Program Outcome

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Program Outcomes

PO1	Engineering Knowledge
PO2	Problem Analysis
PO3	Design/development of the solution
PO4	Conduct investigations of complex problems
PO5	Modern tool usage
PO6	The engineer and society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and teamwork
PO10	Communication
PO11	Project Management and finance
PO12	Life – long learning.

Program outcome and Course Outcome

PO-CO Mapping

1. Engineering Knowledge
2. Problem Analysis
3. Modern Tool usage
4. Individual and teamwork
5. Life-long learning

LTP detail L:3 P:0 Credit:3

Course Outcomes

CO1:: Understand electrical laws and semiconductor device operation with applications.

CO2:: Analyze virtual applications by configuring an Arduino Board and sensor module.

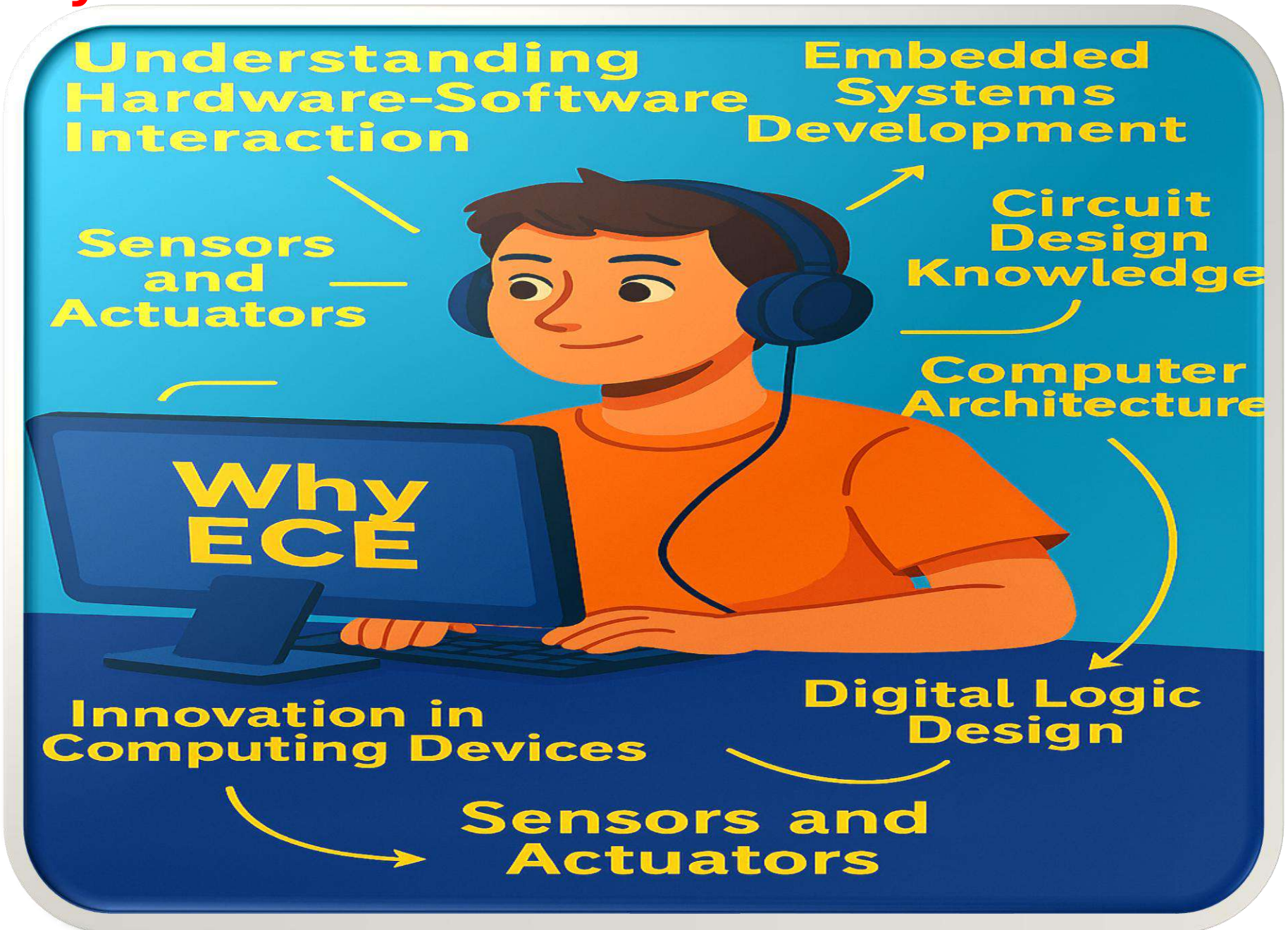
CO3:: Examine various number systems and their application in digital circuits.

CO4:: Design combinational circuits with applications specific integrated circuits.

CO5:: Develop sequential circuits with flip flops and ICs for various applications.

CO6:: Create skill-oriented projects with features and ergonomics.

Why this course for CSE?



Semiconductor companies hire CSE graduates

Job Profile
Software engineers
Embedded systems engineers
Firmware engineers
Application engineers
Hardware engineers
Chip design engineers

Text Book:

1. DIGITAL LOGIC AND COMPUTER DESIGN BY M. MORRIS MANO, PEARSON PUBLISHERS.

References:

2. FUNDAMENTALS OF ELECTRICAL ENGINEERING AND ELECTRONICS by B.L.THERAJA, S.CHAND & COMPANY

3. DIGITAL FUNDAMENTALS BY THOMAS L. FLOYD, R. P JAIN, PEARSON by THOMAS L. FLOYD, R. P JAIN, PEARSON

4. ELECTRONIC CIRCUIT FUNDAMENTALS AND APPLICATIONS by MIKE TOOLEY, NEWNES PUBLISHERS

5. DIGITAL ELECTRONICS PRINCIPLES, DEVICES AND APPLICATIONS by ANIL K. MAINI, WILEY

Course Assessment Model

Marks Break Up:

• Attendance	5
• CA (A0202)	25
• MTE	20
• ETE	50
• Total	100

Evaluation Mechanism

	CA-1	CA-2: Phase 1 (Before MTE)	Mid Term Exam (MTE)	CA-2: Phase 2 (After MTE)	End Term Exam (ETE)	Attendance
Evaluation Task	• Type: MCQ • Total questions:30 • Total Marks : 30 M (1 marks for each question) • Negative Marking: 25% • Syllabus: Unit 1& Unit 2 • Platform: OAS/Google Form/ Offline	• Problem Statement: 10M • Literature Survey: 10M • Circuit Simulation: 10M • Synopsis Report: 5M • Platform for Synopsis Report: Google form • Total Marks: 35 M	• Type: MCQ • Total questions:30 • Total Marks : 30 M (1 marks for each question) • Negative Marking: 25% • Syllabus: Unit 1, Unit 2 &Unit 3 • Platform: As per University Examination Guidelines	• Working model: 20M • Viva: 20M • Flashcheck: 20M • Edutrack:5M • Platform for Final project report: Google form and Hard copy with duly signed by supervisor • Total Marks: 65M • **Note: Phase 2 is only applicable to those students who qualify Phase 1.**	• Type: Mix Questions • Total questions:30 MCQ & 4 Subjective • Total Marks: 30M MCQ and 40 M Subjective • Negative Marking in MCQ: 25% • Syllabus: Complete Syllabus	
Sub. Date	**Week 3**	**Week 7**	**As per Examination**	**Week 13**	**As per Examination**	
Outcomes	• Time management • Understand electrical laws and semiconductor • MTE preparations	• Problem formulation • Literature Survey • Virtual validation • Components identification and specification	• ETE preparation • Tested on electrical laws, semiconductor • Building the basics of Digital Electronics • Learn Arduino Interfacing	• Component-Level Understanding • Testing & Debugging Techniques • Interdisciplinary Knowledge • Presentation Skills • Innovation Readiness	• Understanding of electrical laws and semiconductors • Arduino interfacing and Virtual implementation • Digital circuit understanding • Understanding of combinational and sequential circuits	
Weightage	**12.5M**	**4.375M**	**20M**	**8.125M**	**50M**	**5M**
Total	**100M**					

