Ramaiah Institute of Technology
(Autonomous Institute, Affiliated to VTU)
Department of CSE
Tutorial-1

Programme: B.E
Course: Computer Organization

Term: Jan to May 2018
Course Code: CS45

Name: MADHUSUDAN BALAJI	**Marks:** 10/10	**Date:**
USN: 1MS18CS064	**Signature of the Faculty:**	

Activity I: Assembling and disassembling of a computer

Objective: To demonstrate the functional units of a system.

Assembling of a system: A PC computer is a modular type of computer, it can be assembled using hardware components made by different manufacturers, so as to have a custom built computer according to one's specific needs.

Disassembling of a system: When referring to hardware, **disassemble** is the process of breaking down a device into separate parts. A device may be disassembled to help determine a problem, to replace a part, or to take the parts and use them in another device or to sell them individually.

Activity to be performed by students: Identify the different parts of the system including its interconnection. Observe the assembly and disassembly procedure.

Answer the following questions.

1. Write down the detailed procedure to assemble a system.
2. Explain how troubleshooting a system helps to trace and correct the faults in a system
3. List out the procedure to install extra memory card to a system
4. With a diagram explain different cables used to connect function units in a system.
5. Discuss the safety precautions one should take while removing components of a system

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MARKS :

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Subject :		Subject Code:	

(Q1) Step 1:- Remove side panels on case

After removing case from the box, the panels are removed from the case with thumb screws.

Step 2:- Insert motherboard

Before setting the board in, the I/O panel faceplate needs to be snapped into the location in the back of the case. Be sure to orient it to the board.

Once the board is resting in the case, line up the first hole. Do not tighten all the way down until all screws are started so that the others will line up. After all are in and tightened, there should be little or no deflection if you gently press it. It is advisable that any place there is a mounting location for the board that it is screwed into a standoff.

Step 3:- check clearances.

Step 4:- Front panel connections : It is time to attach the connections for the buttons, lights, USB ports and audio connections.

step 5 :- Install power supply
Normally the supply is screwed into the back panel by 4 screws, though some cases include a clamp to hold it down that way.

step 6 :- Power motherboard
with the power being the largest cable and sometimes just long enough first run the cable before plugging it into the board.

step 7 :- Installing optical drive

step 8 :- Installing hard drives
The size & number of harddrives your computer contains is completely dependent on style of use & storage needs.

step 9 :- Connect cables :- The cables are keyed so they will only fit in one direction into the board

step 10 :- Install RAM
The slots are keyed as are the RAM sticks so make sure the notch is lined up. You will know when they are set firmly as the locking tabs will snap into place and hold the RAM firmly in the slot

step 11 : Install Graphic card Expansion card

Step 12: Cable management
At this step we also install fans and lights can be connected

(12) Troubleshooting :- It is a systematic approach to problem solving that is often used to find and correct issues with complex machines, electronics, computers & software systems.
The first step is to gather information on the issue, such as an undesired behaviour or lack of expected functionality. Other important information includes related symptoms and special circumstances that maybe required to reproduce the issue.
The next step might be to eliminate unnecessary components in the system and verify that the issue persists, to rule out incompatibility and third-party causes.
Assuming the issue remains check common causes. Depending on the issue and trouble shooter's experience, they may have some ideas

After common causes are ruled out, the trouble shooter may resort to more systematic & logical process

of verifying the expected functions of parts of a system. One common method is split half troubleshooting approach with a problem resulting from a number of possible parts in series, one test halfway down the line of components. The split half process can save time in systems that depend on many components

- Once the problem part is identified, it may be adjusted replaced or repaired as needed.

Evidence is indicated when issue is no longer reproducible and function is restored one.

(Q3) 1) Determine the mode and amount of RAM your computer need:- You must know how many and what kind of RAM you need since the new RAM should match the existing RAM specifications & configurations.

2) Disconnect cables:- Shut down computer & unplug the AC power cord. Disconnect all peripheral devices such as the mouse, keyboard, monitor and etc.

(3) open the computer:- You can remove computer cover by screwdriver or your fingers.

(4) Ground yourself:- Make sure you first touch an unpainted grounded metal object to discharge any static electricity stored in your clothing or body.

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MARKS :

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USN/Roll No. :		Sem/Sec:	
Subject :		Subject Code:	

(5) Check expansion sockets :- Locating the existing memory & expansion sockets on the motherboard if no extra sockets are available, you will need to remove the old smaller capacity memory to allow more room for new higher capacity memory

(6) Uninstall old memory :- Finding out old RAM & remove it by pushing outward on white ejector tabs

(7) Get new memory sticks :- Check model of the memory and go to the store to get matched RAM

(8) Insert new memory :- Pick up memory stick by the ends without touching pins or chips. Insert the memory stick straight into the available expansion socket.

(9) Lock the memory stick :- use slight pressure to the back of the stick & make sure the small holes on each side of the stick fit into the holders.

(10) Install all the memories

Q4) 1) VGA cable: Also known as D-sub cable analog video cable. Connect one end to computer monitor, television. Connect other end to VGA port on computer

2) DVI cable: Connect one end to computer monitor connect other end to DVI port on computer

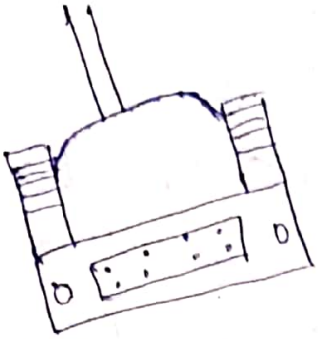
3) HDMI cable: connect one end to computer monitor television. Connect other end to HDMI port on computer

(4) PS/2 cable :- connect one end to PS/2 keyboard PS/2 mouse. Connect other to PS/2 port on computer Purple PS/2 port: keyboard. Green PS/2 :- mouse

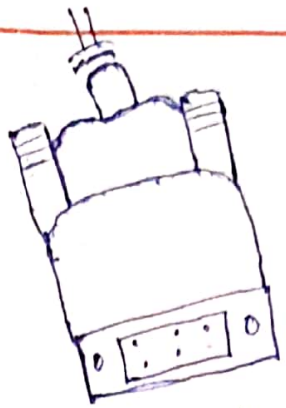
(5) Ethernet cable: one end to router, network switch. other end to etherinet port on computer.

(6) USB cable: one end to USB device. other end to USB port on computer

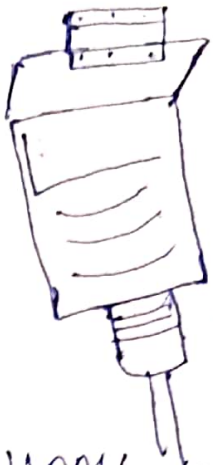
(7) Computer power cord: one end to AC power socket. other end to power supply unit, computer monitor



1) VGA cable

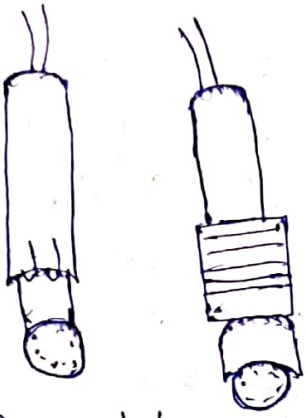


2. DVI cable



3. HDMI cable

(4)

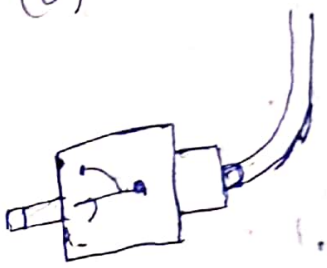


PS/2 cable

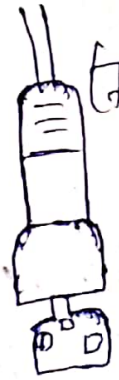
(5)

Ethernet cable

(6)



USB cable



(7) computer power cord

(25) A few precautions and warnings are

(1) Fully shutdown & unplug the computer before you make any attempts to disconnect the towers.

