20IT 402 Digital Electronics and Computer architecture
Flipped Classroom activity (2021-22, Sem - I)
04-Jan-2022
2021-22

Description: To implement the flipped classroom activity, the YouTube video link https://www.youtube.com/watch?v=3NXyTxo82CQ, was shared with the students in Google Classroom.

The video explained how 8086 works in Minimum mode of operation and how to draw timing diagrams for read and write cycle in Minimum mode. Students were asked to go through the video and learn the concept. Based on the understanding students were asked to try timing diagram for Maximum mode of 8086 too.

A doubt clearance session on Minimum and Maximum modes was conducted, in which the concept was again briefly discussed in class. After the discussion, to check the understanding of the concept, an assignment based on modes of operation for 8086 was uploaded in Google classroom which had following questions;

Q.1 Draw and explain interfacing of 8086 when it works in Minimum mode and explain the timing diagram for it.
Q.2 Draw and explain interfacing of 8086 when it works in Maximum mode and explain the timing diagram for it.

The students were expected to upload answers for the assignment in the Google classroom.

Objective: The objective was to make sure students can draw timing diagrams for various operations of the microprocessor and understand basic difference between read and write cycle.

Impact: Students realised once they understood timing diagram drawing and interpretation for one microprocessor, they can understand and draw the same for any other microprocessor too. Students liked this new way of learning. . They found this technique interesting, helpful, innovative, refreshing, and creative.

1) **Screenshot You tube link shared in Google classroom**

2) Screen shot of declaration of an Assignment based on the topic , in the Google classroom

3) Screen shots of sample responses uploaded in the Google classroom

**4) Sample answer sheet which contains an explanation and timing diagram for Minimum and Maximum modes of 8086**

ASSIGNMENT 2

8086 MODES OF OPERATION

Q1. Draw and explain interfacing of 8086 when it works in Minimum mode and explain the timing diagram for it.

→ • 8086 works in Minimum mode, when pin 33, i.e., MN/$\overline{MX}$ pin is set to logic 1.
• There is a single 8086 microprocessor in the minimum mode system.
•
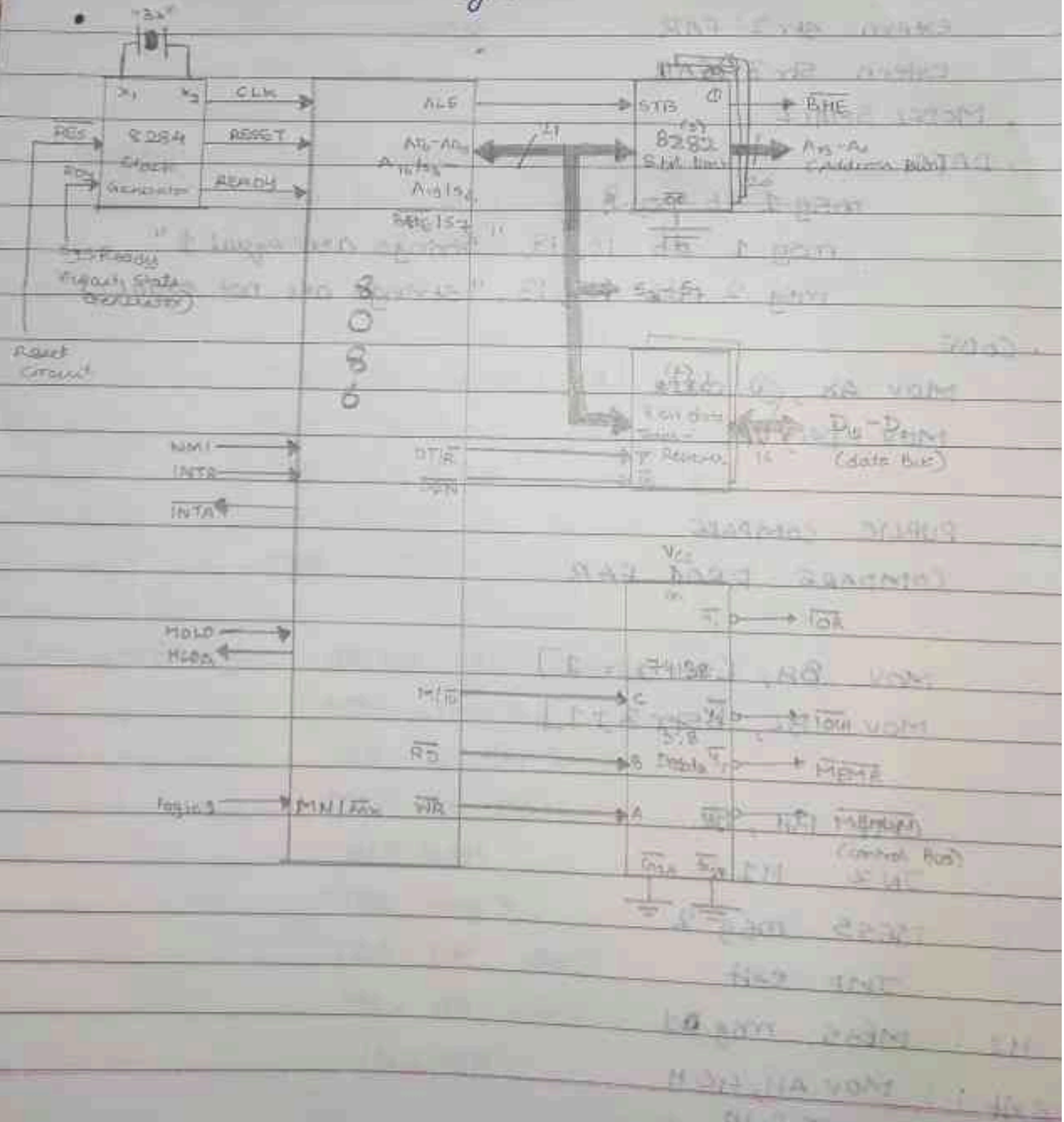
- Clock is provided by 8284 clock generator, it provides CLK, RESET, READY input to 8086.
- address from address bus is latched into 8282 8-bit latch we require 3 such latches as the address bus is 20 bit ($3 \times 8 = 24$).
- The ALE of 8086 is connected to STB of the latch.
- The data bus is driven through 8286 8-bit trans-reciever. We require 2 such trans-recievers as the data bus is 16 bit ($2 \times 8 = 16$).
- The trans-reciever is enabled through $\overline{DEN}$ signal, and direction of data is controlled by $DT/\overline{R}$ signal.
- $\overline{DEN}$ is connected to $\overline{OE}$, and $DT/\overline{R}$ is connected to T.

