North South University

Department of Electrical & Computer Engineering

LAB REPORT

Course Name: **CSE332L- Computer Organization and Architecture Lab**

Experiment Number: 06

Experiment Name: Build a single cycle datapath

Experiment Date: 28.11.2021

Report Submission Date: 28.11.2021

Section: 07

Group Number:

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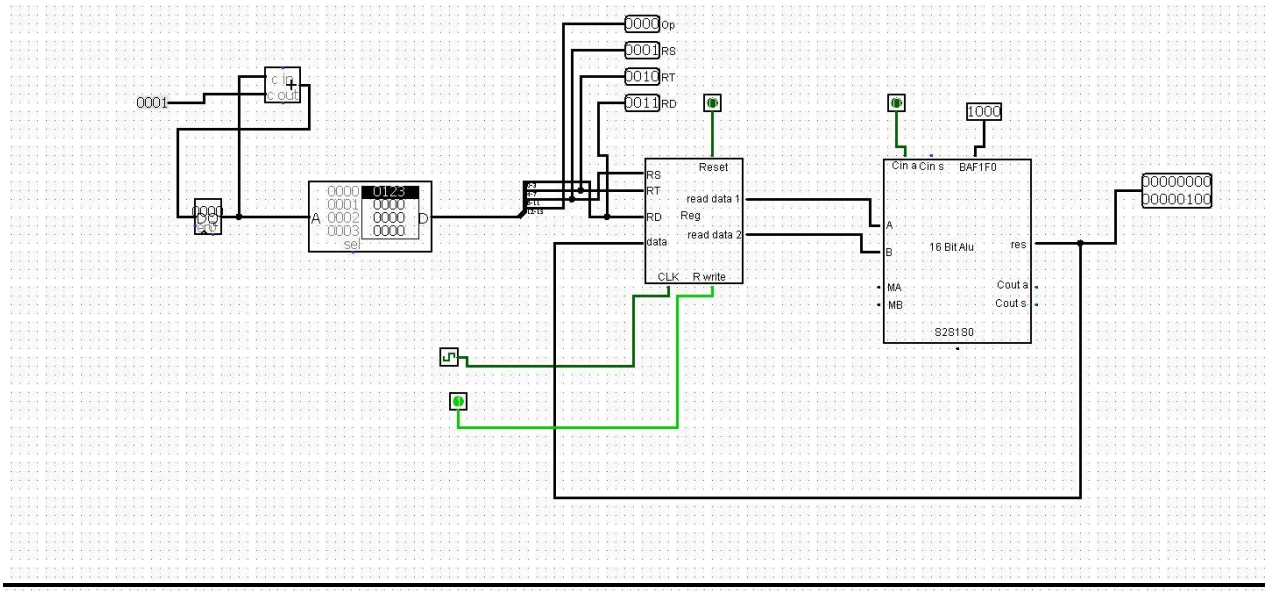
Student ID: **1931746042**	
Remarks:	