(2) Take off any metal objects on your arms or fingers such as bracelets, rings or watches. Even if your

unit is unplugged, there may still be some remaining electric charge
(3) Make sure your hands are completely dry to avoid damaging any mechanical parts as well as to avoid electrocution
(4) Work in cool areas to avoid perspiration.
(5) Before touching any part within the tower put your hand against another metal surface to remove static charge which may damage sensitive devices
(6) Prepare a place to keep any screws you may remove. A container or piece of paper with labels for each part is ideal to avoid confusion bho similar looking screws.
(7) Handle all parts with care. Place each piece you remove carefully down onto stable surface
(8) If a component does not come out easily, do not forcefully remove it.
(9) Be careful when handling motherboard
(10) Never attempt to remove power supply
(11) when removing any cables, wires, ribbons make sure to grasp wire at base or head to keep it from breaking
(12) Be careful not to drop any small parts into unreachable areas such as into computer fan or disk drives
(13) Take note that the three most dangerous things to a computer are moisture, shock & dust.

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Tutorial -II

Programme: B.E
Course: Computer Organization

Term: Jan to May 2020
Course Code: CS45

Name: MADHUSUDAN BALASEE	**Marks:** 9 /10	**Date:**
USN: 1MS18CS064	**Signature of the Faculty:**	

Activity II: Demonstrating Datapath and instruction execution stages using MarieSim Simulator

Objective: To simulate inter communication between CPU and memory.

Simulator Description: MarieSim is a computer architecture simulator based on the MARIE architecture. It provides users with interactive tools and simulations to help them deepen their understanding of the operation of a simple computer. One can observe how assembly language statements affect the registers and memory of a computer system.

Activity to be performed by students:

1. Draw the interconnection between memory and a processor.

2. List out the steps required to execute an instruction.

3. Write and execute assembly language program to compute
   i) f=(g+h)*(i+y)
   ii) $d=b^2-4ac$

4. Describe the factors affecting the performance of a processor

3. Results and Snapshots:

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Data Sheet

MARKS :

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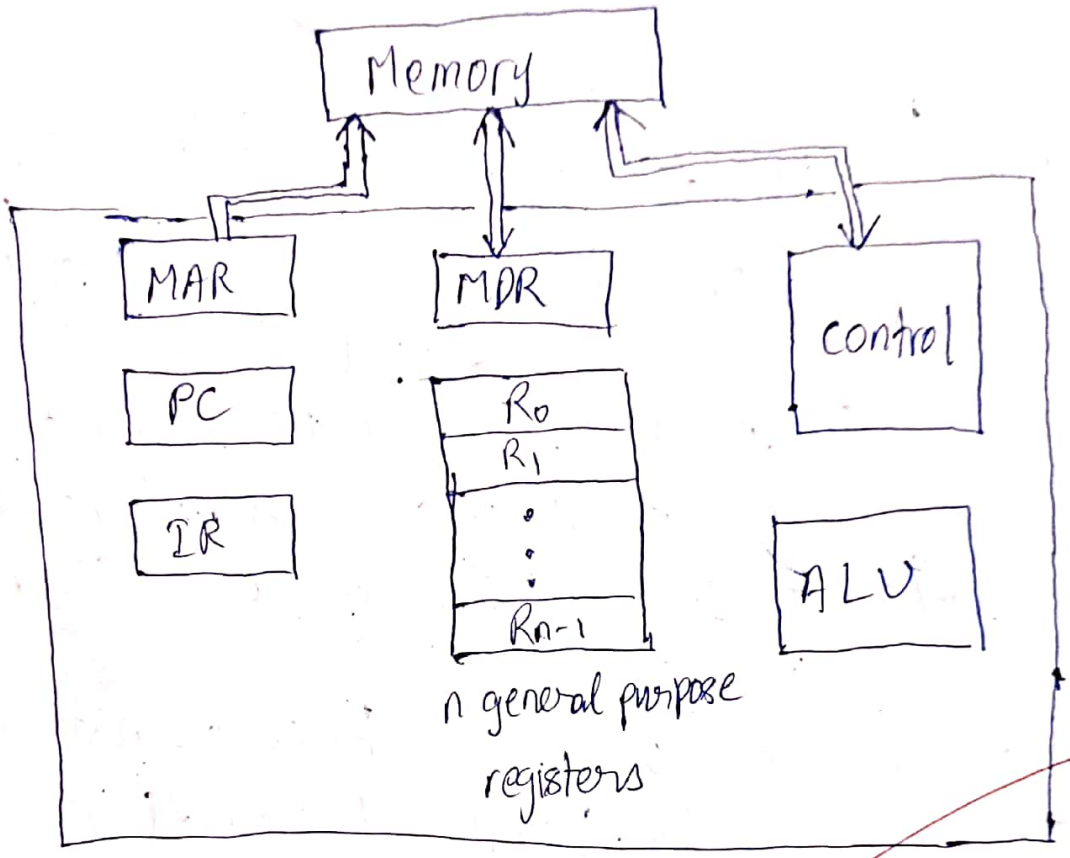
Subject :	C O . LAB	Subject Code:	

Tutorial - II

(1)



(2) The steps involved are

→ Fetch instruction: cycle starts with fetching instruction from main memory. The instruction at the current program counter (PC) will be fetched and will be stored in instruction register (IR)

→ Decode instruction: the encoded instruction present in [IR] is interpreted by the decoder.

→ Perform ALU operation: this is where two operands in the instruction will be operated on given operator in the instruction. Such as, if the instruction was to add two numbers, then the addition will happen ALU takes two values and output one, the result of the operation.

→ Access memory: only two kinds of instructions that access memory. LOAD and STORE. LOAD copies a value from memory to a register & STORE copies a register value to memory. Any other instruction skips this step.

→ Update Register File: The output /result of the ALU is written back to the register file. The result could also be due to a LOAD from memory. Some instructions don't have results to store.

→ Update the Program Counter: at the end of the execution of the current instruction, we need to update the PC to the address of the next instruction, so that we can go back to step 1 where the CPU will fetch the instruction.

(4) Factors affecting performance of processor

→ Instruction set

This is the processor's built in code that tells it how to execute its duties. Its something thats coded into the chip which is manufactured & that can't be changed. But together with processor architecture, it does affect performance a given line of CPUs.

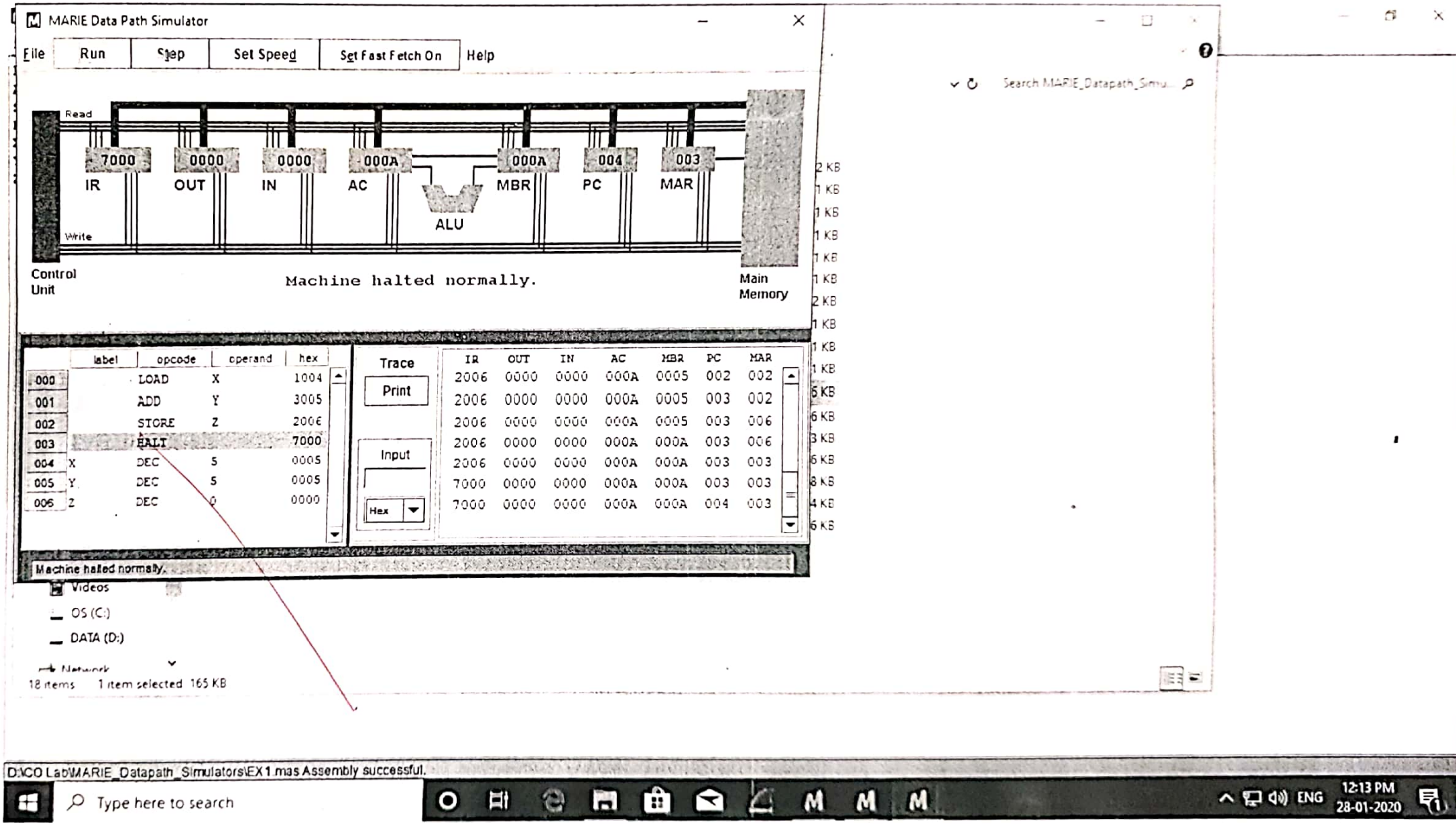
Processor architecture & instruction set determine how many cycles, or ticks are needed to execute a given instruction.