$\overline{DEN}$	$DT/\overline{R}$	Action
1	X	Trans-reciever disabled
0	0	Receive data
0	1	Transmit data

- $M/\overline{IO}$, $\overline{RD}$, $\overline{WR}$ are decoded by a 3:8 decoder (IC 74138)

$M/\overline{IO}$	$\overline{RD}$	$\overline{WR}$	Action
1	0	1	Memory Read ($\overline{MEMR}$)
1	1	0	Memory write ($\overline{MEMW}$)
0	0	1	I/O Read ($\overline{IOR}$)
0	1	0	I/O write ($\overline{IOW}$)

- Bus request is done using HOLD and HLDA signals
- $\overline{INTA}$ is given by 8086, in response to an interrupt on INTR line.

Timing Diagram
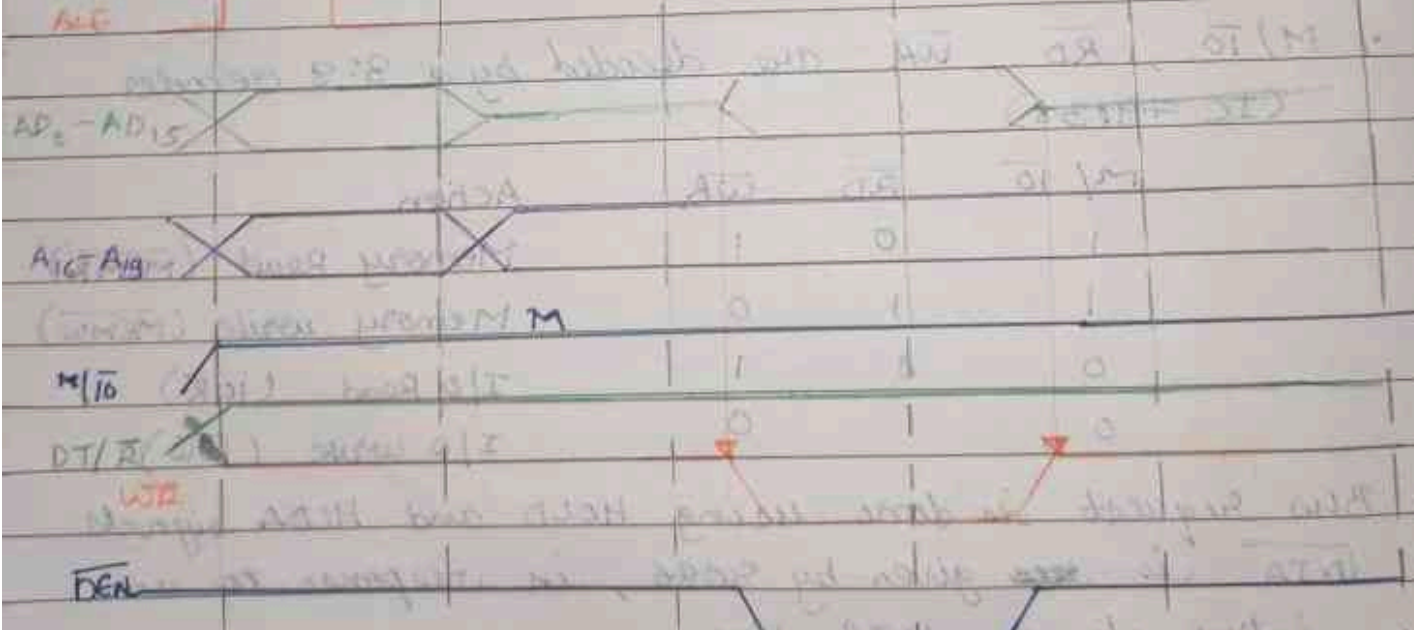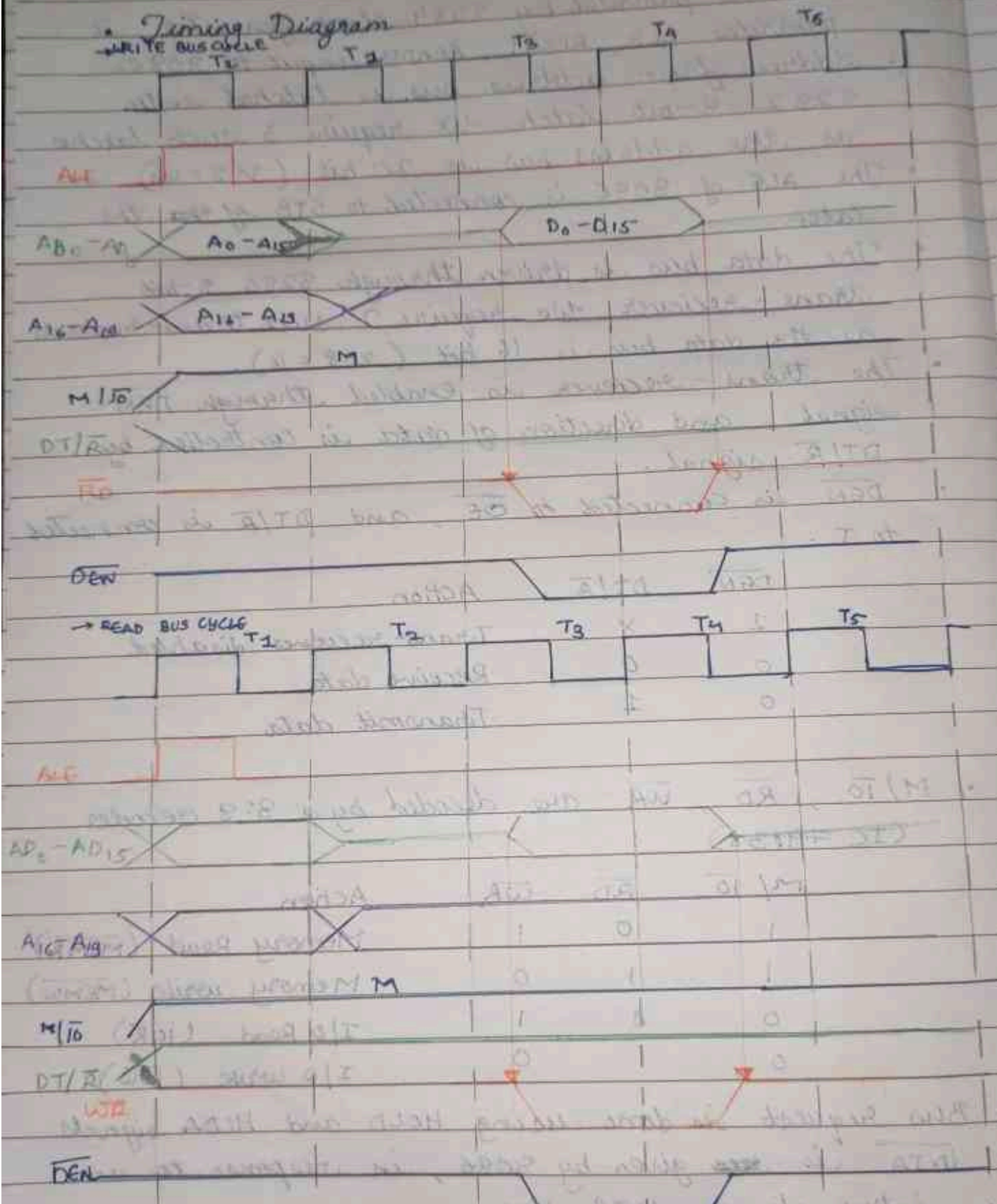
WRITE BUS CYCLE