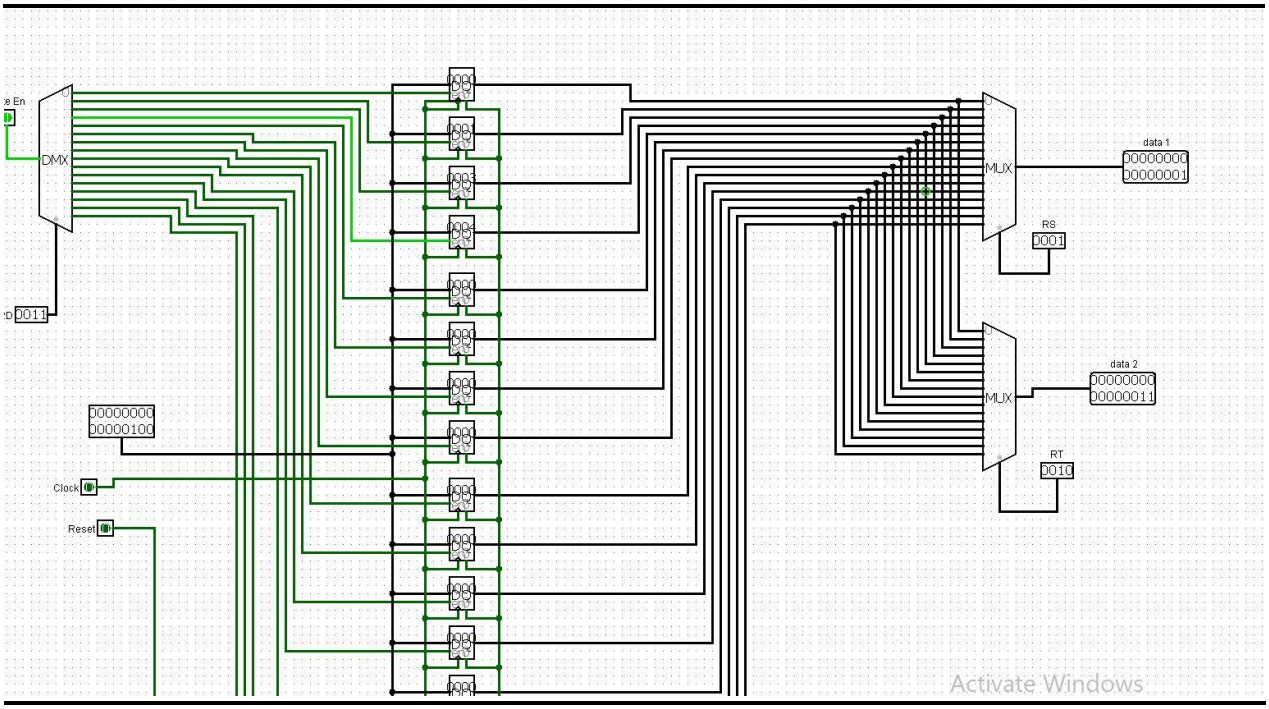
Exp Name: Build a single cycle datapath

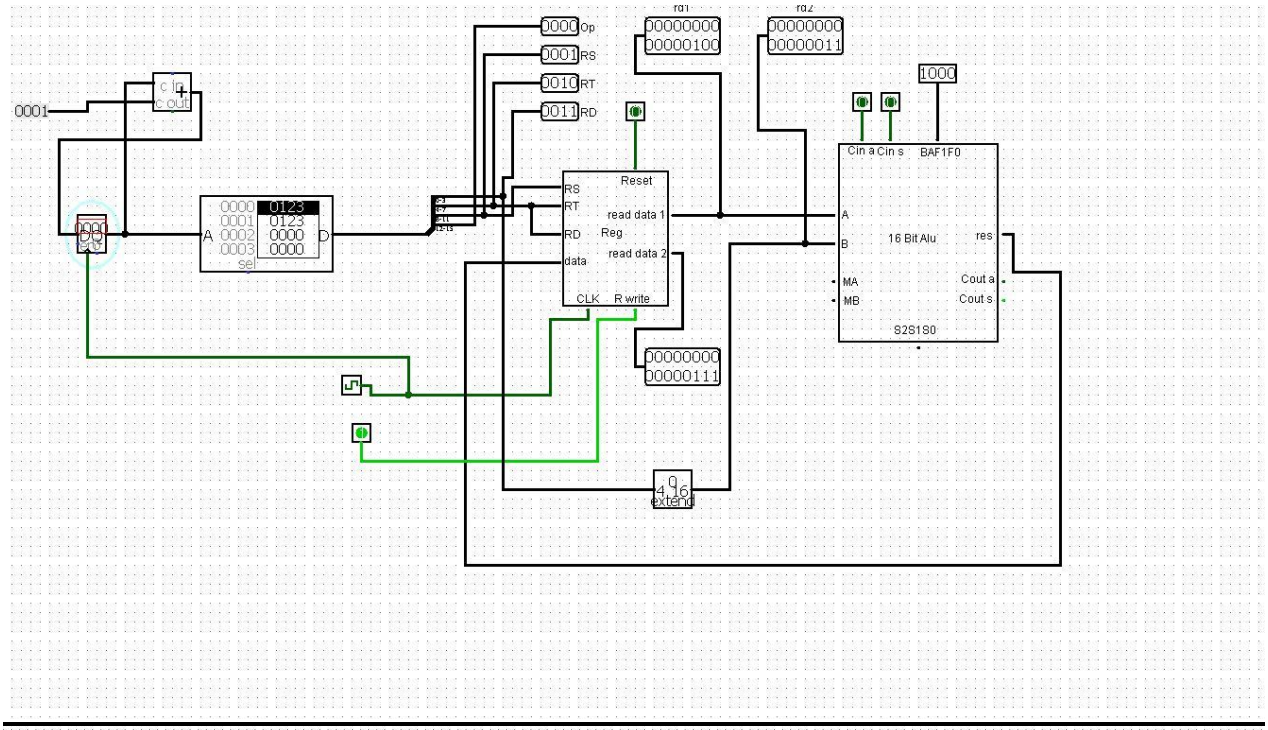
Objectives:

