A.V.C COLLEGE OF ENGINEERING, MANNAMPANDAL, MAYILADUTHURAI

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai

Reaccredited by NAAC with 'B++ (2nd cycle) 'Grade, an ISO 9001:2015 certified institution

Department of Electronics and Communication Engineering
(Accredited by NBA)

"LEMON NEWSLETTER"

Message from Head of the Department

I appreciate all the final year students selected for internship training in Coromental Electronics and SYRMA SGS Technology Private Companies.

I look forward from the students to participate in paper presentation and national and international conferences will be conducted by various engineering colleges.

I expect from the faculties for mentoring the students towards achieve excellence in NPTEL courses.

Dr. CHITRAVALAVAN

HOD/ECE

Positive Attitude

"Building a positive attitude begins with having confidence in yourself."

"A positive attitude is something everyone can work on, and everyone can learn how to employ it."

"A positive attitude may not solve all our problems but that is the only option we have if we want to get out of problems."

"The most important thing you'll ever wear is your attitude."

"If you look the right way, you can see that the whole world is a garden."

"Take the attitude of a student, never be too big to ask questions, and never know too much to learn something new."

Faculty Corner:

Image Processing And Its Future Implications

- **Dr.K.R.Vinothini, AP/ECE**

In today's world of cutting-edge technologies, implementation of image processing techniques has become a crucial part for many tech organizations, regardless of their volume and field of operation. Acquisition of instant information has become possible because of the advancements taking place in the domain of the internet.

Image processing is already being used by a diverse range of companies and it holds a huge potential of wide adoption in the future. But before delving into its future implementations, let's have a quick look at what the technology is all about.

Image processing technology

Digital image processing refers to the process of recognizing, making algorithmic enhancements and manipulating a digital image. In general, the technology deals with images that are two-dimensional entities (like satellite pictures, scanned documents etc) captured electronically. In the process, multiple computer algorithms are used by developers to solve different tasks.

Here are some image processing examples: image detection, analysis, restoration, image data compression, enhancement, analog image processing, and estimation, among others.

Future scope

Image processing technology extracts information from images and integrates it for a wide range of applications. Here, we've outlined the most prominent fields where image processing could bring significant benefits.

In production automation

Image processing applications can make it possible for machines to act as more self-sufficient and ensure the quality of products. Assuming processing systems work faster than humans, inline quality controls like 100% controls can be very quickly implemented.

Damaged parts can be replaced or corrected, which would lead to more efficacies of production facilities. With the help of advanced image processing technologies, even an entire production facility can be managed.

In agricultural landscape

Key concerns in agriculture include quality of yield and water stress. Irrigation monitoring and providing information can be made possible by tracking satellite imaging of the fields. Processing of infrared images can act as an additional means to monitor and analyze irrigation. This analysis can then be utilized in pre-harvesting operations for deciding whether to harvest or not.

Growth of weeds can also be detected by using a combination of machine learning and image processing algorithms and techniques. Quality of yields can be ensured

by the reliable and accurate method of image processing through sorting and grading of fresh products.

Biomedical and other healthcare applications

3D imaging is a process where a 2D image is converted into a 3D image by creating the optical illusion of depth. The next step is rendering where colors and textures are included in the 3D model to make it look realistic.

With such 3D imaging and rendering, doctors can see extremely high quality 3D images of organs that they couldn't have seen otherwise. This, in turn, can help them carry out delicate surgeries and make accurate diagnoses.

Disaster management

Drone aircrafts monitoring environmental and traffic conditions can use image processing to capture high resolution real-time videos and photographs. In case of natural or other disasters like flood, earthquake, fire etc, knowing which disaster-struck areas the authorities need to focus upon can help save lives by reaching quickly to those trapped and bring them out safely.

Even monitoring the progress and ensuring co-ordination during such rescue operations can be made easier with real-time image processing techniques.
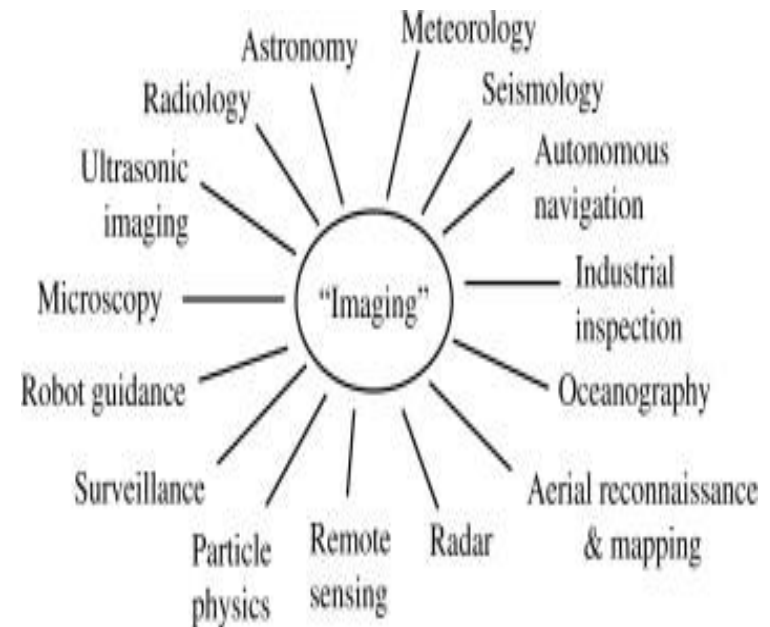
Astrophysics