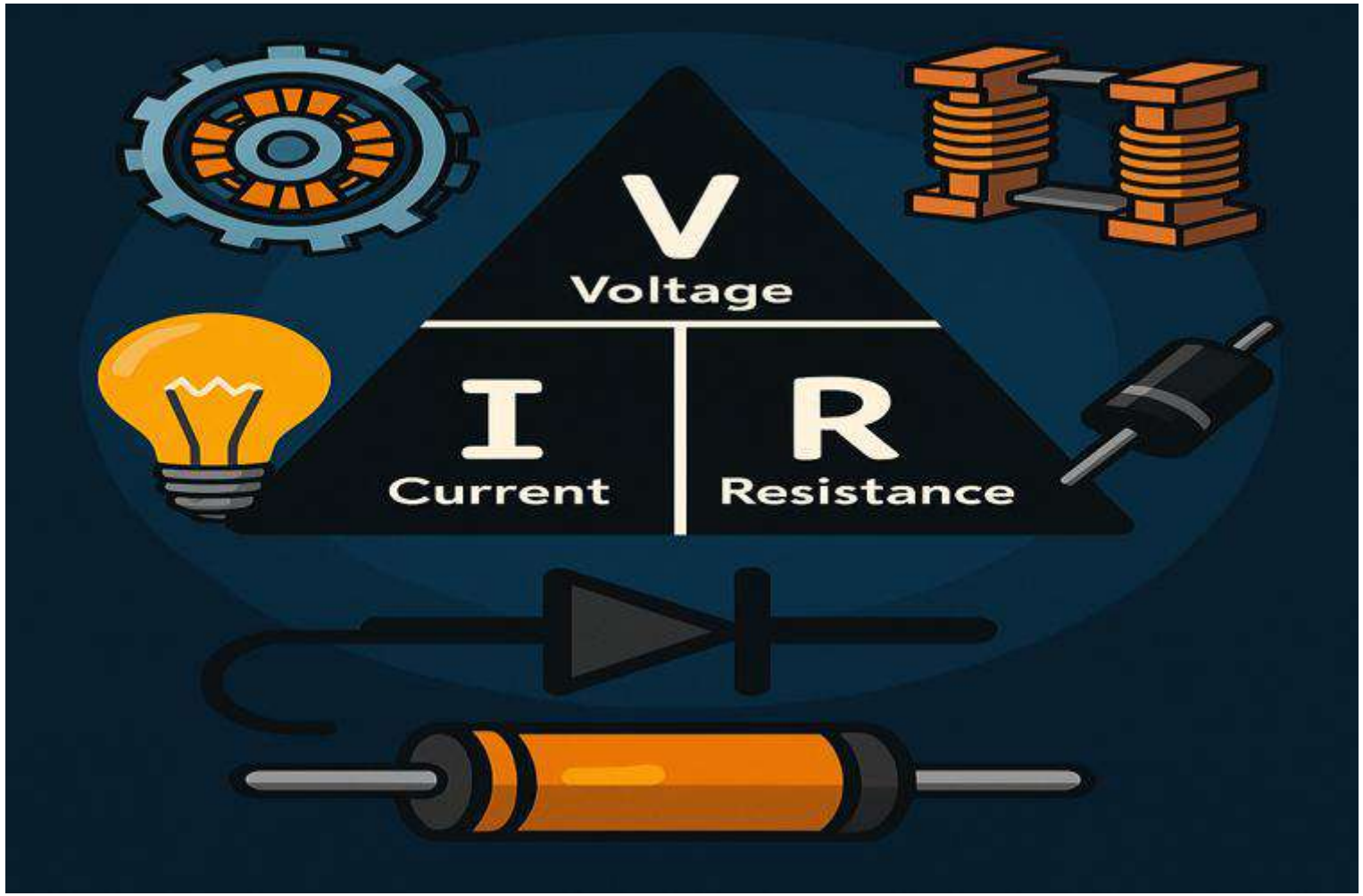
EDU Revolution initiatives offered in ECE249

Grade Upgradation-Core (In this scheme, these options has been given to students and they can take up and after completion, can apply to Standing Committee for Grade Upgradation)

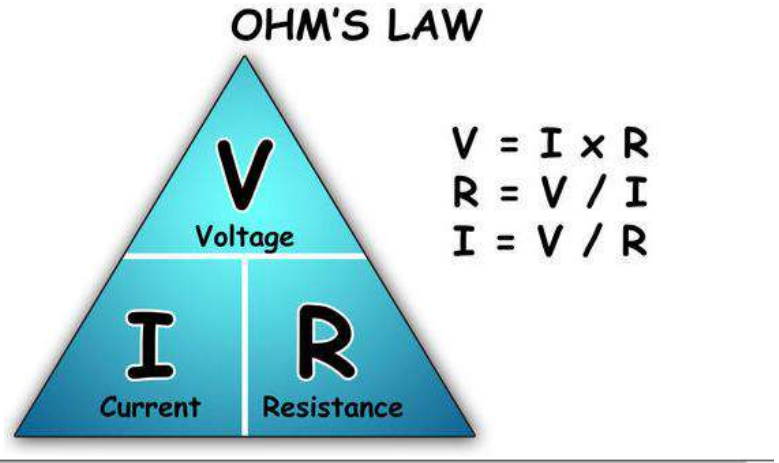
- **Publications/Patent/Copyrights:** Students will be trained to published working project as a patent or published report as research article or copyright. If they achieve then rewarded at later stage.

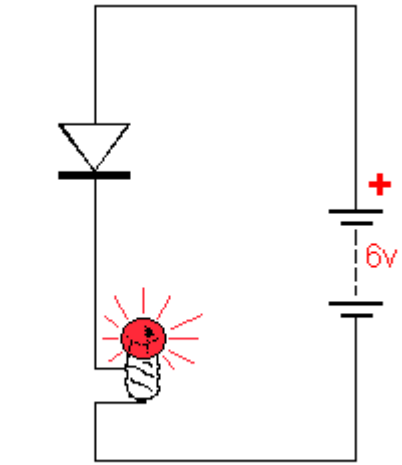
- **Technical competition / Hackathon:** Students will be guided to map the project work with hackathon or competitions. Those who get good performance in competition then they will be rewarded.