| | T_1 | T_2 | T_3 | T_4 | T_5 | T_6 |

- ALE
- $AB_0 - N$: $A_0 - A_{15}$ ... $D_0 - D_{15}$
- $A_{16} - A_{09}$: $A_{16} - A_{19}$
- $M/\overline{IO}$: M
- $DT/\overline{R}$
- $\overline{WR}$
- DEN

READ BUS CYCLE

| | T_1 | T_2 | T_3 | T_4 | T_5 |

- ALE
- $AD_0 - AD_{15}$
- $A_{16} - A_{19}$
- $M/\overline{IO}$: M
- $DT/\overline{R}$
- $\overline{WR}$
- DEN

Q2. Draw and explain interfacing of 8086 when it works in Maximum mode and explain the timing diagram for it.

⇒ • 8086 works in Maximum mode, when pin 33, i.e, MX/$\overline{MX}$ pin is set to GND
• In maximum mode, there may be more than one microprocessor in the system configuration
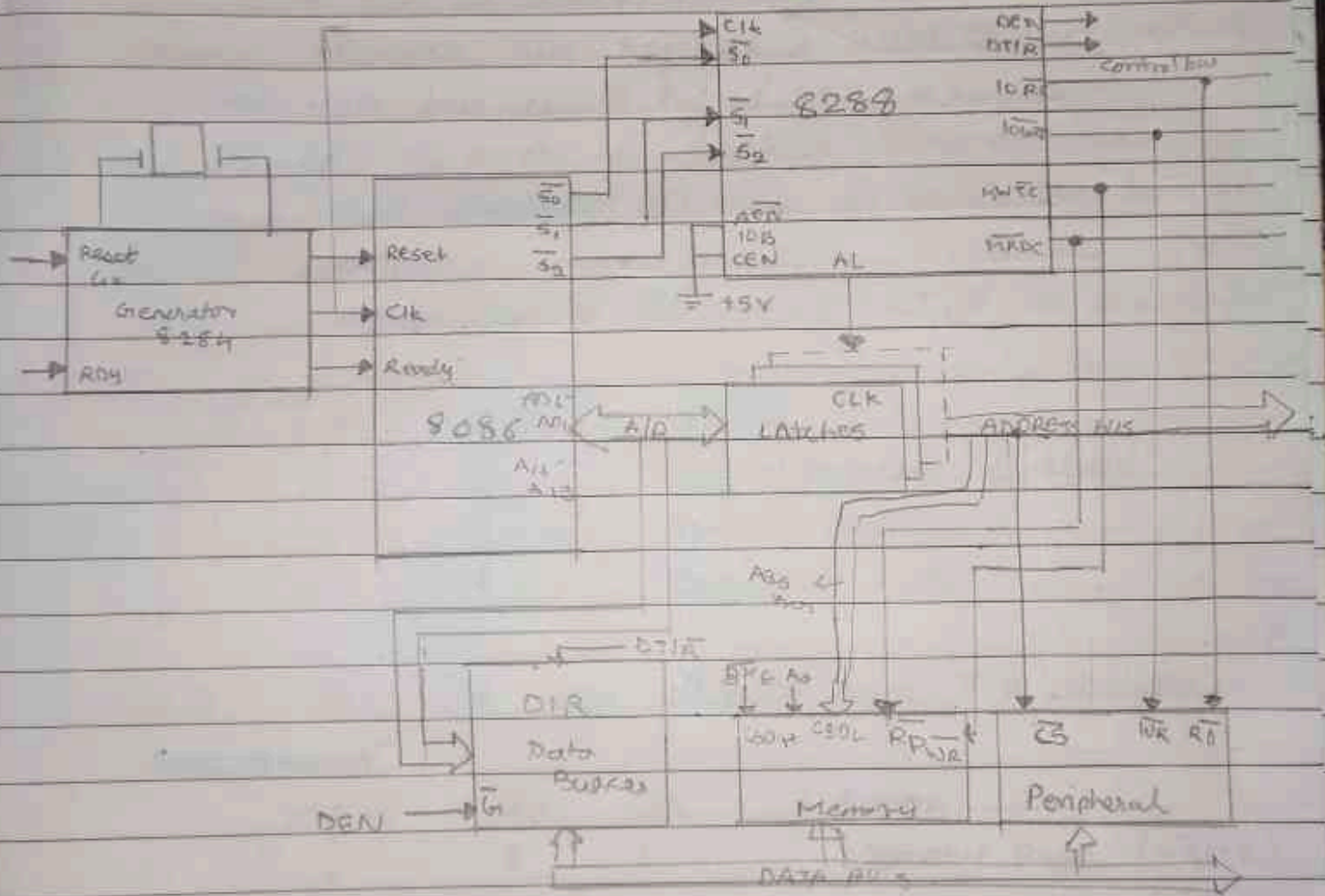
- The basic function of the bus controller chip IC 8288 is to derive control signals like RD and WR, $\overline{DEN}$, DT/$\overline{R}$, ALE etc, using the information by the processor on the status lines.