clock speed :- it is stated in megahertz or giga hertz and refers to speed at which processor can execute instructions. Faster the clock, the more instructions can complete per second.

Bandwidth: Measured in bits, it determines how much information the processor can process in one instruction.

Front Side Bus Speed: It is the interface btwn processor and system memory. The FSB speed limits the rate at which the CPU can process the data. The CPU's FSB speed determines maximum speed at which it can transfer data to the rest of the system.

On-board cache :- It is a relatively small amount of high performance SRAM built directly into the processor. It enables the CPU to access repeatedly used data directly from its own on-board memory, rather than repeatedly requesting it from the system RAM.



Assembly Listing for EX1.mas

```
    Assembly listing for: EX1.mas
             Assembled: Tue Jan 28 12:07:24 IST 2020

000 1004 |          LOAD X
001 3005 |          ADD Y
002 2006 |          STORE Z
003 7000 |          HALT
004 0005 |  X       DEC 5
005 0005 |  Y       DEC 5
006 0000 |  Z       DEC 0

Assembly successful.

        SYMBOL TABLE
        ------------------------------------------------
         Symbol | Defined | References
        --------+---------+-------------------------------
         X      |  004    | 000
         Y      |  005    | 001
         Z      |  006    | 002
        ------------------------------------------------
```

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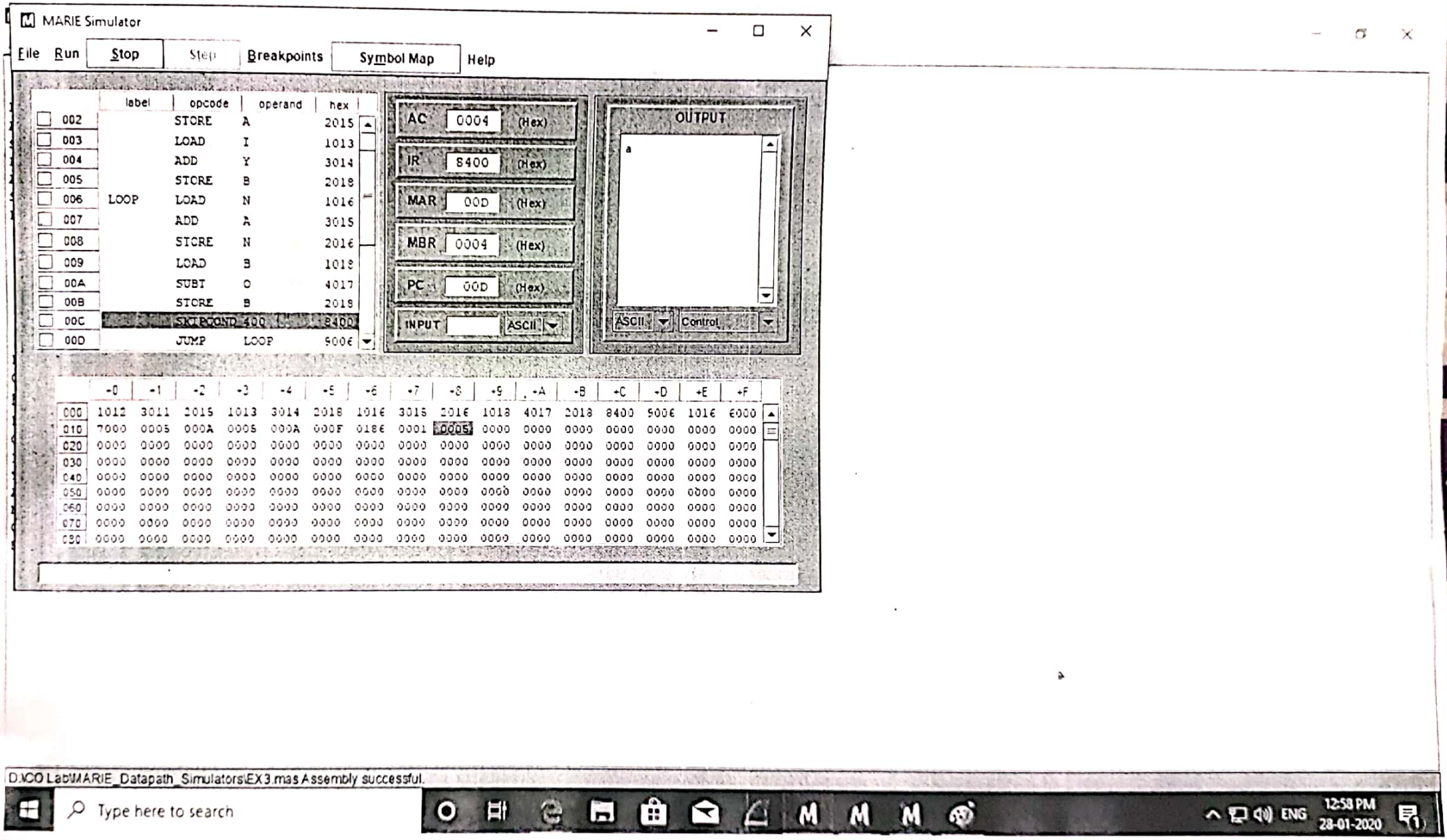