Unit- 1: Fundamentals of Electrical Laws, Semiconductor Devices, and its Applications

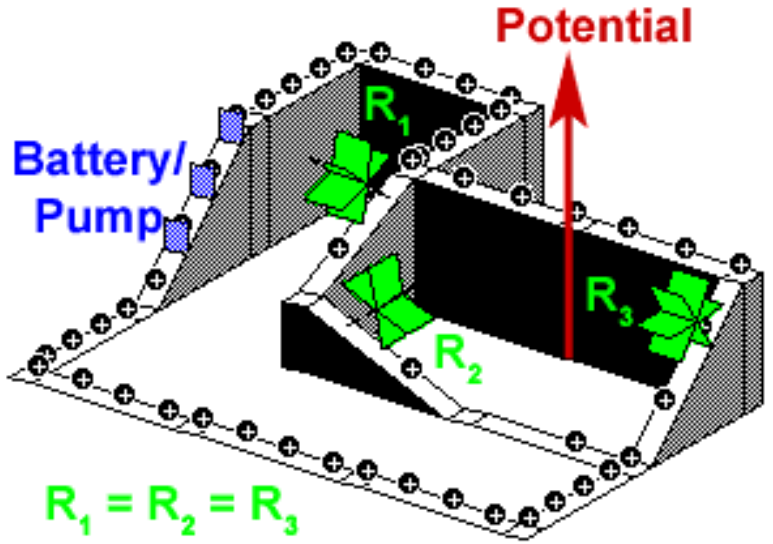


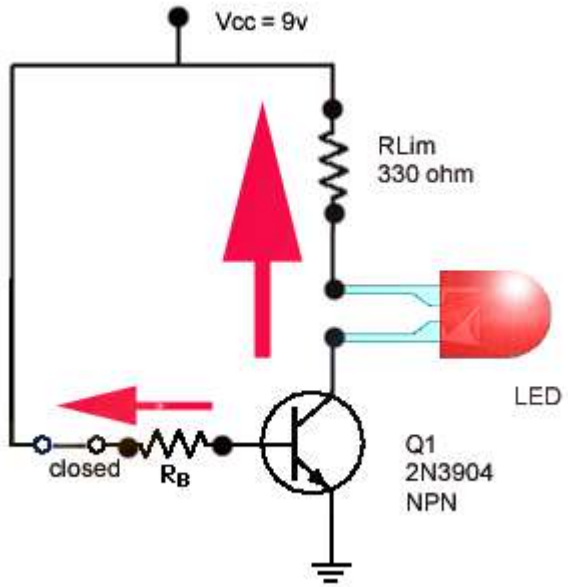
Unit- 1: Fundamentals of Electrical Laws, Semiconductor Devices, and its Applications

