
| --- | --- |
| Address | Memory |
| 000 0000 | Mem[0] |
| 000 0001 | Mem[1] |
| ... | ... |
| 110 1101 | Mem[109] |

#### 4.2 Instruction Memory

* 8-bit byte addressable, PC is initialized at 0
* 64 memory units in total
* using 6-bit address.

|  |  |
| --- | --- |
| Address | Memory |
| 00 0000 | Mem[0] |
| 00 0001 | Mem[1] |
| ... | ... |
| 11 1111 | Mem[63] |