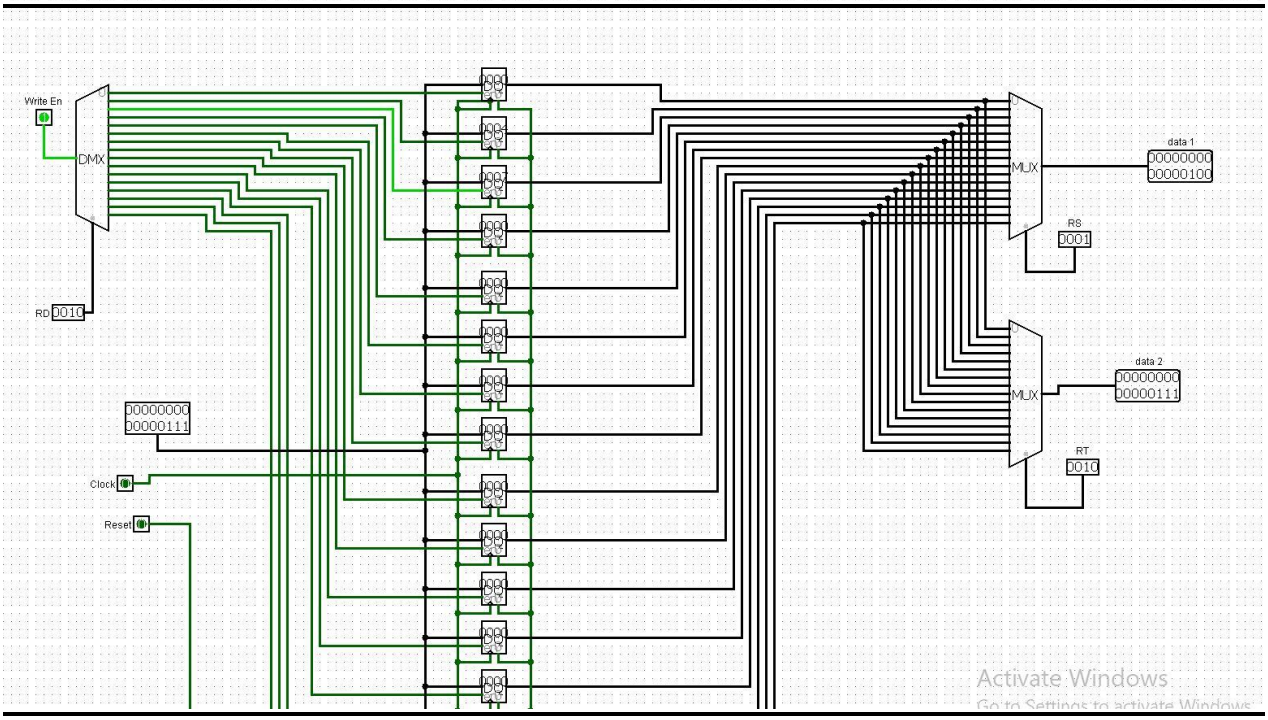
We will have following objectives to fulfill:
1) Design an Instruction Fetch Unit of the datapath.
2) Design an R-format and Load/Store Datapath .
3) Compose the datapath segments designed above to yield a complete single cycle datapath.