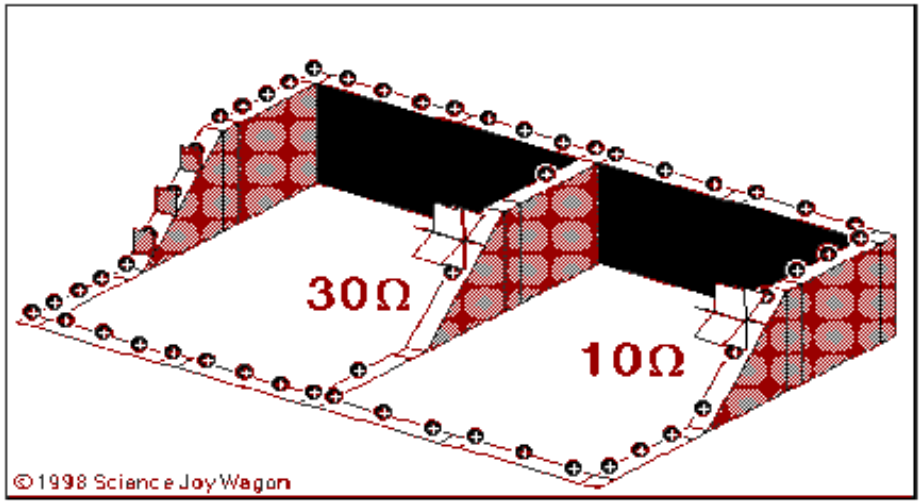




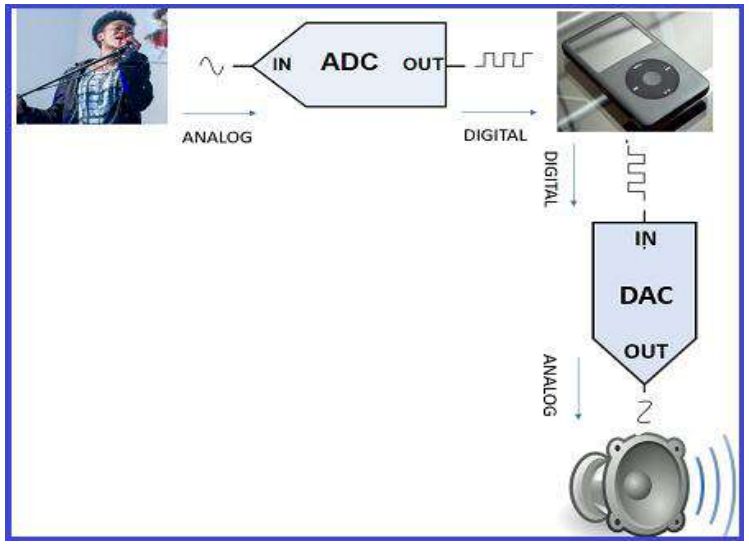
How a diode works

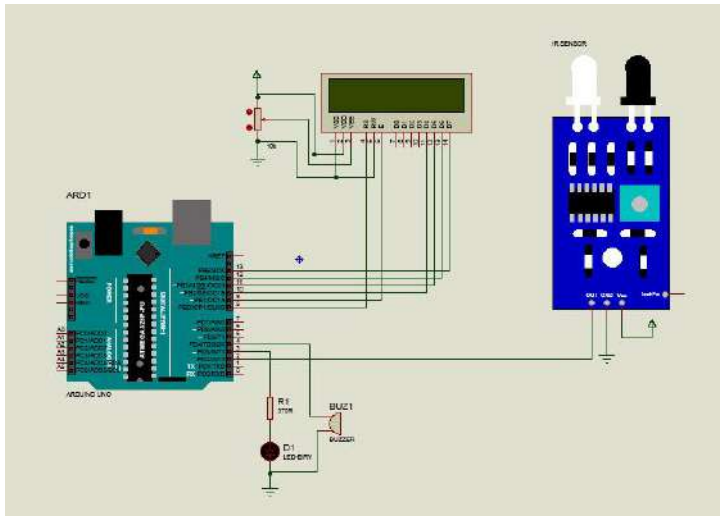


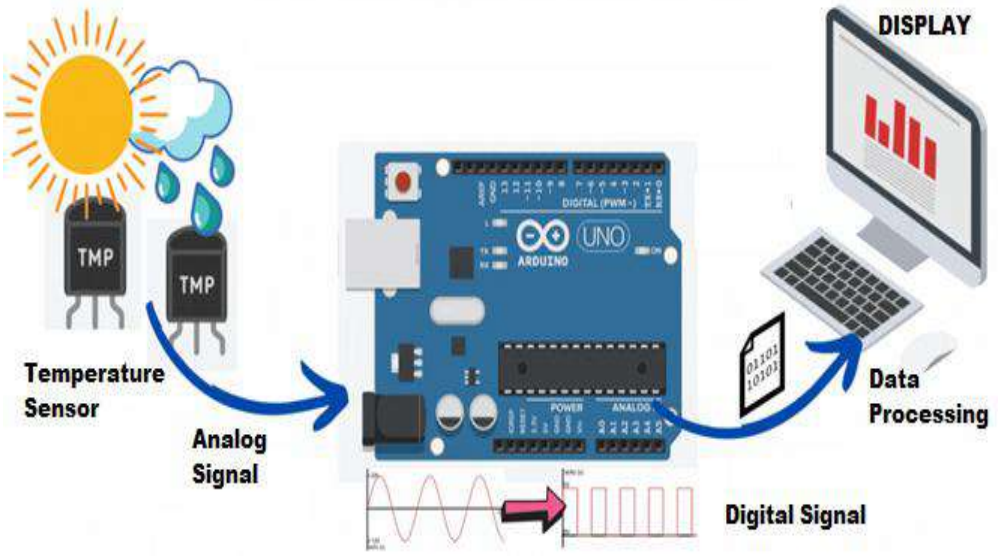


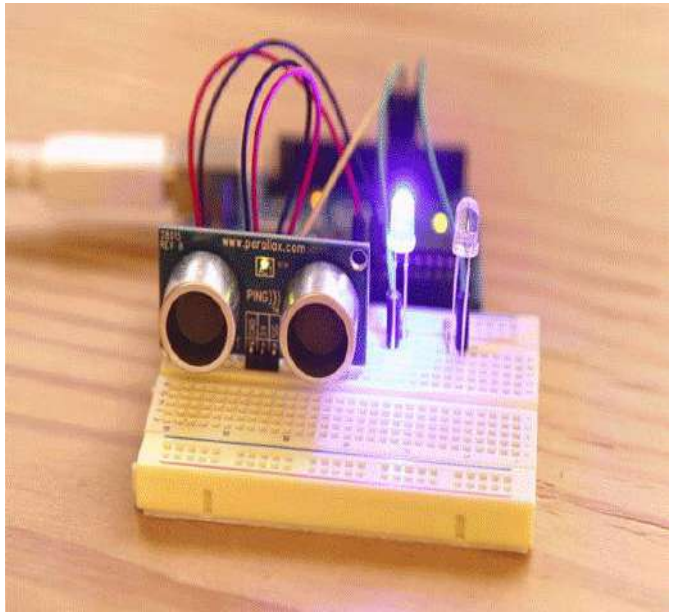


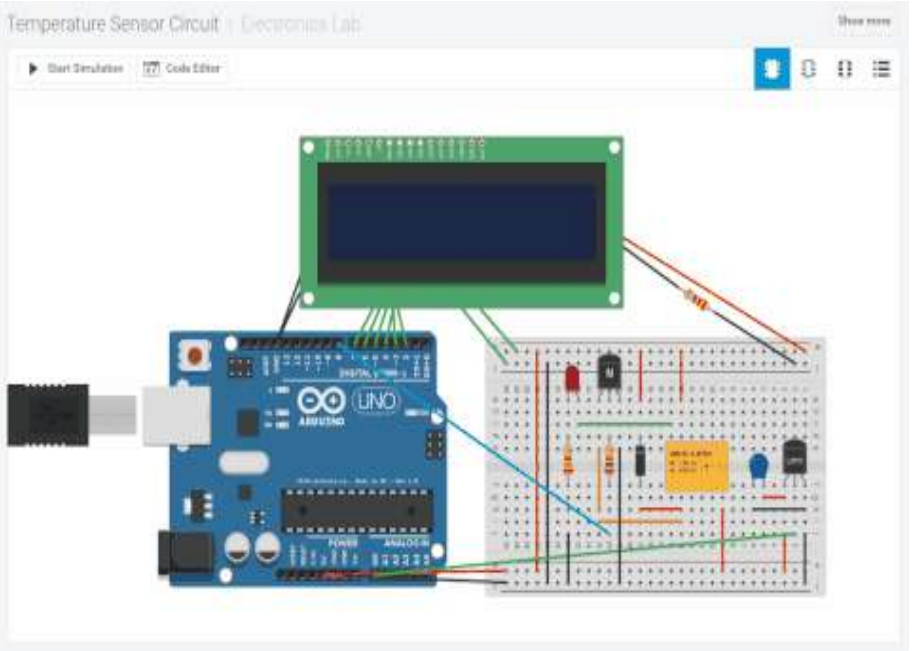
Unit-2: Introduction of Arduino and Sensors

