c. C Source Code

case 0xA:

p->r1 = p->mem[data];

break;

case 0xB:

p->mem[data] = p->r0;

break;

case 0xC:

p->mem[data] = p->r1;

break;

case 0xD:

state.cur = data;

return state;

case 0xE:

if (p->r0 == 0) {

state.cur = data;

return state;

}

break;

case 0xF:

if (p->r0 != 0) {

state.cur = data;

return state;

}

break;

default:

printf("Unknown instruction: %d\nHalting...", p->mem[state.cur]);

state.halt = 1;

}

state.cur++;

return state;

}

processor \* run(byte memory[16]) {

processor \* p = malloc(sizeof(processor));

if (p == NULL || memory == NULL) {

return NULL;

}

p->r0 = 0;

p->r1 = 0;

int i;

for (i = 0; i < 16; ++i) {

p->mem[i] = memory[i];

}

program\_state\_t state;

while (state.cur < 16 && !state.halt) {

state = instruction(p, state);

}

return p;

}

#include <stdlib.h>

#include <stdio.h>

#include "4241.h"

program\_state\_t instruction(processor \* p, program\_state\_t state) {

byte cur = state.cur;

byte data = 0;

if (p->mem[cur] >= 0x8) {

// two byte instructions need the data value stored

// and the instruction pointer incremented once more

data = p->mem[++(state.cur)];

}

switch(p->mem[cur]) {

case 0x0:

state.halt = 1;

break;

case 0x1:

p->r0 = (p->r0 + p->r1) % 16;

break;

case 0x2:

p->r0 = (p->r0 - p->r1) % 16;

break;

case 0x3:

p->r0++;

p->r0 %= 16;

break;

case 0x4:

p->r1++;

p->r1 %= 16;

break;

case 0x5:

p->r0--;

p->r0 %= 16;

break;

case 0x6:

p->r1--;

p->r1 %= 16;

break;

case 0x7:

printf("\a");

data = p->r0;

p->r0 = p->r1;

p->r1 = data;

break;

case 0x8:

printf("%d\n", data);

break;

case 0x9:

p->r0 = p->mem[data];

break;

d. HEX Code

e. Project’s Actual Picture

Diagram, schematic

Description automatically generated

REFLECTION

Gimoros

I am really happy because we have learned a lot about computer architecture. We are also able to build our own architectures. It really helps us to become more efficient in project planning and implementation. We are also very thankful because our professor is a master of his class and very hands on to make sure we learned a lot. I am very sure that this new skill that I learned will be used when I will be the one making it in the industry.