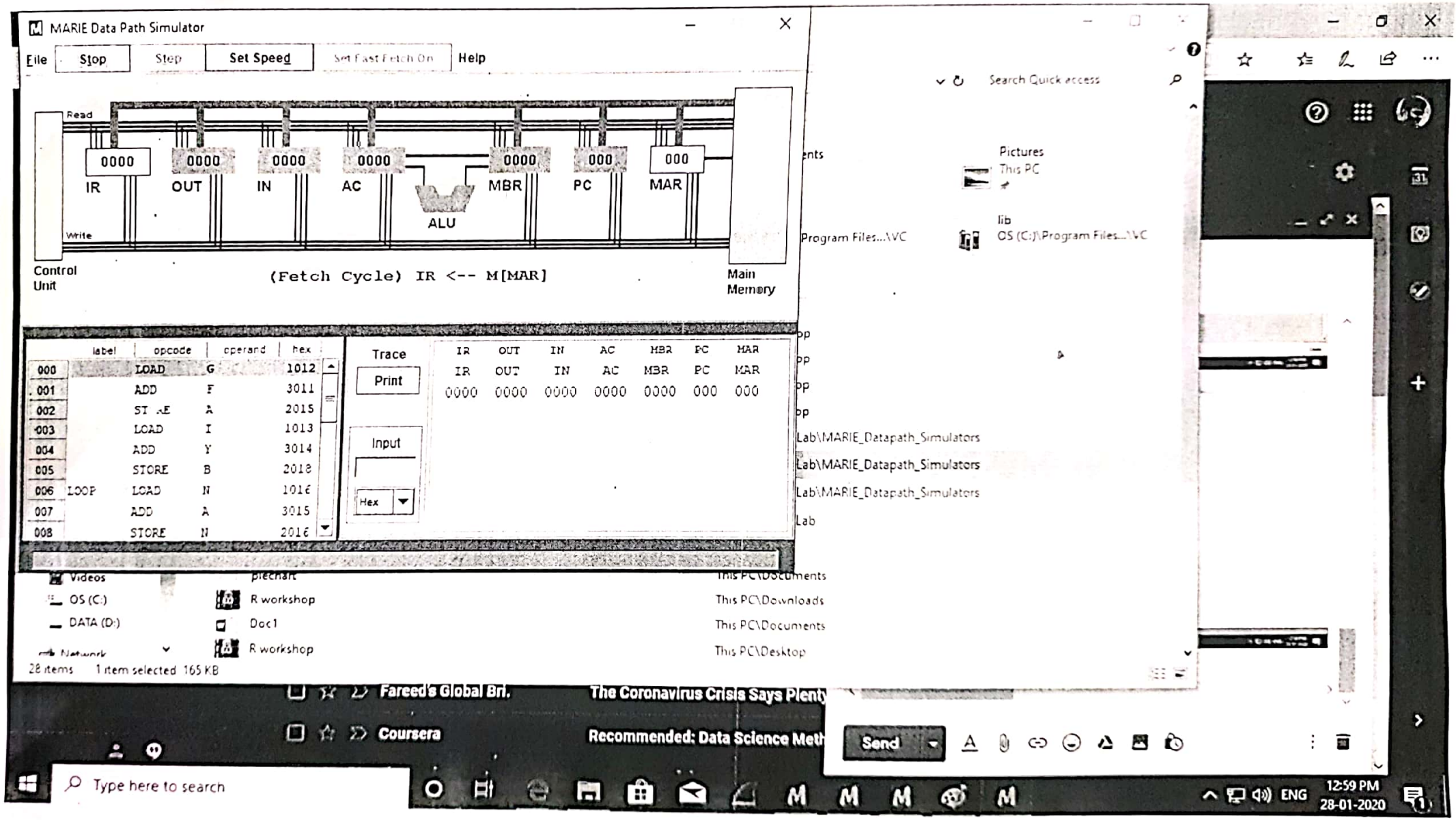

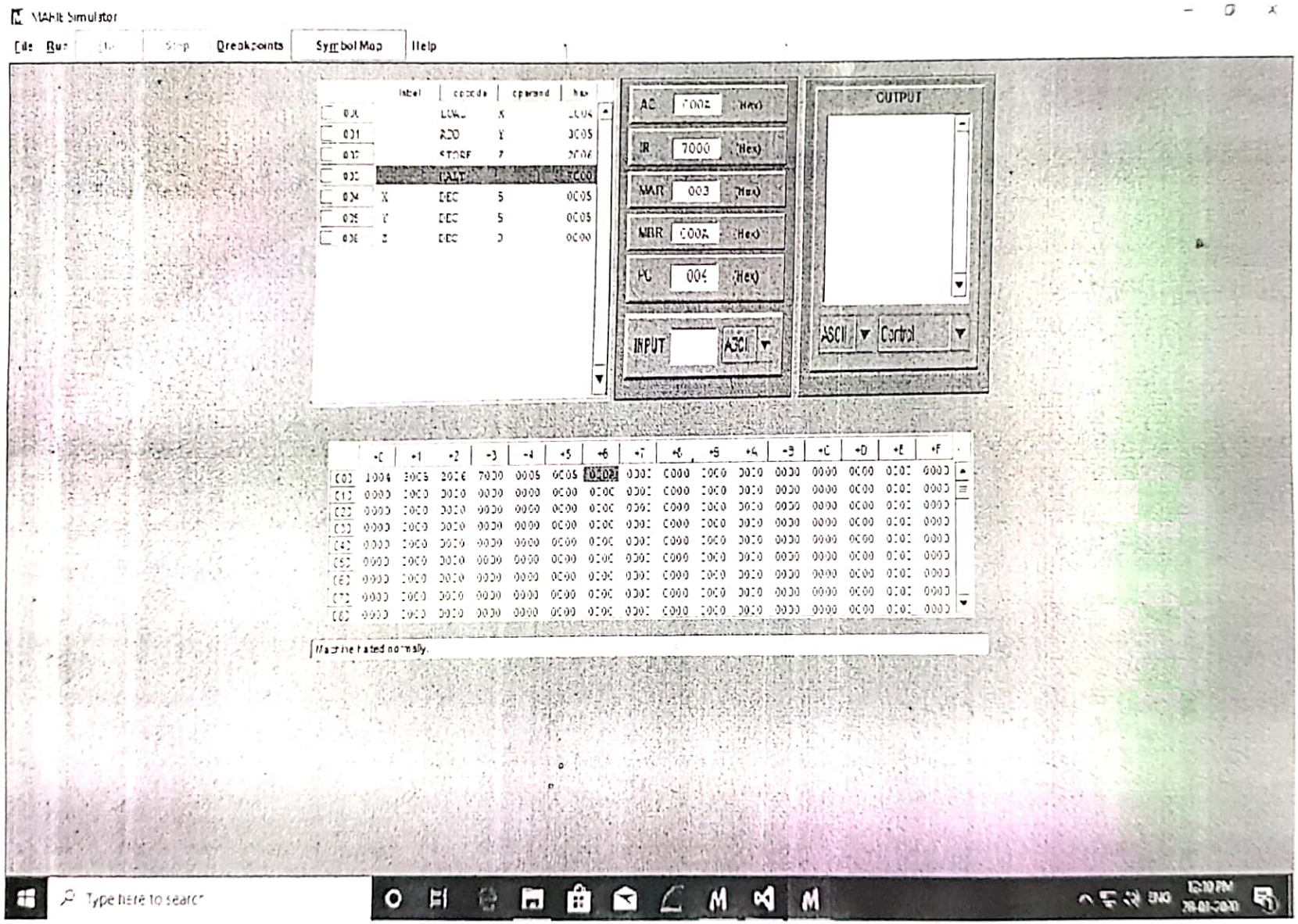

Assembly Listing for EX3.mas

```
00C 8400 |          SKIPCOND 400
00D 9006 |          JUMP LOOP
00E 1016 |          LOAD N
00F 6000 |          OUTPUT
010 7000 |          HALT
011 0005 |  F       DEC 5
012 000A |  G       DEC 10
013 0005 |  I       DEC 5
014 000A |  Y       DEC 10
015 0000 |  A       DEC 0
016 0000 |  N       DEC 0
017 0001 |  O       DEC 1
018 0000 |  B       DEC 0

Assembly successful.

        SYMBOL TABLE
        ------------------------------------------------
         Symbol | Defined | References
        --------+---------+-----------------------------
         A      |   015   | 002, 007
         B      |   018   | 005, 009, 00B
         F      |   011   | 001
         G      |   012   | 000
         I      |   013   | 003
         LOOP   |   006   | 00D
         N      |   016   | 006, 008, 00E
         O      |   017   | 00A
         Y      |   014   | 004
        ------------------------------------------------
```

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Assembly Listing for: EX3.mas

```
    Assembly listing for: EX3.mas
              Assembled: Tue Jan 28 12:53:24 IST 2020

         |
         |
000 1012 |          LOAD G
001 3011 |          ADD F
002 2015 |          STORE A
003 1013 |          LOAD I
004 3014 |          ADD Y
005 2018 |          STORE B
006 1016 | LOOP     LOAD N
007 3015 |          ADD A
008 2016 |          STORE N
009 1018 |          LOAD B
00A 4017 |          SUBT O
00B 2018 |          STORE B
00C 8400 |          SKIPCOND 400
00D 9006 |          JUMP LOOP
00E 1016 |          LOAD N
00F 6000 |          OUTPUT
010 7000 |          HALT
011 0005 | F        DEC 5
012 000A | G        DEC 10
013 0005 | I        DEC 5
014 000A | Y        DEC 10
015 0000 | A        DEC 0
016 0000 | N        DEC 0
017 0001 | O        DEC 1
018 0000 | B        DEC 0

Assembly successful.
```

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Tutorial -III

Programme: B.E
Course: Computer Organization Course Code: CS45

Term: Jan to May 2020

Name: MADHUSUDAN BALAJEE	**Marks:** 19/10	**Date:**
USN: 1MS18CS064	**Signature of the Faculty:**	

Objective: To simulate ARM Instruction set using ARMsim simulator.