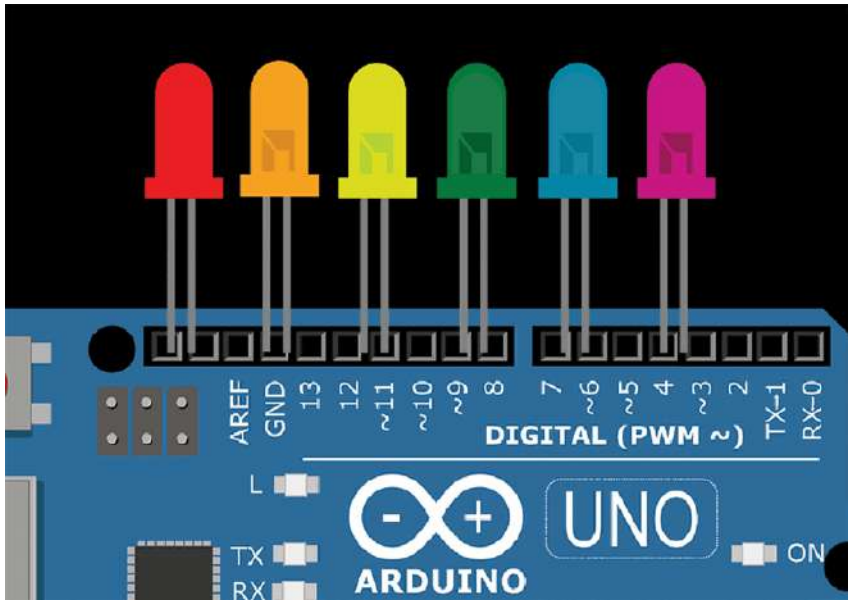




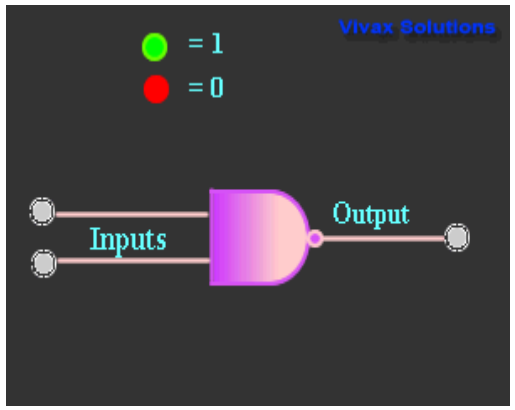


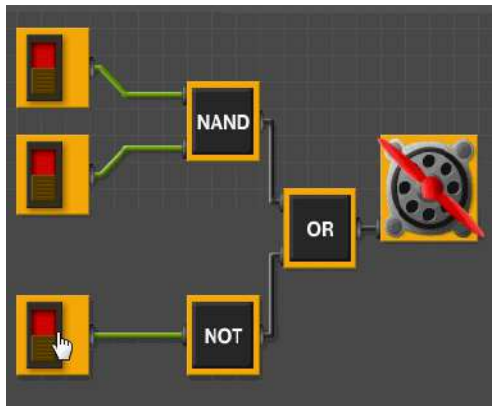


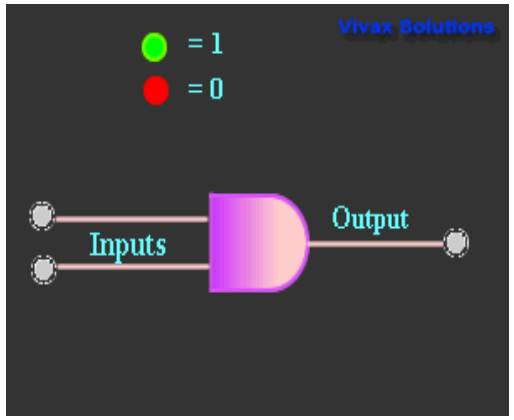


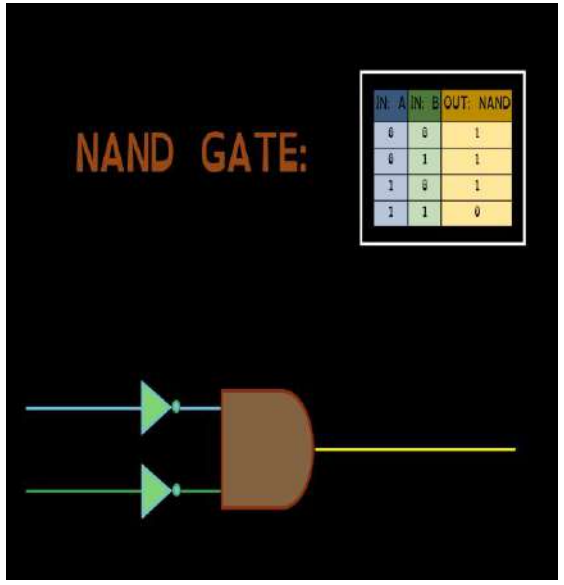


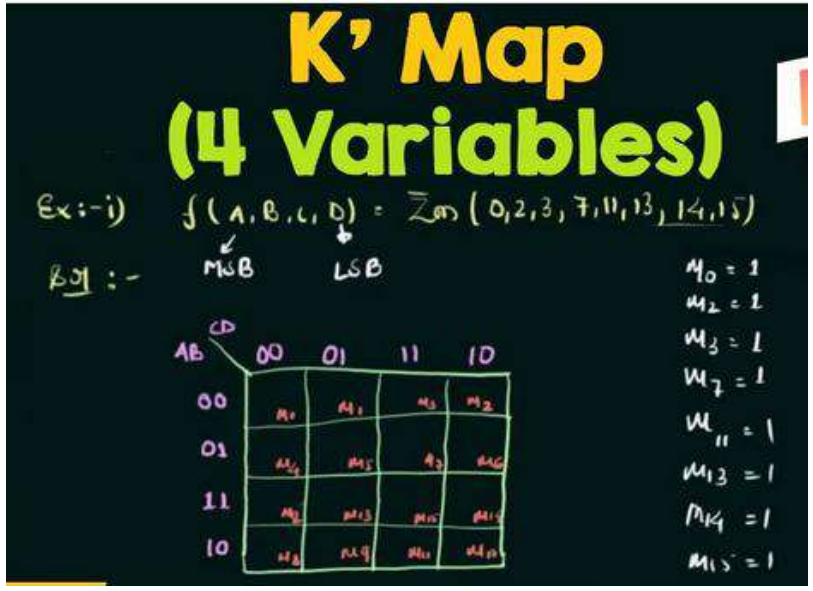
Unit- 3: Introduction to number system and logic gates







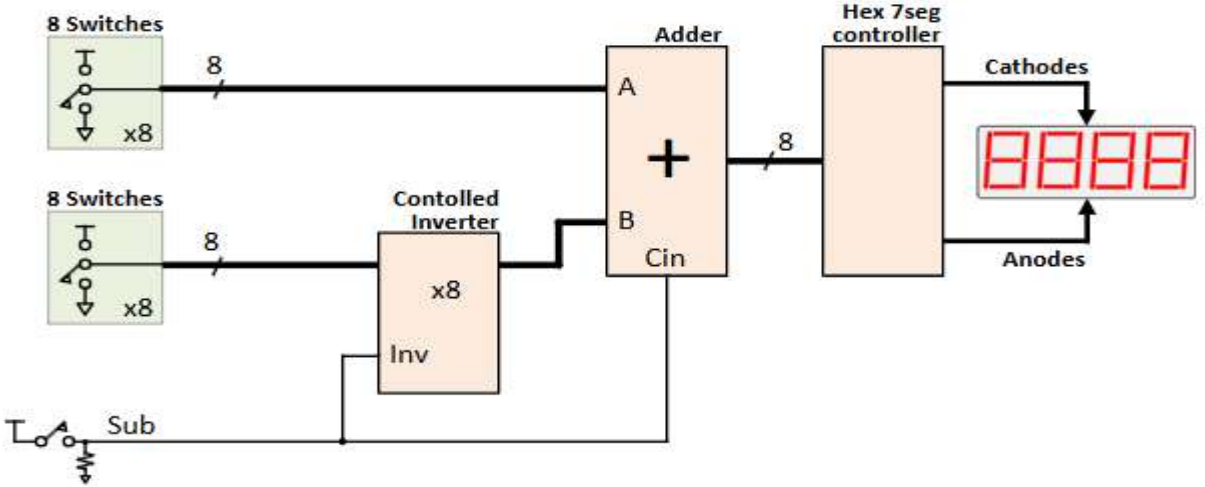




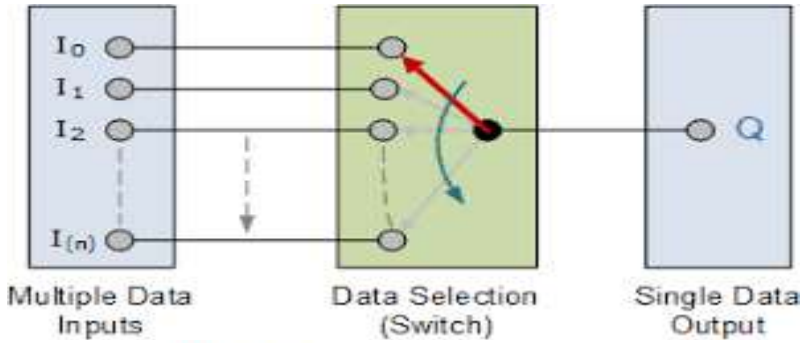
Dec Numbers	Binary Numbers	Octal Numbers	Hexadecimal Numbers
0	0	0	0
1	1	1	1
2		2	2
3		3	3
4		4	4
5		5	5
6		6	6
7		7	7
8			8
9			9
			A
			B
			C
			D
			E
			F

