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]