Activity 2-2 : Central Processing Unit

Group No : G27

Group Member :

1. Ittipat Yodprasit 6431349821
2. Anik Romyanon 6330571421
3. Waranthorn Chansawang 6432154921
4. Name ID

Part 0 : Preparation

- In part 1, use Activity 2 Reference: SML Instruction Set, which can be downloaded from CourseVille or below:
  https://www.mycourseville.com/sites/all/modules/courseville/files/uploads/2016_1/2110221/materials/sml_instruction_set.333.1471674877.pdf

- In part 2 and 3, Use Brookshear Simple Machine Emulator to perform the indicated tasks
  https://www.mycourseville.com/sites/all/modules/courseville/files/uploads/2016_1/2110221/materials/bme.333.1471675276.htm

- Make a copy of this sheet. Answer the questions in the box given. Share this file with the permission for **anyone with link can view the document**. Submit the URL of this file to CourseVille.
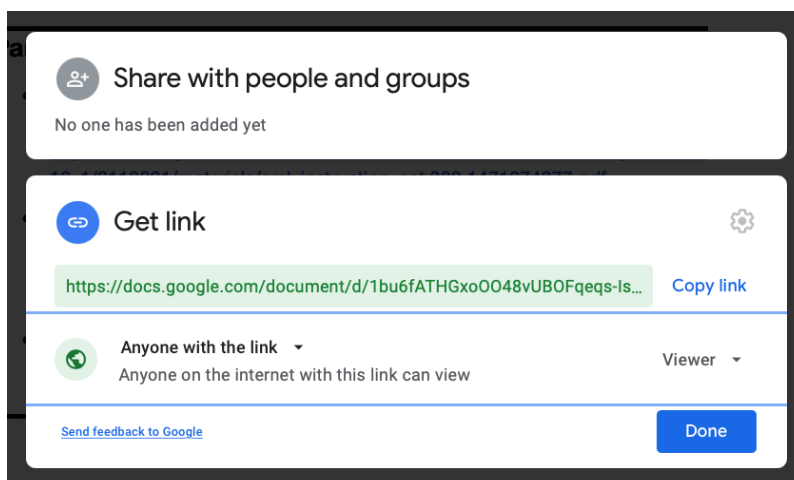
Part 2 : Playing with Emulator (20 minutes)

Suppose the CPU is started with PC=0 and the following values in cells 00-0F and F0-F2 in memory.

Address	Content
00	10
01	F0
02	11
03	F1
04	12
05	F2
06	23
07	01
08	54
09	03
0A	55
0B	41
0C	56
0D	52
0E	57
0F	66
10	37
11	F3
12	C0
13	00

Address	Content
F0	02
F1	03
F2	05

Start the program using "step" button until it complete the first machine cycle (fetch->decode->execute).

Question 2.1 At this point, what is the value stored in:

PC	02
IR	10F0
R0	02

Question 2.2 Execute a single machine cycle again, Record the changes in the registers.

PC	04
IR	11F1
R1	03

Question 2.3 Execute a single machine cycle again, Record the changes in the registers.

PC	06
IR	12F2
R2	05

Question 2.4 Execute a single machine cycle again, Record the changes in the registers.

PC	08
IR	2301
R3	01

Question 2.5 Execute a single machine cycle again, Record the changes in the registers.

PC	0A
IR	5403
R4	03

Question 2.6 What is the PC value when the program changes the value in Register 6?

```
0E
```

Question 2.7 After the program ends, what value does the program store in memory cell F3?

```
16
```

The value in memory cell F3 depends on what is initially stored in cells F0-F2; experiment by starting the machine with different values in those cells, <u>trace the execution of the program step by step, and determine what is being computed</u>

Question 2.8 What is being computed

```
Load r0 with F0
Load r1 with F1
Load r2 with F2
Load r3 with 01
Load r4 with r0 + r3
Load r5 with r4 + r1
Load r6 with r5 + r2
load r7 with r6 + r6
Store r7 to F3

= Compute the value of 2(F0+F1+F2+1)
```