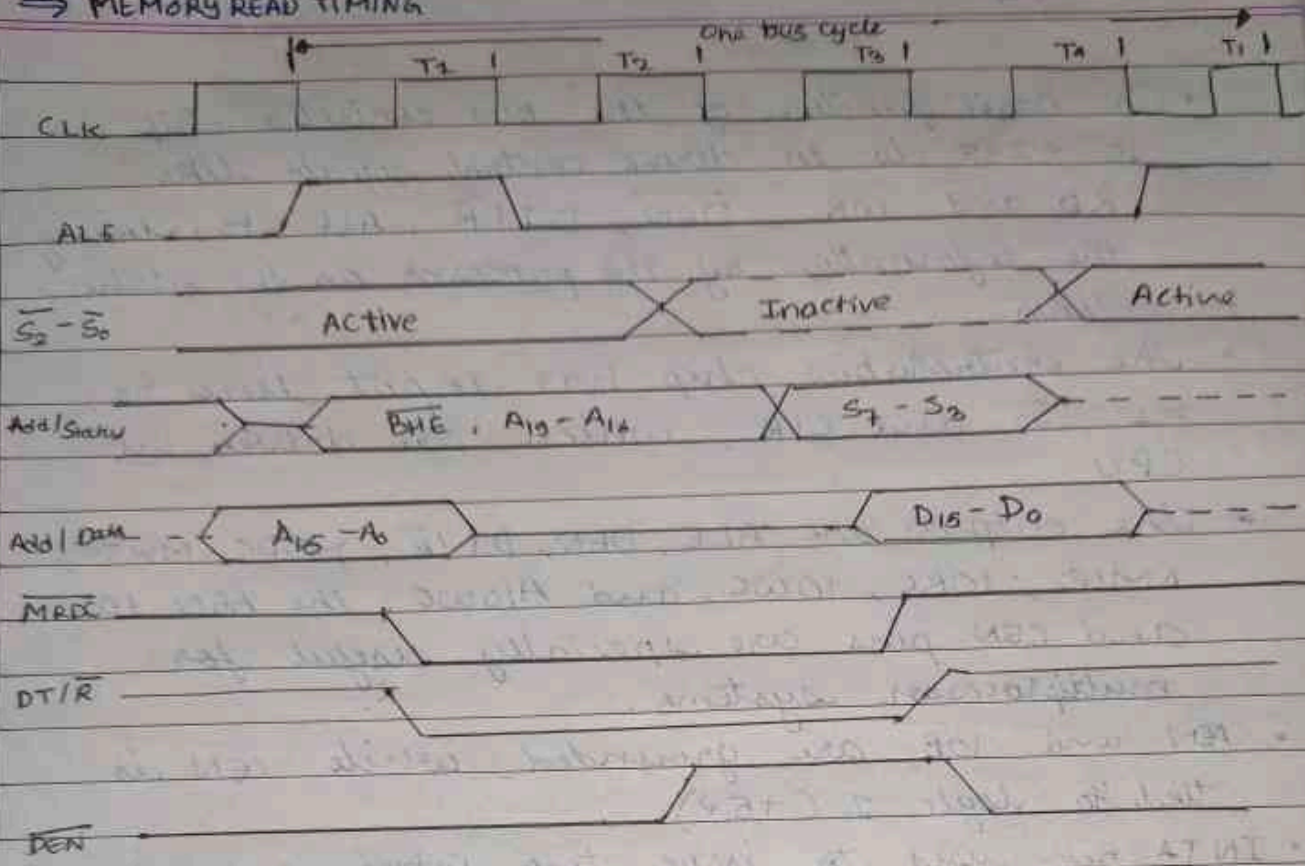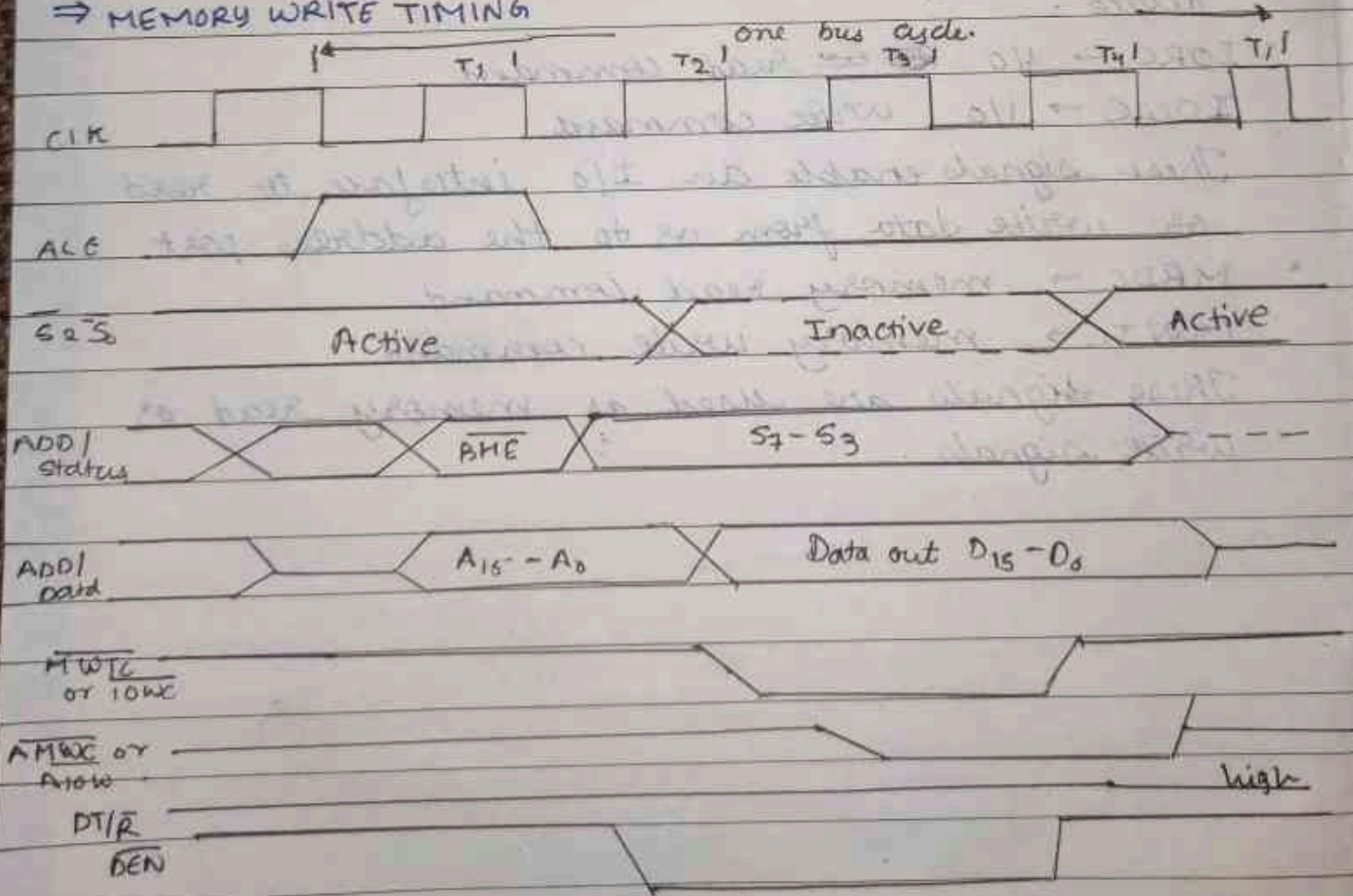- The controller bus chip has input lines S_2, S_1, S_0 and Clk, which are driven by CPU
- The outputs are ALE, DEN, DT/$\overline{R}$, MRDC, MWTC, AMWC, IORC, IOWC, and AIOWC. The AEN, IOB and CEN pins are specially useful for multiprocessor systems.
- AEN and IOB are grounded, while CEN is tied to logic 1 (+5v).
- INTA pin used to issue two interrupt acknowledge pulses to the interrupt controller or to an interrupt device.
- IORC → I/O read command
  IOWC → I/O write command
  These signals enable an I/o interface to read or write data from or to the address port
- MRDC → memory read command
  MWTC → memory write command
  These signals are used as memory read or write signals.