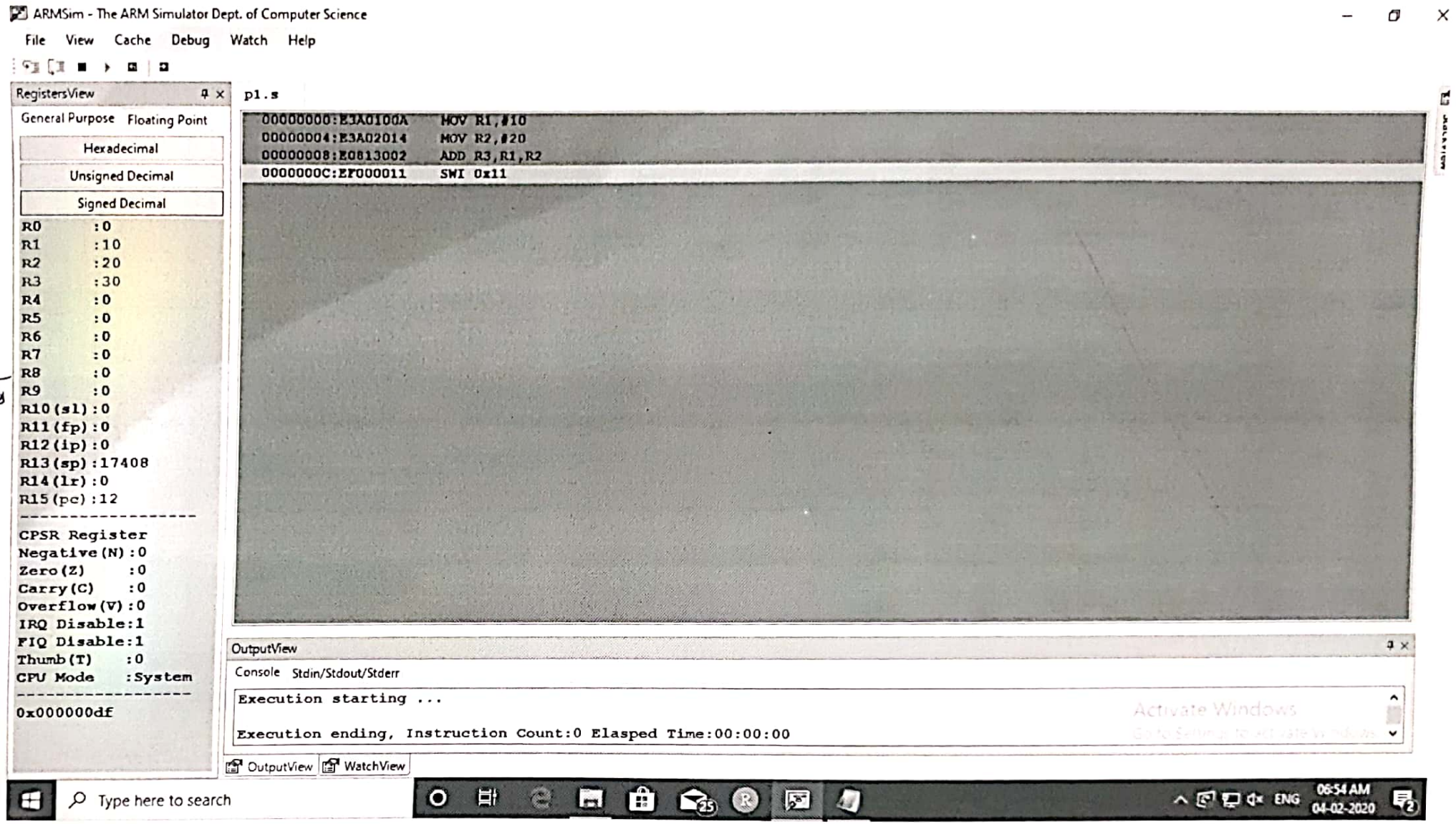
Simulator Used: ARMSim 1.91 is a desktop application running in a Windows environment. It allows users to simulate the execution of ARM assembly language programs on a system based on the ARM7TDMI processor.

ARM enables the users both to debug ARM assembly programs and to monitor the state of the system while a program executes.

Activity to be performed by students:

1) Write an ARM program to perform basic arithmetic operations.
2) Write an ARM program to demonstrate the working of load and store instructions.
3) Write an ARM program to evaluate expression f=(g+h)-(i+j)
4) Write an ARM program to find the sum of all elements of an array.
5) Write an ARM program to find the factorial of a number.

Programs and the snapshots:



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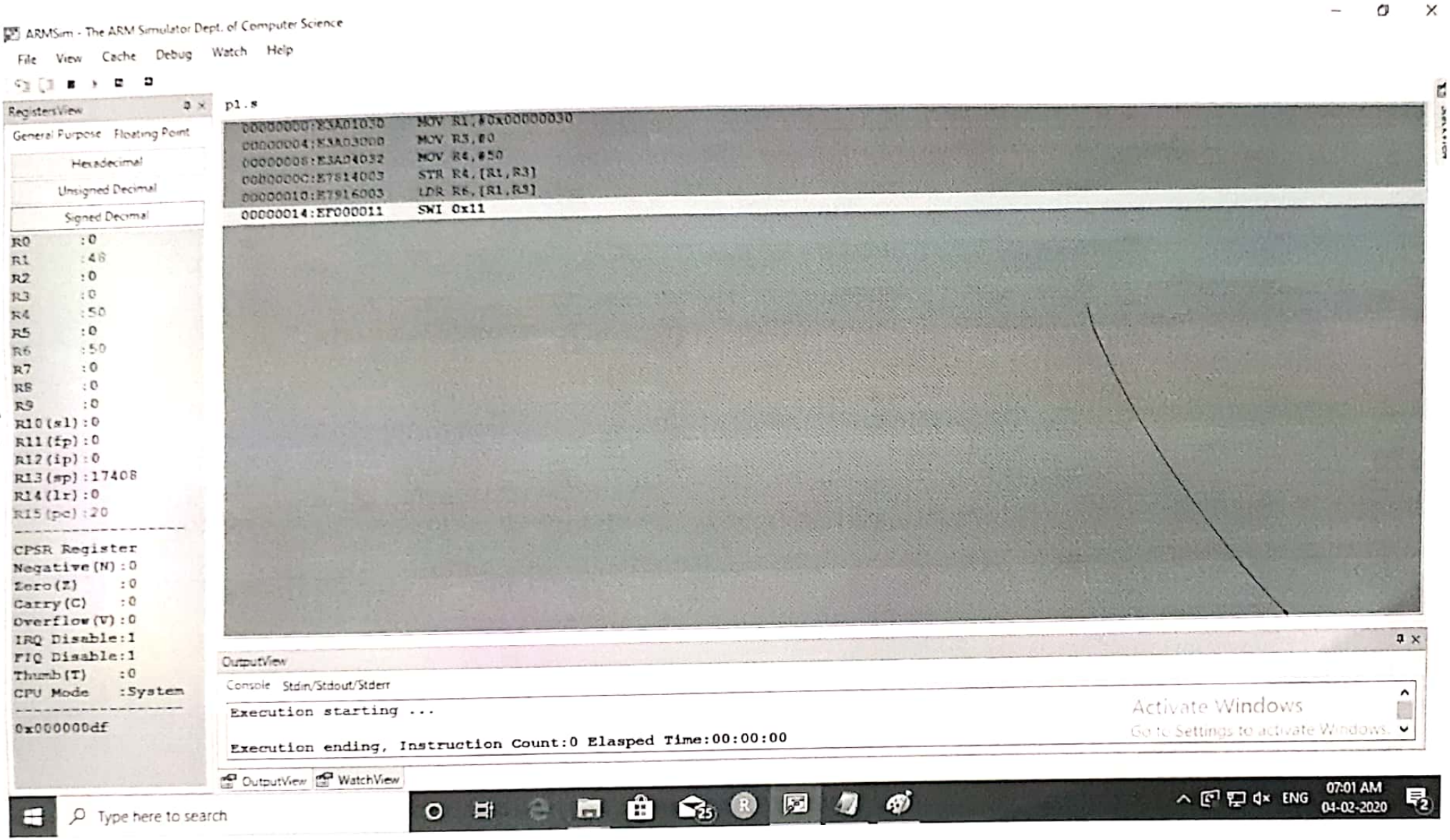