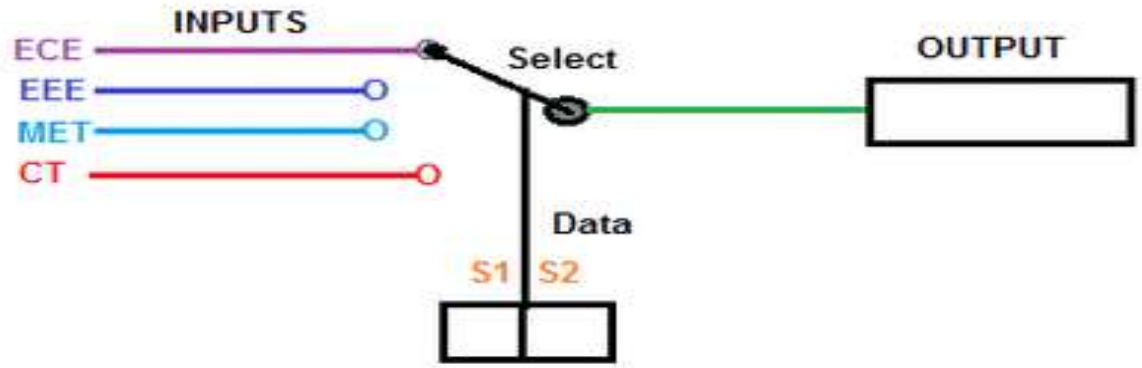
How to create large numbers in any number system????

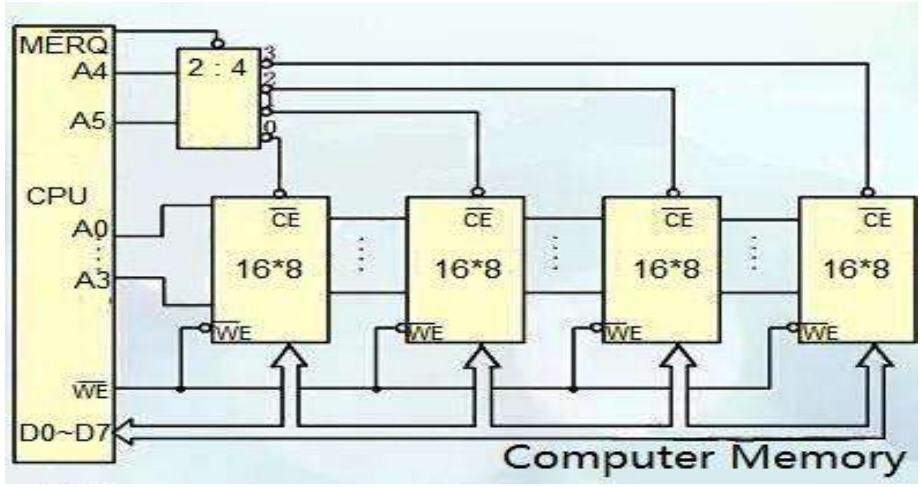
Unit-4 : Introduction to Combinational Logic Circuits