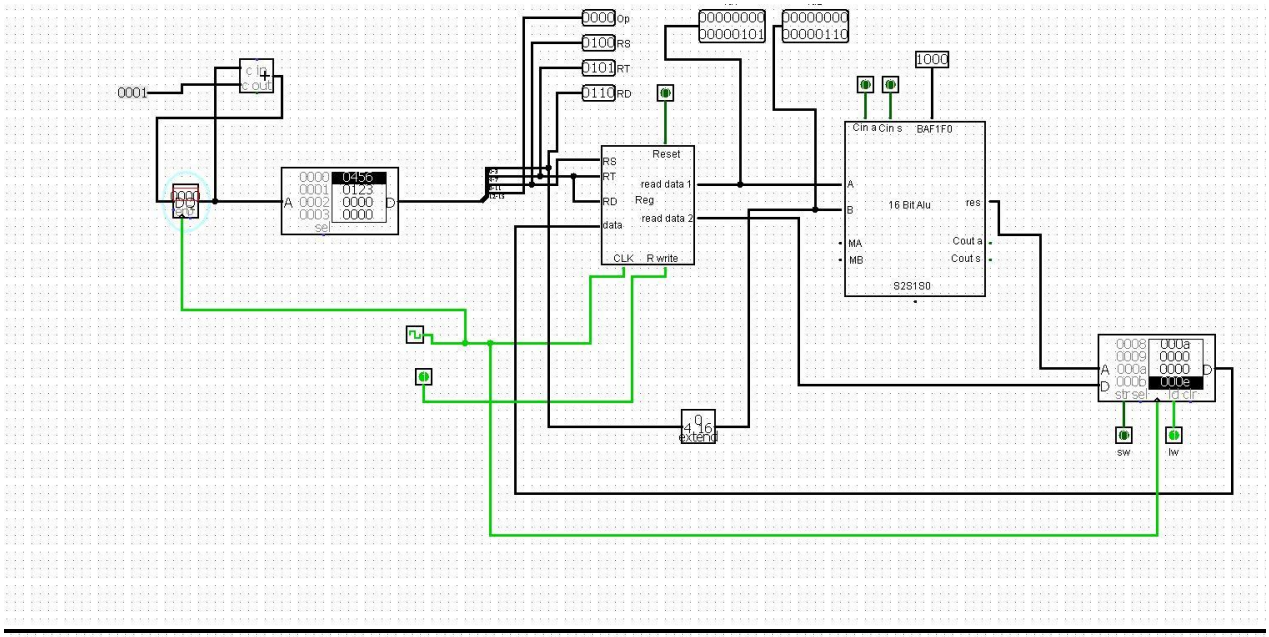
Circuit Diagrams:

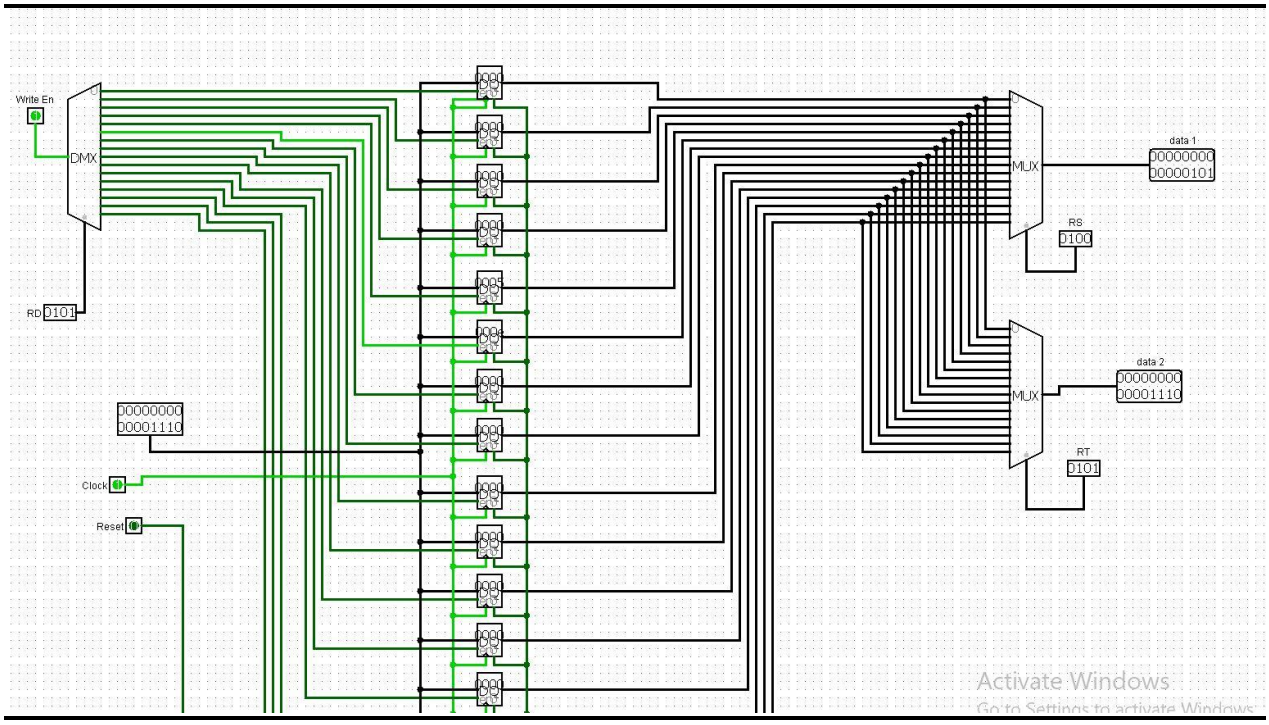

0000 Op
0001 RS
0010 RT
0011 RD
0001
c in
c out
0000
0123
A
D
sel
Reset
RS
RT
RD
data
read data 1
Reg
read data 2
CLK
R write
1000
Cin a Cin s
BAF1F0
A
B
16 Bit Alu
res
MA
MB
Cout a
Cout s
S2S1S0
00000000
00000100

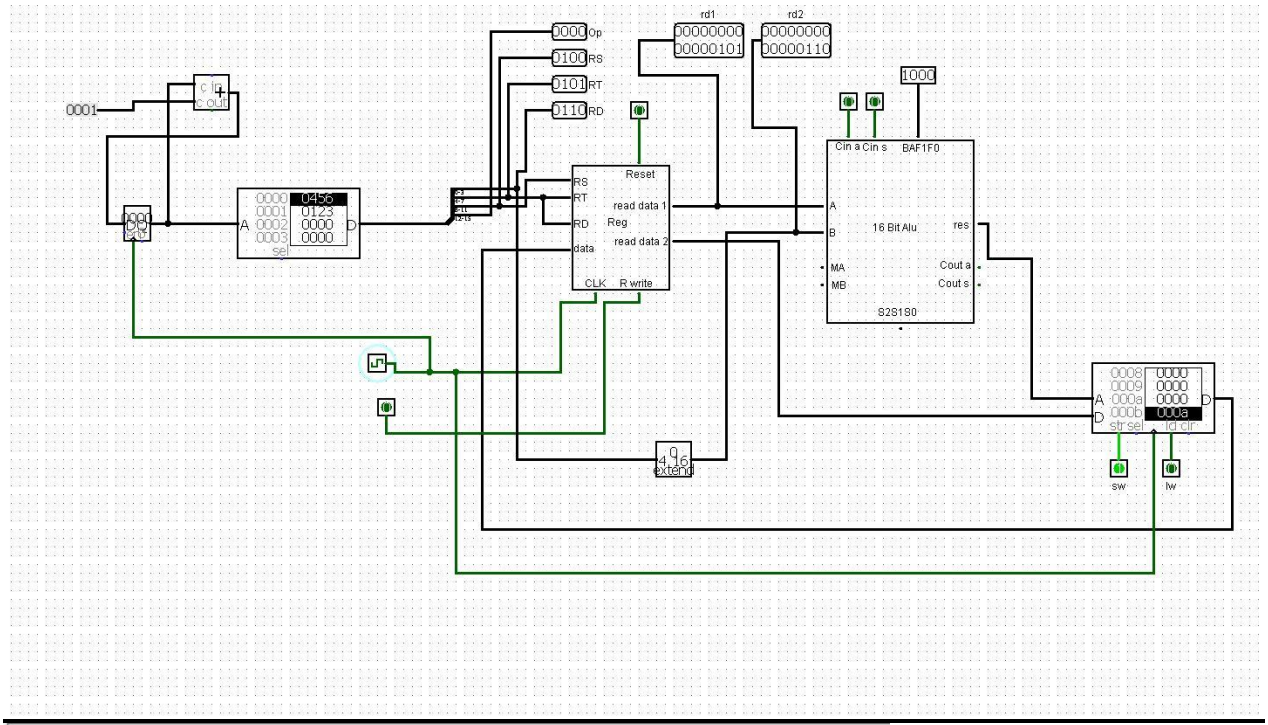

DMX
0011
00000000
00000100
Clock
Reset
MUX
data 1
00000000
00000001
RS
0001
MUX
data 2
00000000
00000011
RT
0010
Activate Windows