⇒ MEMORY READ TIMING

One bus cycle

| CLK | T₁ | T₂ | T₃ | T₄ | T₁ |

ALE

$\overline{S_2} - \overline{S_0}$ Active   Inactive   Active

Add/Status   BHE , $A_{19} - A_{16}$ $S_7 - S_3$ — — — —

Add / Data — $A_{15} - A_0$ $D_{15} - D_0$ — — — —

$\overline{MRDC}$

$DT/\overline{R}$

$\overline{DEN}$

⇒ MEMORY WRITE TIMING

One bus cycle.

| CIK | T₁ | T₂ | T₃ | T₄ | T₁ |

ALE

$\overline{S_2 S_0}$ Active   Inactive   Active

ADD / Status $\overline{BHE}$ $S_7 - S_3$ — — —

ADD / data $A_{15} - A_0$ Data out $D_{15} - D_0$

$\overline{MWTC}$ or $\overline{IOWC}$

$\overline{AMWC}$ or $\overline{AIOW}$ high

$DT/\overline{R}$
$\overline{DEN}$

HS4101C Green Computing
Movie assignment

Description: From its extraction through sale, use and disposal, all the stuff in our lives affects communities at home and abroad, yet most of this is hidden from view. The Story of Stuff is a 20-minute; fast-paced, fact-filled look at the underside of our production and consumption patterns. The Story of Stuff exposes the connections between a huge number of environmental and social issues, and calls us together to create a more sustainable and just world

Objective: To expose the connections between a huge number of environmental and social issues, and ensure responsibility together to create a more sustainable world.

Impact: It'll teach you something, it'll make you laugh, and it just may change the way you look at all the stuff in your life forever.

The story of Stuff

"The Story of Stuff" worksheet
Watch the video "The Story of Stuff"(https://www.storyofstuff.org/movies/story-of-stuff/)
with Annie Leonard and answer the following questions to check your listening and understanding:

1. Copy the sketches of the 5 stages of the materials economy (Extraction, Production, Distribution, Consumption, Disposal)
2. How much of our natural resources have been trashed in the last few decades?
3. How many planets are needed to support current rates of consumption in the US and Australia?
4. How many trees are being lost in the Amazon each minute?
5. What is being added to the production system that is created dangerous waste products?
6. What food is at the top of the food chain and threatening the health of future generations?
7. What is meant by "externalising costs of production"?
8. 8 Who is paying for the real cost of cheap electronic equipment (i.e. the $4.99 radio)? List three groups at least.
9. How much material is still in the system after 6 months?_____%.
10. Where have the remaining materials gone?
11. When did the modern consumer economy come into being? Why?
12. According to Annie Leonard, what are some of the social and community interests being neglected while we are busy consuming "stuff"?
13. What do these terms mean? Give an example of each.
14. "planned obsolescence"_____
15. For example_____
16. "perceived obsolescence"_____
17. For example_____
18. What is happening to the levels of measured happiness?
19. What reasons are given?