Adder/Subtractor

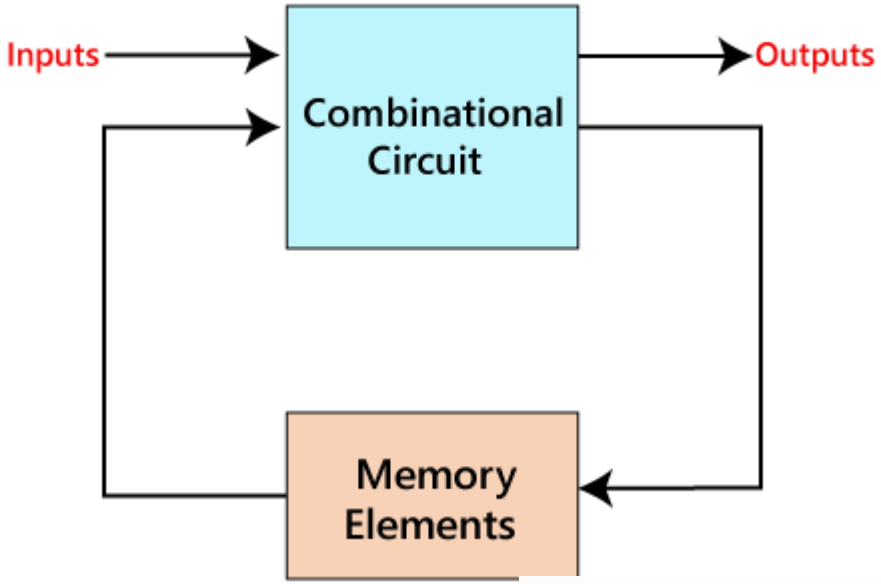


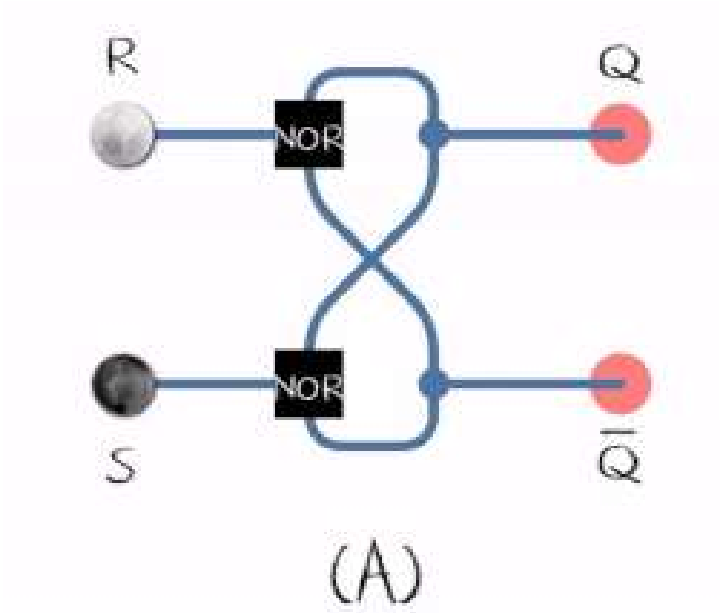


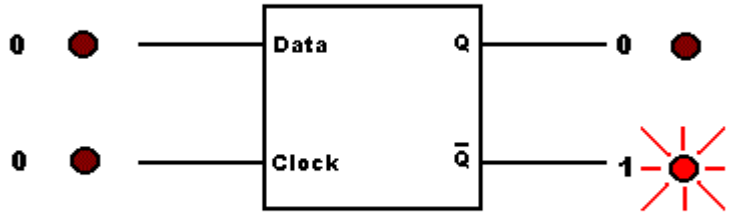


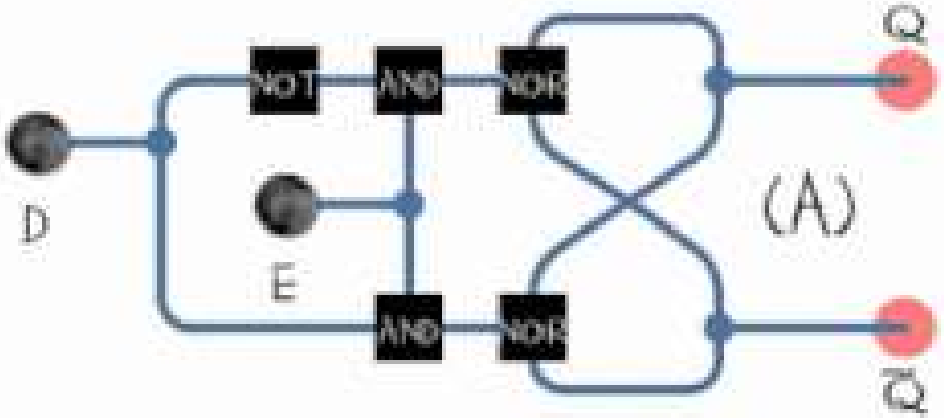
Decoder used to activate memory chips

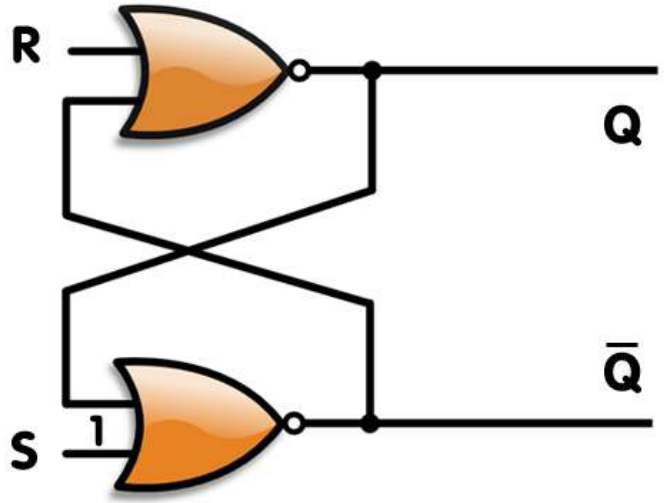
Unit-5: Introduction to Sequential Logic Circuits



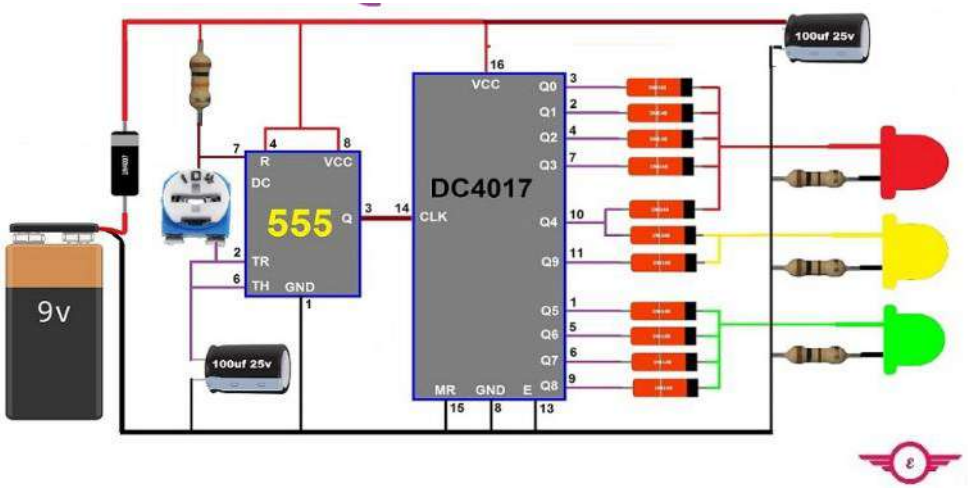


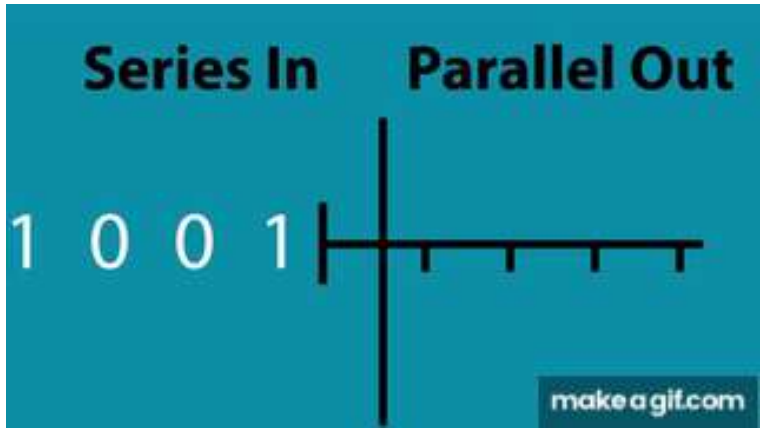


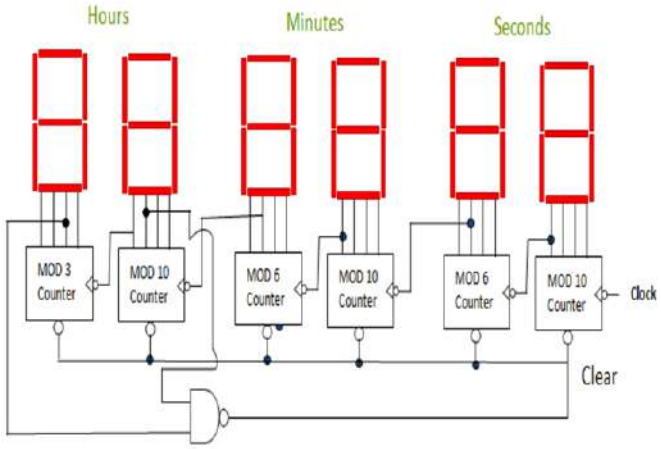




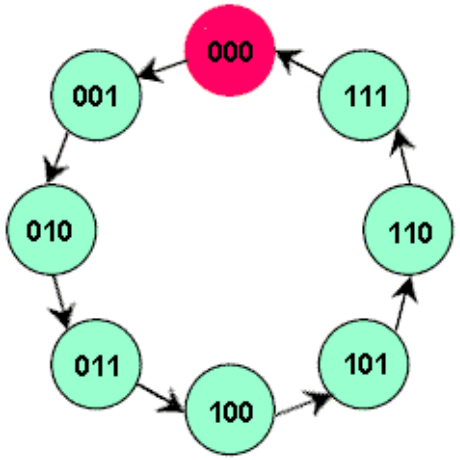
Unit-6: Applications of Sequential Circuits