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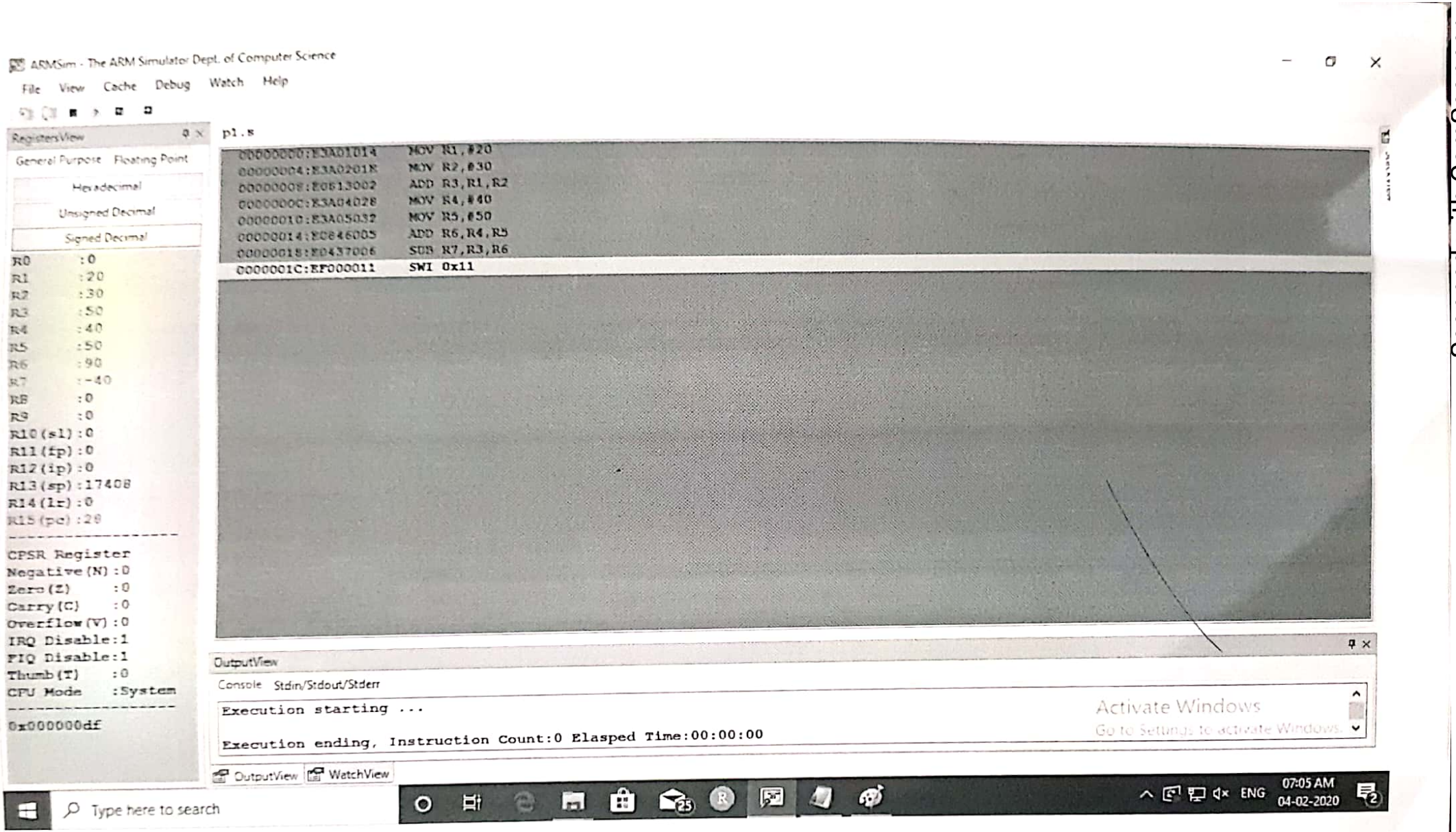

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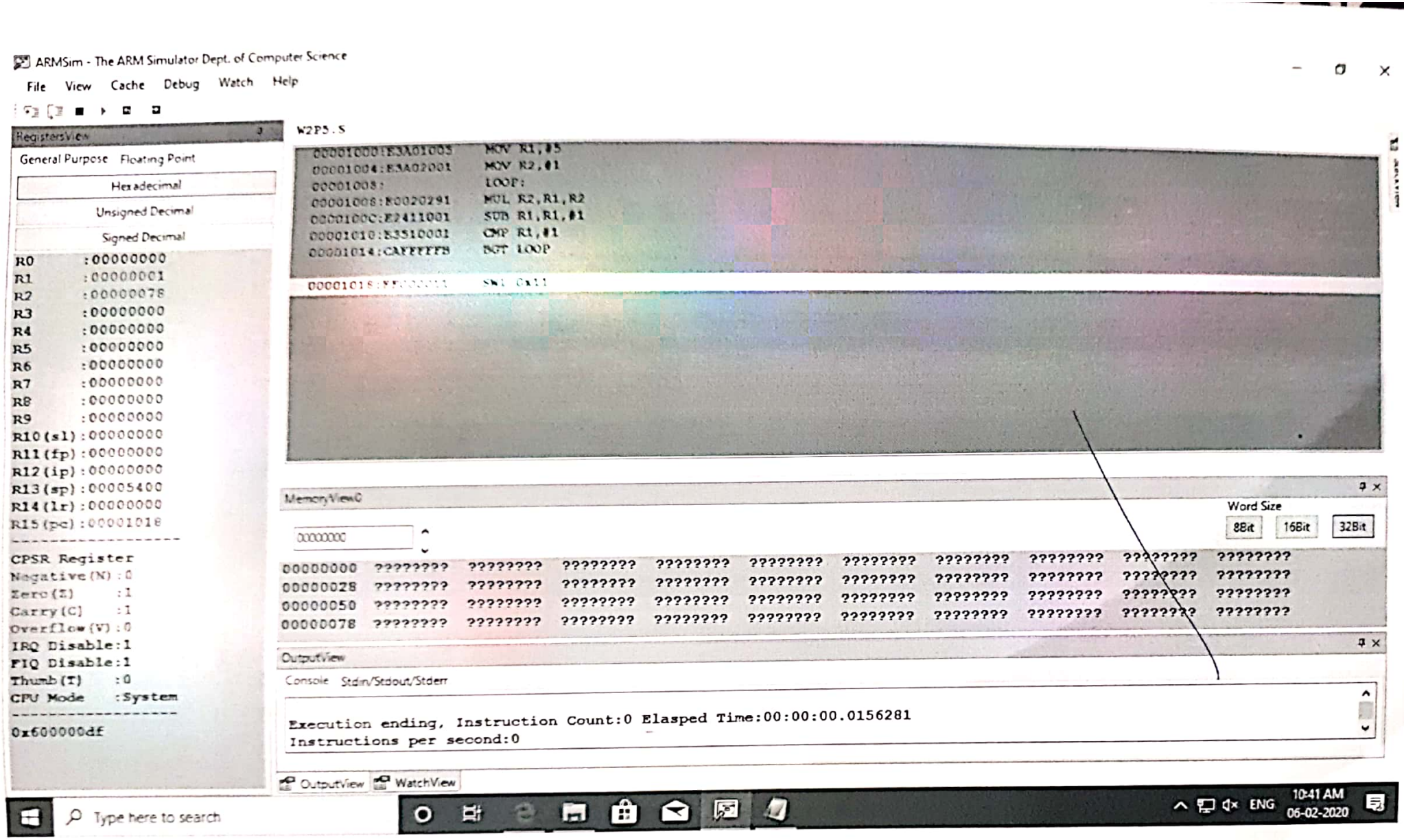

Q5

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Department of CSE

Programme: B.E **Term: Jan to May 2019**
Course: Computer Organization **Course Code: CS45**

Activity IV: Executing ARM programs using ARMsim simulator.

Name: MADHUSUDAN BALAJEE	**Marks: /10**	**Date:**
USN: 1MS18CS064	**Signature of the Faculty:**	

Objective: To simulate ARM Instruction set using ARMsim simulator.

Simulator Used: ARMSim 1.91 is a desktop application running in a Windows environment. It allows users to simulate the execution of ARM assembly language programs on a system based on the ARM7TDMI processor.