IT3102 Theory of Computation

Tic-Tac-Toe game

Description: Students were supposed to play the game in team of two members. A team member will select the cell number. There was a predefined question for that cell. Answering correctly with in 15 sec will win that cell. This way they need to complete the Tic-Tac-Toe to win.
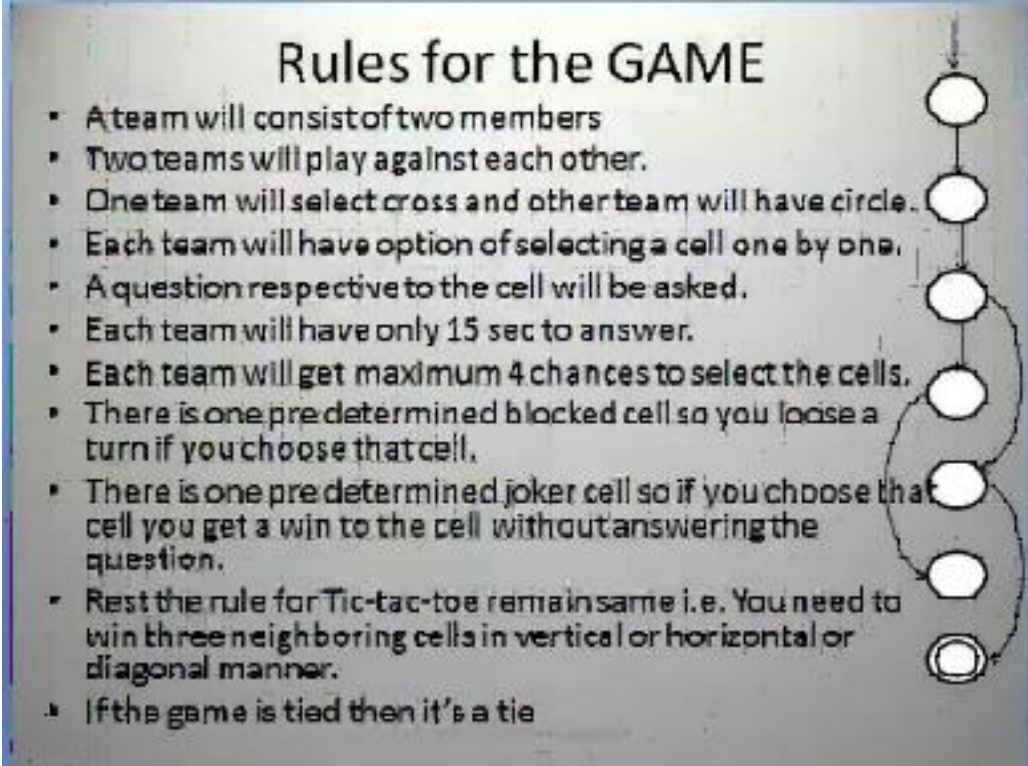
Objective:
The objective was to enable students to revise the basic concepts of Theory of Computation such as FA, NFA, DFA, their properties and limitations. Students were free to choose the partner to play the game of classic Tic-Tac-Toe game.

Impact:
- Students could relate to the basics of Theory of Computation
- They could think innovatively to apply their learned Theory of Computation.

Rule for the Game

Rules for the GAME

- A team will consist of two members
- Two teams will play against each other.
- One team will select cross and other team will have circle.
- Each team will have option of selecting a cell one by one.
- A question respective to the cell will be asked.
- Each team will have only 15 sec to answer.
- Each team will get maximum 4 chances to select the cells.
- There is one pre determined blocked cell so you loose a turn if you choose that cell.
- There is one pre determined joker cell so if you choose that cell you get a win to the cell without answering the question.
- Rest the rule for Tic-tac-toe remains same i.e. You need to win three neighboring cells in vertical or horizontal or diagonal manner.
- If the game is tied then it's a tie

Game Template
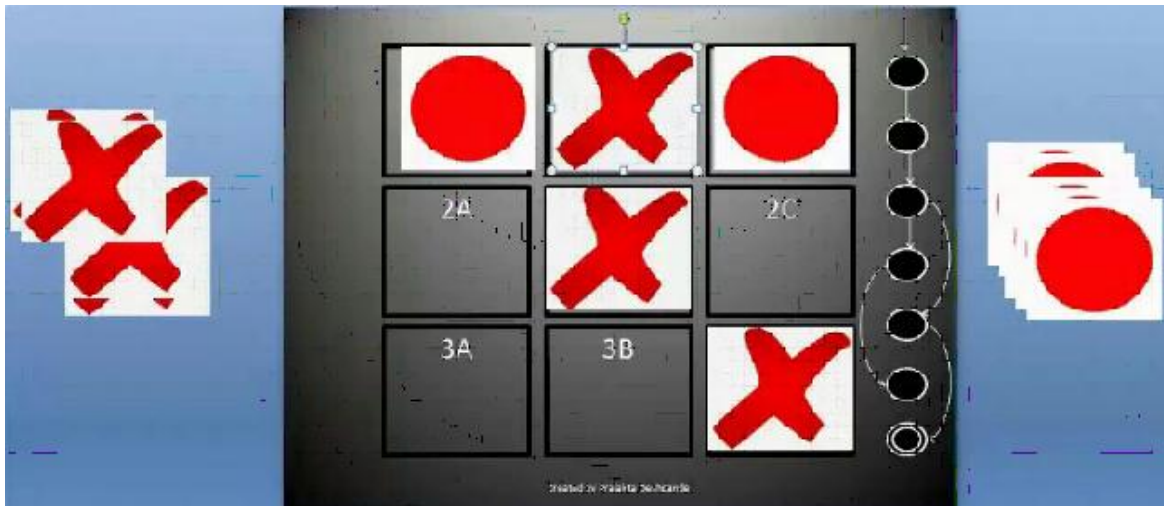
Sample Questions Asked

Game 1

1A) Number of states required to accept string ending with '10' are: Ans: 3

1B) Transition function for NFA is given by: Ans: Qx∑→Q

1C) Language of Finite Automata is always: Ans: Formal Language

2A) What is the difference between a string and valid word for a language? : Ans: String is any combination of ∑ where as valid word is that combination that reaches final state of FA

2B) What is Null string? Ans: A string with no alphabet.

2C) Joker cell

3A) For a language if ∑={a,b} then will 'ab' a valid alphabet for the same language? Ans: No it will be a word generated from ∑

3B) Blocked cell

3C)What is difference between NFA and DFA?

Ans: NFA can have many transition on a given state on a given input symbol

DFA has unique transition on a state on unique input symbol.