DIGITAL WATCH



0

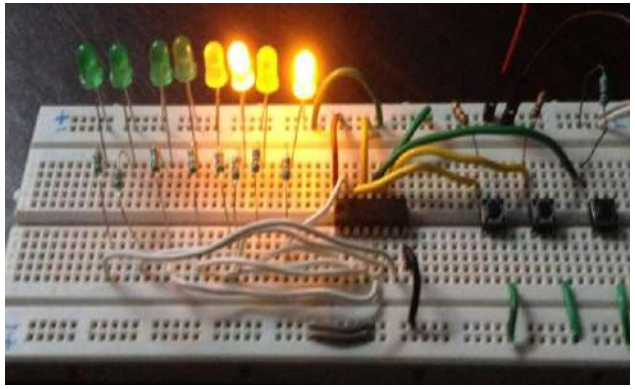
Write

Flip Flop 1	Flip Flop 2	Flip Flop 3	Flip Flop 4

1 0 0 1

Data Input Q

Clk



Register Application

Software Link

- You are requested to kindly install **Proteus Design Suite** and the **Arduino IDE** on your systems.
- Proteus will help in simulating electronic circuits, while Arduino IDE is essential for writing and uploading code to microcontrollers.
- Ensure both are properly installed before the upcoming lab Lecture. Link for both are as follows:

Link for Proteus
https://drive.google.com/u/0/uc?id=18dc8n0lpLu9QRzxbgZzciAwhg6NeqnPp&export=download **(Link to download proteus)**
Link for Arduino
https://www.arduino.cc/en/software **(Link to download arduino IDE 1.8.19 by)**

Link to download all Arduino and sensors libraries
https://drive.google.com/drive/folders/1EIKKUkkDyN-yYRVXu6fiiZQogabUvUck?usp=sharing

The path to paste libraries of Arduino and other sensor are as follows
C:\Program Files (x86)\Labcenter Electronics\Proteus 8 Professional\LIBRARY

The course content Before MTE

Unit I

Fundamentals of Electrical Laws, Semiconductor Devices and its Applications: Ohm's Law, Kirchhoff's Law, Voltage Division Rule, Current division rule, Basics of semiconductor (Intrinsic and Extrinsic), PN junction diode (working and characteristics) and its applications (rectifiers and switch), Bipolar junction transistor (types, modes, construction, and working CE configuration).

Unit II

Introduction of Arduino and Sensors: Analog and digital signals, Arduino board (pin configuration and description), basic principle of IR sensor, LDR, ultrasonic sensor, Temperature sensor (DHT11/DHT22).

Unit III

Introduction to Number System and Logic Gates: Number system (conversion), Codes (B-G, G-B, Excess-3, BCD), logic gates, Compliments, Binary Arithmetic (addition and subtraction using 2's complement), boolean algebra, SOP and POS, K- Map (up to 4 variables)

The course contents After MTE

Unit IV

Introduction to Combinational Logic Circuits: Adders, Subtractors, Comparators, Multiplexers, De-multiplexers, Decoders, Encoders

Unit V

Introduction to Sequential Logic Circuits: Basic sequential circuits: Latch (SR, D), Flip-flops (SR, D, JK, T), Master-Slave flip-flop, Conversion of basic flip-flops.

Unit VI

Applications of Sequential Circuits: Registers: Operation of basic Shift Registers (SISO, SIPO, PISO, PIPO), Counters: Design of Asynchronous, Synchronous counters, Ring counter, and Johnson ring counter,

Guidelines for the Students

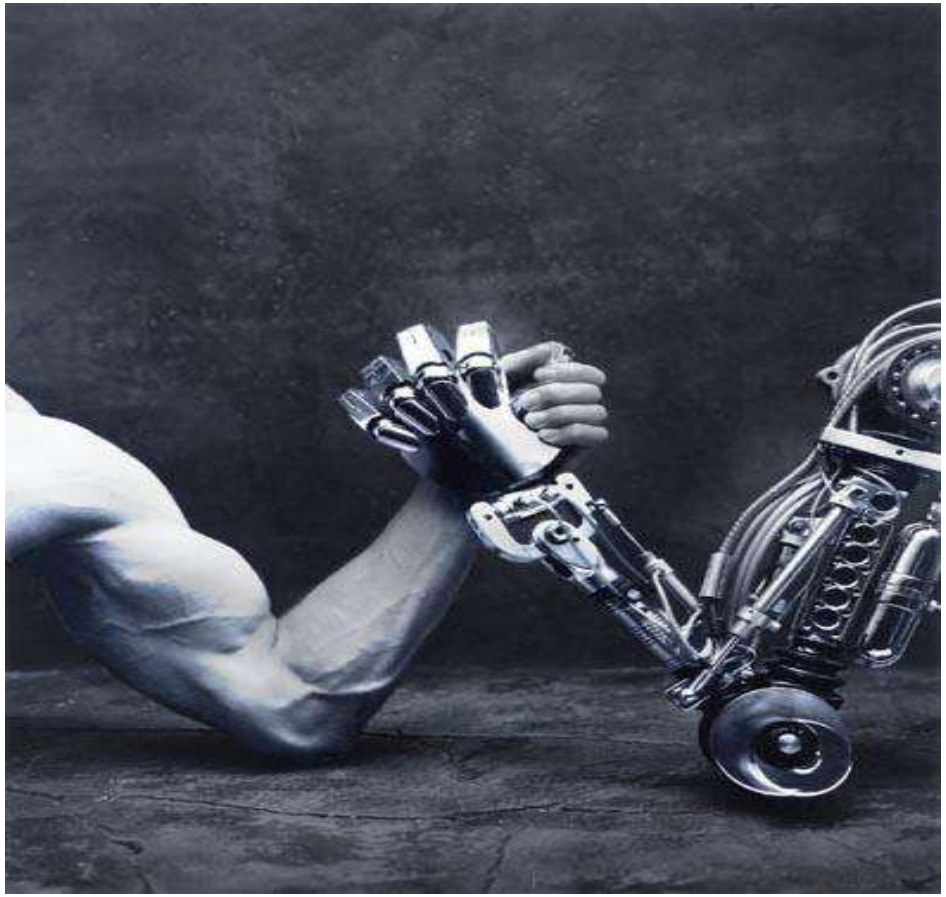
- It is mandatory to carry a separate notebook for the lecture and tutorial.
- Students must wear an ID card around their neck to enter the class.
- Students will sit according to the roll no. (start from left to right) only.
- Students must wear a dress as per university norms.
- Students must enter the class within 1st two minutes of the start of class.
- Students can enter the class till 1st 10 minutes but can't ask faculty to mark attendance in case faculty has already updated/ marked it.

Get Set Go!!!

Gear up

Fasten your seat belts

Build futuristic solutions



Ed-Rev Initiatives

Execution

Edu-Revolution Implementation Plan:	• 1. Software demonstration • 2. Patent and publication/Book chapter	Week 3 (Lecture 10) Week 14 (Lecture 36)
Generation Activities/Plans Gamification Strategies in Course Delivery:	• Simulation game on proteus, TinkerCAD	Week 3 (Lecture 10)
Proposed/Planned Industrial Visits and Outdoor Activities:	• A Project Expo is scheduled for the second last week of the semester.	Week 14 (Outside)
Student Project Mapping and Execution Plan:	• CA2: Phase 1 and Phase 2 implementation plan for a hardware-based.	Phase 1: Week 13 (10) Week 13 (Lecture 34)
CoursesHackathon / Competition details.:	• Any hardware-based project participation through the Innovation Studio or under faculty mentorship is a great opportunity for hands-on learning, competitions.	Week 3 (10) Week 14 (Lecture 36)

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Any Queries?