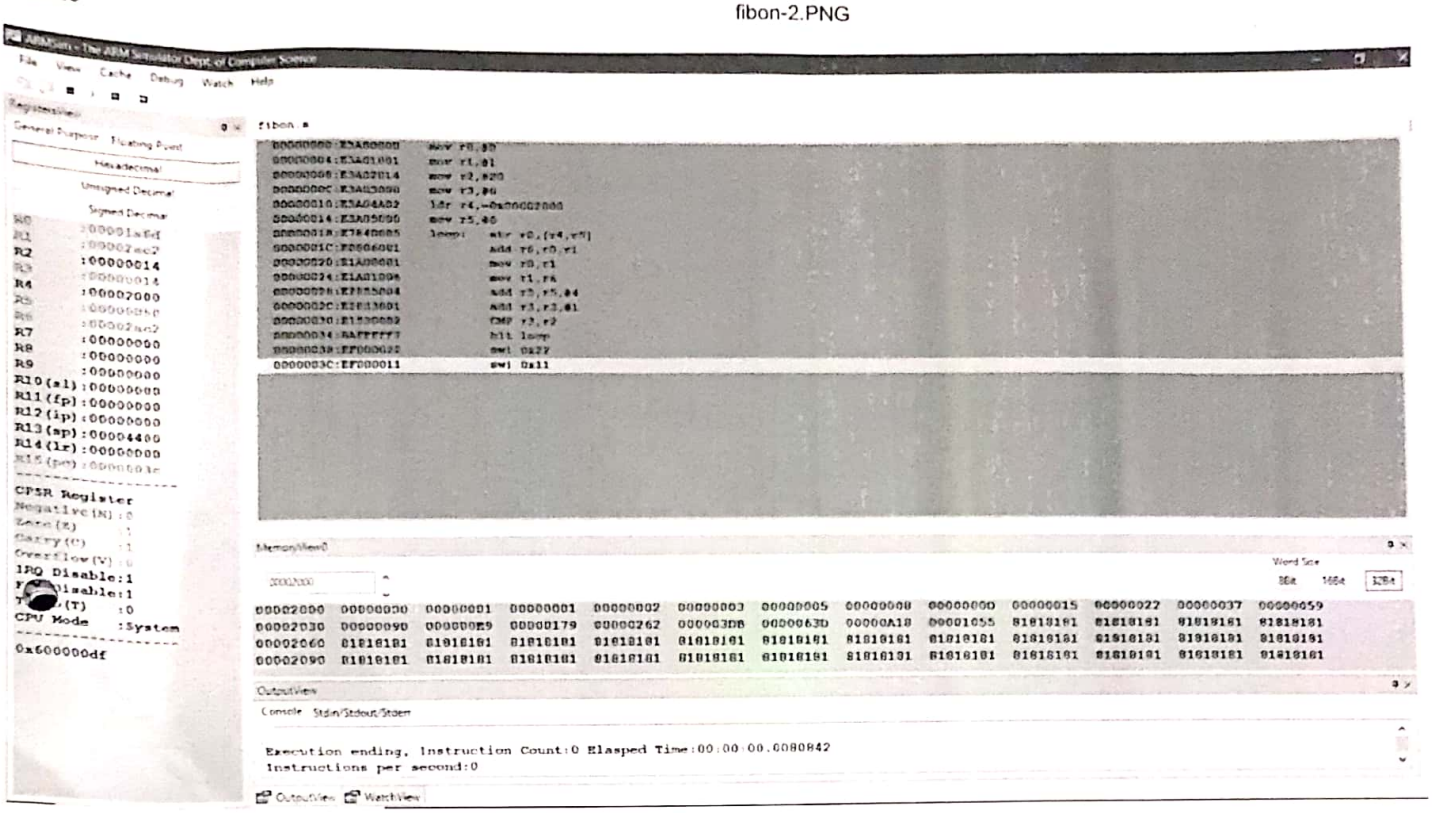
ARM enables the users both to debug ARM assembly programs and to monitor the state of the system while a program executes.

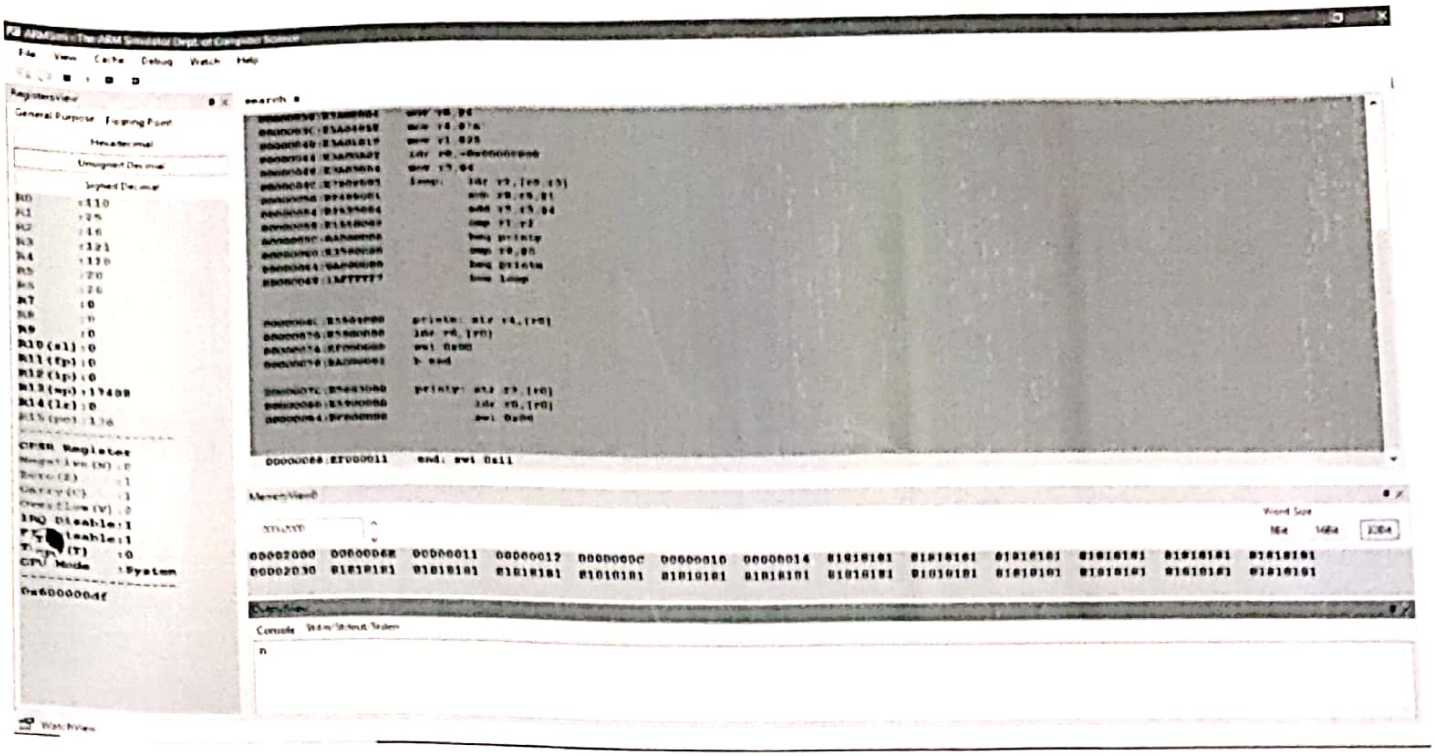
Activity to be performed by students:

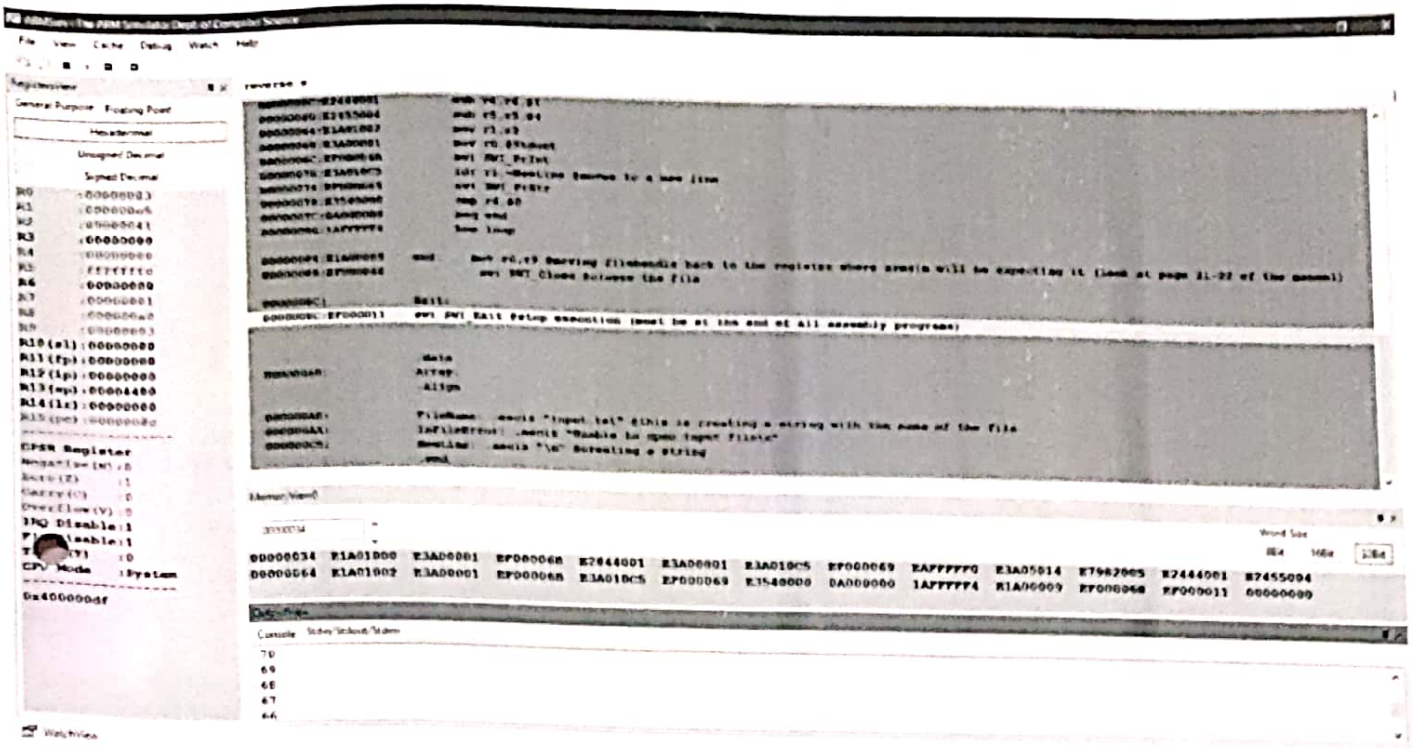
1) Write an ARM program to generate Fibonacci Series.
2) Write an ARM to search an element in an array and print Y if found and print N if not found.
3) Write an ARM program to find the length of a string and copying one string to another.

Results/Conclusions and Snapshots: Take the snap shot of registers file and memory view

fibon-2.PNG







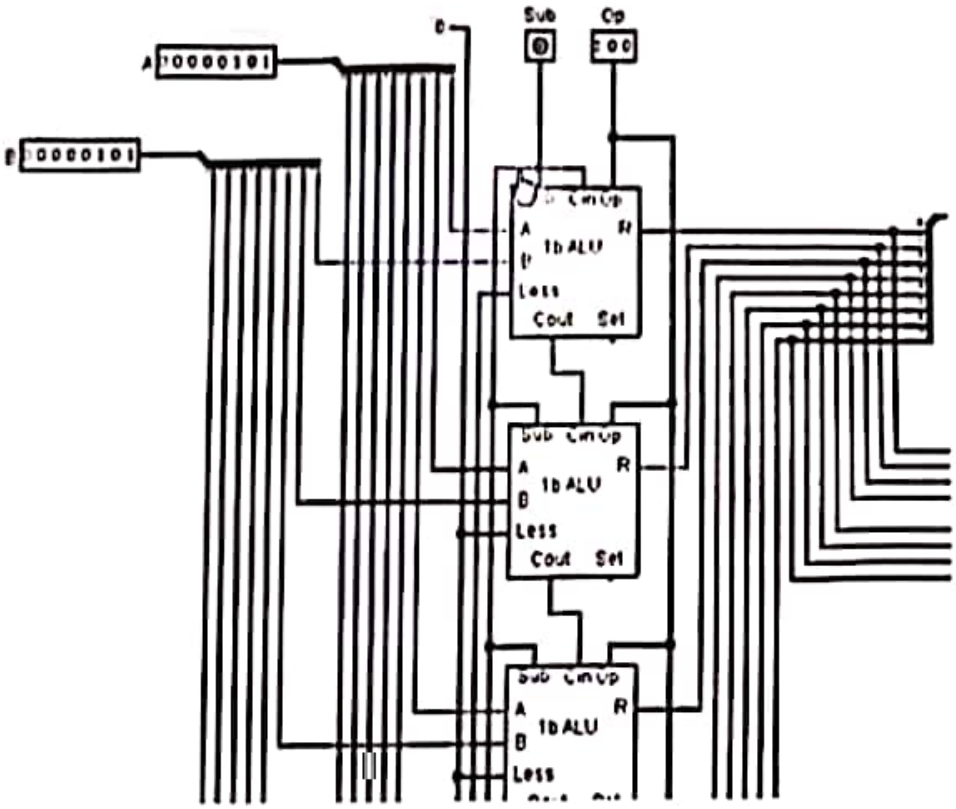
ACTIVITY - 5

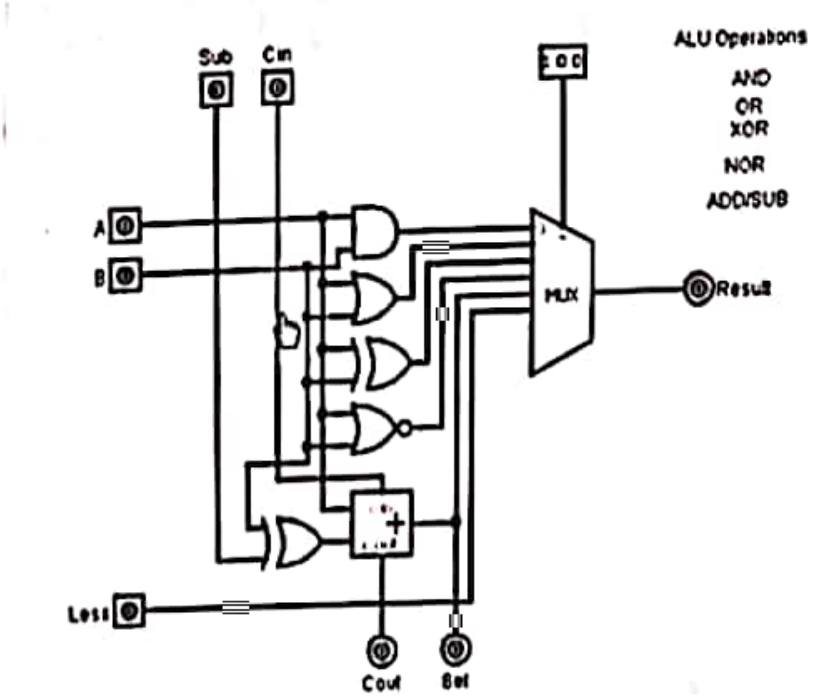
NAME:
MADHUSUDAN BALAJEE IMS18CS064

List out steps in designing ALU

1. Add the two i/p pins. Name them A and B.
2. Add or, name, ex-or, nor gates and a 1-bit adder.
3. Connect the A's and B's of all the gates to their respective pins.
4. Add an o/p pin and name it Result.
5. Add a 1-bit multiplexer with 3 select bits.
6. Connect outputs of all the gates to the mux.
7. Connect 3-bit input pins to musc.
8. Add i/p pin to Cin, and o/p pin to Cout.
9. Add an ex-or gate. Connect its o/p to Cout the first i/p must be connected to B and second to another i/p pin sub.
10. Add another i/p and name it Less. Connect it to mux.
11. Add on o/p pin and name it set, connect it to o/p of adder unit.

Snapshots.





ACTIVITY VI

MADHUSUDAN BALAJEE
MIS18CS064

List out steps in designing memory system:

1. Add a RAM with seperate load and store selected.
2. Add a counter and connect Q to A of the RAM.
3. Add a controller buffer and connect its o/p to the RAM.
4. Add a clock and connect to the i/p of the buffer.
5. Add a TTY unit with 32 rows and columns Make connects with RAM
6. Add a 7-bit random number generator, connect Q to D.
7. Add another controlled buffer, connect to TTY. Also add an i/p pin to the buffer.
8. Connect the o/p of the second buffer to the counter.
9. Connect a button to the counter.

Snapshots :