Feedback
Q1 What have you learned from the GAME
Logic and team work!
Always choose a circle in tic-tac-toe of toc. Also questions were really good and challenging.
The questions how they are confusing and tricky one
Being spontaneous
Many tricky questions which were not known, gained more knowledge, concepts were cleared
Learning and Summary in interesting way
New points related to toc
It was a really fun game which required good grip over basic TOC concepts
To do study in fun manner
Different terms related to FA,DFA etc
It was awesome and learning can be fun too
It was fun filled game with tricky TOC questions.
FA doesn't have memory so no calculations can be performed, mealy is more efficient than moore machine, and finally Circle always wins!! Kidding!!! :)
How the fun activity is useful .
To think faster for correct answers !!
we learn that how to solve questions in time
I learnt the pattern of questions like I was assuming that questions for TOC would always be like numerical..and not in such a way
learning is ongoing process.
All concepts have got cleared,limitations of FSM.
many things...drawbacks of FSM,Advantages of using automata etc.It was fun game with knowledge.
The basic points were cleared
Some very intricate and tricky questions were asked. Got more in depth knowledge about the topics. Got increased interest inTOC as well!
It was interesting... Questions were quite tricky and easy to understand but enjoyed learning
Study TOC concept thoroughly
it helped to revise the concepts of TOC and some questions were really tricky .
The concepts taught in lectures got revised again. Also, I got to know which topics I am weak at and should be more practiced.
Ability to analyze and answer questions quickly and, under pressure
Definitions of moore,mealy machines,formal language
Learning can be interesting. And because of game I have revised all the concepts in fun way
Co-relate idea to subject
Revised concepts
To answer tricky questions and to know basic concepts of TOC
That we should choose O between O and X always□
it is interesting
little more about fa , fsm, nfa and dfa
learned and revised some basic concept of theory of computation
Revision of Mealy and Moore machine, NFA and DFA,Fa with tricky questions
It was interactive and i understood that the basics are key.
I learnt the answers of tricky questions from the game which otherwise I would have overlooked while studying unintentionally.

Very interesting game...I could easily revise and clear my concepts.

Q2 Should we play such games?
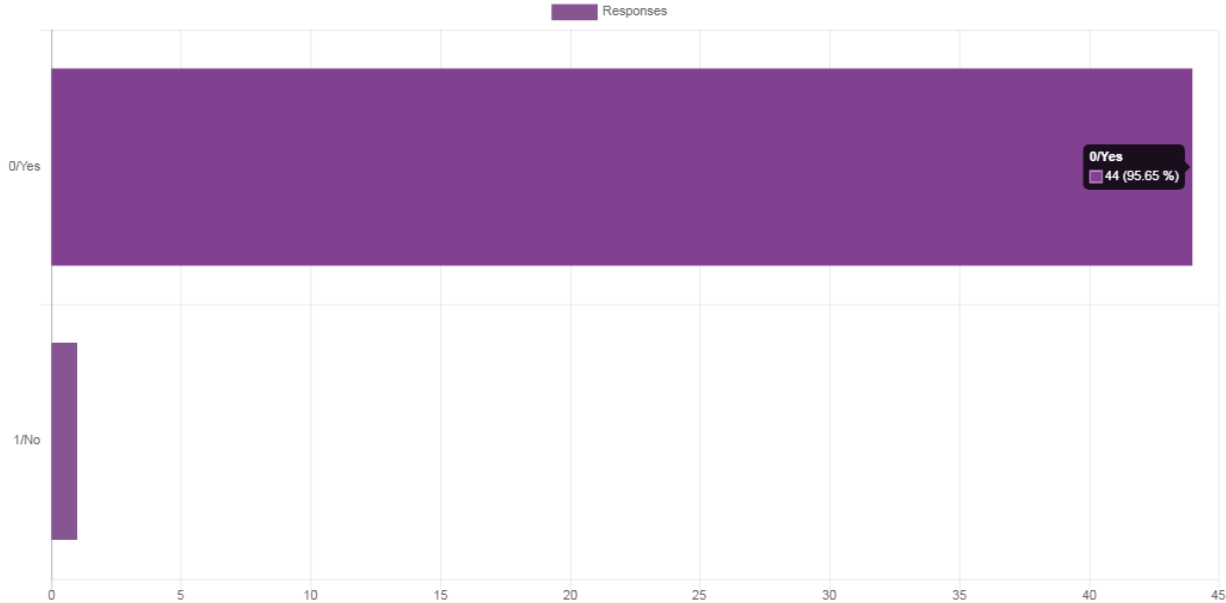
IT 3203 Software Engineering

Presentation of Process Model

Description: It was a group activity. Students explored unique features of every process model. Then they studied various available problem statements and selected the process model that had to be adopted for the particular type of problem statement. They prepared decorative charts clearly showing features and pros-cons of process models.

Objective: The objective of this activity (pedagogic technique) ws to allow students to explore, learn and understand software engineering process models in ejoyable way.

Impact: Students really enjoyed this type of learning as….
1) They worked on real life problem statements
2)They used various innovative way to depict the process model.
3) Decorative methods (in charts / models) to show pros and cons of every model were very beneficial to understand benefits and constraints involved with every process models.
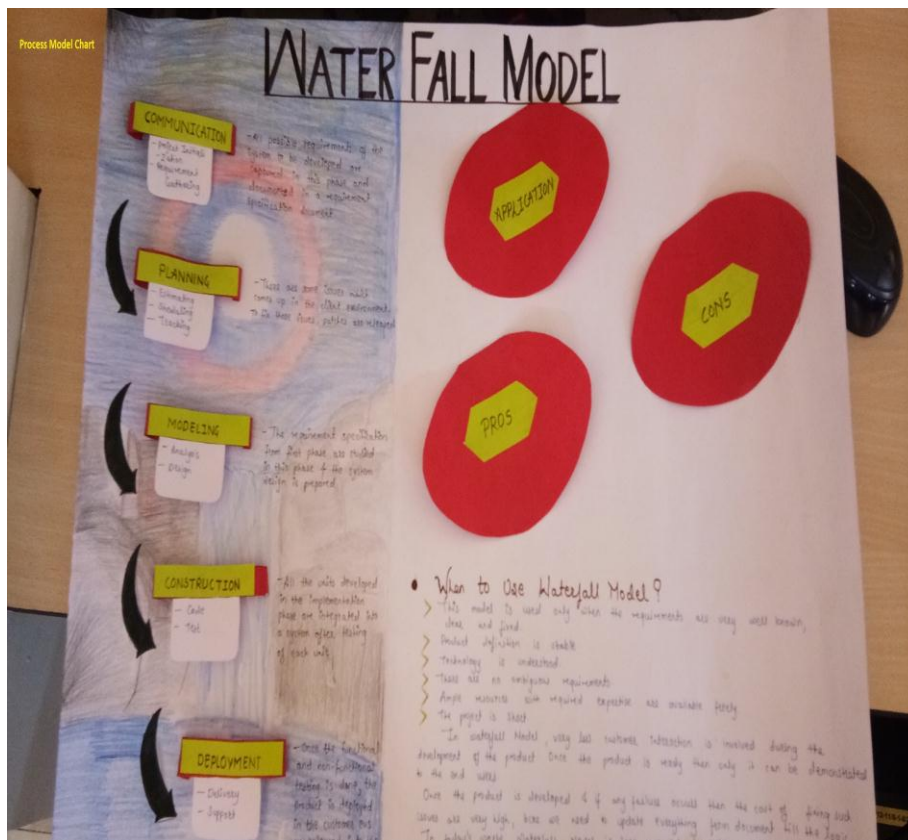
Feedback from students:

Overall comments (descriptive)

59 responses

Mode of examination was good. We learned the concept that we presented in creative way

It was a very new type of learning

It was a new way to explore a topic

We studied our model and compared it with other models too to know how Spiral model was different. We tried to understand it better. It was very helpful to gain knowledge.

Learned how we can put up a particular topic in a creative way in front of others. Also it helped to learn the applications of the topic in real projects.

Good way of conducting the exam

na

it is a little time consuming.

IT 3103 Machine Learning

Who wants to be a spy? - Sehmat hain app?

22nd September 2021

Description: This is a game of guessing which words in a given set of words are related to the clue-word given by spymaster of the same team. Two teams (Red and Blue) compete at a time. 25 words in Machine Learning are laid out in 5x5 rectangular grid. A few words belong to red team, a few to blue team, a few are neutral and one word is a bomb/killer. The spymaster is given a color-coded 5x5 grid layout whereas the other member gets the plain grid of the same layout. The spymaster gives 1-word hint and the number of words related to that hint. Using this hint the other member has to identify the words that belong to their color. Both the teams take turns. The one who first guesses all its words correctly is the winner. If bomb/killer is guessed, the game ends and other team is declared as winner.

A sample color-coded 5x5 grid layout for the spymaster

Objective: The objective of this game (pedagogic technique) was to encourage students to learn and remember most commonly used words in Machine Learning in fun way.

Impact: Students liked this new way of looking at technical concepts. They found this technique interesting, helpful, innovative, refreshing, creative and so on. They found it refreshing and learnt a new way to co-relate the words.

Feedback from students:

Rate how effective was the game - Who wants to be a Spy? Sehmat hain aap?

65 responses
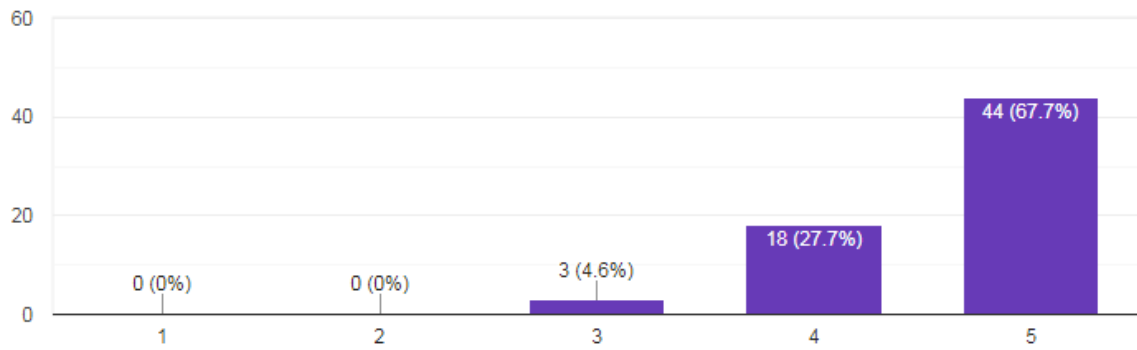
Do you want to participate if we play this game again?

65 responses

- No
- Yes

95.4%
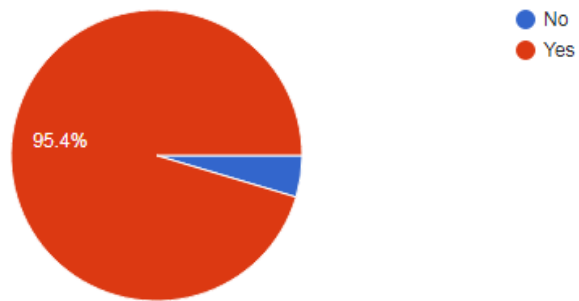
Actively learning concepts

When we have to guess the words related to the word given by spy

I liked the way the spy master had to give the clue. The clue had to be very smart and effective so that the other team-mate could guess the word right.

I really enjoyed how the elements of Machine Learning were added in the game. It was fun as well as revision of the concepts.

We had to guess from given words based on the clue.

how it made us think and learn and have fun doing it all at the same time.

It makes one person more active

Through the game, I come to know the different perspectives of a single word.I liked that about the game.

PEIT 3101C Business Intelligence
Crossword Generation

Description: Description: Students were asked to frame crossword with the terms they learn in Business intelligence

Objective: Students were supposed to dig different terms and correlate them, revise the concepts, find new definitions to explain the same concept.

Impact: Students explored new terms of BI. Created Challenging crosswords which exercise students brain and study further.

Sample of Crossword:

Business Intelligence

Across

2. Large table that stores business measurements
3. Language used for managing relational databases and data manipulation
5. Discovery of meaningful patterns in data
7. Process of flattening the design of a database by adding redundant data
9. Actions of making the best or most effective use of a situation or resource
10. Methods for analytical data evaluation
12. Prediction or estimate of future events
14. Voluminous and complex data sets that traditional data processing application softwares are inadequate to deal with
15. A view of data at a particular moment in time

Down

1. Ability of a BI solution to be used by a large number of people as time passes
4. A data repository that deals with multiple subject areas (or data marts)
6. Access data that is in the lower level of a hierarchically structured database
7. Data an organisation generates and stores through regular business activities, but then never utilises
8. Data that gives information about other data(or primary data)
11. Measures of performance that observe progress and evaluate trends within an organisation
13. A situation where the enterprise is full of unnecessary copies of data, and no one knows which is the most updated and real version of data

Feedback of Students:
Student found the task challenging
They need to explore various web resources, different tools
Students enjoyed the activity