Logisim: Hex Editor

File Edit Project Simulate Window Help

0000	0000	0000	0000	0000	0000	0000	000a	0000
0008	0000	0000	0000	000a	0000	0000	0000	0000
0010	0000	0000	0000	0000	0000	0000	0000	0000
0018	0000	0000	0000	0000	0000	0000	0000	0000
0020	0000	0000	0000	0000	0000	0000	0000	0000
0028	0000	0000	0000	0000	0000	0000	0000	0000
0030	0000	0000	0000	0000	0000	0000	0000	0000
0038	0000	0000	0000	0000	0000	0000	0000	0000
0040	0000	0000	0000	0000	0000	0000	0000	0000
0048	0000	0000	0000	0000	0000	0000	0000	0000
0050	0000	0000	0000	0000	0000	0000	0000	0000
0058	0000	0000	0000	0000	0000	0000	0000	0000
0060	0000	0000	0000	0000	0000	0000	0000	0000
0068	0000	0000	0000	0000	0000	0000	0000	0000
0070	0000	0000	0000	0000	0000	0000	0000	0000
0078	0000	0000	0000	0000	0000	0000	0000	0000
0080	0000	0000	0000	0000	0000	0000	0000	0000
0088	0000	0000	0000	0000	0000	0000	0000	0000
0090	0000	0000	0000	0000	0000	0000	0000	0000
0098	0000	0000	0000	0000	0000	0000	0000	0000
00a0	0000	0000	0000	0000	0000	0000	0000	0000
00a8	0000	0000	0000	0000	0000	0000	0000	0000
00b0	0000	0000	0000	0000	0000	0000	0000	0000
00b8	0000	0000	0000	0000	0000	0000	0000	0000
00c0	0000	0000	0000	0000	0000	0000	0000	0000
00c8	0000	0000	0000	0000	0000	0000	0000	0000
00d0	0000	0000	0000	0000	0000	0000	0000	0000
00d8	0000	0000	0000	0000	0000	0000	0000	0000
00e0	0000	0000	0000	0000	0000	0000	0000	0000
00e8	0000	0000	0000	0000	0000	0000	0000	0000
00f0	0000	0000	0000	0000	0000	0000	0000	0000
00f8	0000	0000	0000	0000	0000	0000	0000	0000
0100	0000	0000	0000	0000	0000	0000	0000	0000
0108	0000	0000	0000	0000	0000	0000	0000	0000
0110	0000	0000	0000	0000	0000	0000	0000	0000

Discussion: In this expriment,i gather knowledge about Build a single cycle datapath.Firstly,I take D-mux which has write enable and RD is the part of register.Then,I take 16 register which is connected by enable pin with D-mux.In register,there is two more button for reset and clock.Then I take,two mux for reading data 1 nad 2 and two selector RS and RT which is mainly the part of resgister.
Then I make 3 more file for R type,I type and lw/sw.Then I take a Rom and register for controling the register read and write which consist of OP,RS,RT,RD.Then I take the ic of register file .Then I connect everything like RS,RT,RD. After that I take the ic of 16 bit Alu from my project then I connect the result of Alu with the data input of register file which is used for writing.By the help of clock plus ,I can write the data in register file which is mainly R type.

For making I type,I take a Rom and register for controling the register read and write which consist of OP,RS,RT,RD.Then I take the ic of register file .Then I connect everything like RS,RT,RD.RD for immediate value and Rs is for selecting register which one I use for input. After that I take the ic of 16 bit Alu

from my project then I connect the result of Alu with the data input of register file which is used for writing.By the help of clock plus ,I can write the data in register file which is mainly I type.

For doing lw/sw I use same I type,but I add a ram which is connected by AlU output wire and read data two which is use for sw.we use lw for wring value in register and we use lw for storing value in memory.

During the experiment,I face a problem,like my circuit output is showing wrong output .By the help of my lab instructor ,I solve the problem.Then I do the all thing successfully.