Image processing is used once the image acquisition is done by the telescope.
- ➢ Correct from the problems encountered during acquisition
- ➢ Reduce the instrumental and atmospheric effects Reduce the observation noise

- ➢ Deal with missing data (partial sky coverage, defective pixel)
- ➢ Help to design the instrument.

Applications of Image Processing

Digital Image processing based on Low level and High level Approaches

In recent years the growth of computer has improved and digital image processing plays a more an important role in the modern world, including the field of industry, medical, communications, space flight technology etc.,

There are generally three types of digital image processing that are applied to an image. These are: low-level, intermediate-level and high-level processing

Low level image processing is mainly concerned with extracting descriptions from images (that are usually represented as images themselves). The analysis usually does not know anything about what objects are actually in the scene, or where the scene is relative to the observer. It involves primitive actions such as:

➢ Image Preprocessing to reduce noise,
➢ Contrast enhancement and
➢ Image sharpening.

Intermediate level processing involves tasks like

➢ Segmentation (Partitioning an image into regions or objects)
➢ Description of those images to reduce them to form suitable for computer processing, and
➢ Classification (Recognition) of individual objects.

High-level processing involves "making sense" from a group of recognized objects as in image analysis. This process is normally associated with computer vision.

Using these processing techniques, Color edge and face detection, Hand motion detection, Hand gesture detection and medical Image Processing Applications can be performed.
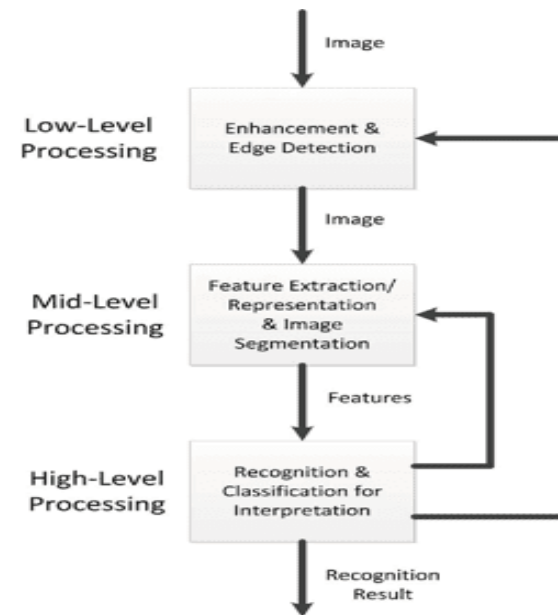
Flowchart of Digital Image Processing Levels

Student Corner:

5G TECHNOLOGY

- ***D.Padmapriya, III ECE***

Introduction

Recently India has launched 5G network technology which paved the way for high speed internet connectivity. October 1, 2022 marks an important date in India's history when Prime Minister Shri Narendra Modi inaugurated the commercial rollout of 5G services in India at the India Mobile

Congress 2022 and telecom companies started rolling out 5G for users after months of testing. Now India will experience highest speed and increased availability of internet which will transform lives of people as well as economic progress of India.

What is 5G technology?

5G, in telecommunications, is the fifth generation networks technology which is the latest upgrade in the long-term evolution (LTE) of mobile broadband networks. It is a new global wireless network technology after 1G, 2G, 3G, and 4G which enables a new kind of network that is designed to connect virtually everyone and everything including machines, objects, and devices.

5G networks are also cellular networks like its predecessors in which service area is divided into small geographical areas which are called cells. All 5G devices in a cell are connected to the Internet and network by radio waves and provides high speed internet.

The main advantage of 5G network technology Is that it has greater bandwidth giving higher speed of data transfer and download with low latency, more reliability, massive network capacity, increased availability. Higher performance and improved efficiency of 5G networks technology empower new user experiences and connects new industries.

Low, mid and high-frequency 5g spectrum:

5G technology mainly works in 3 bands, namely low, mid and high-frequency spectrum where low band spectrum has great promise in terms of coverage and speed of internet and data exchange with limited speed. The mid-band spectrum offers higher speeds in comparison to the low band spectrum and the high-band spectrum offers the highest speed of all three bands and tested to be as high as 20 Gbps (gigabits per second).

Benefits of 5G Networks Technology:

5G networks technology is designed to do a variety of things that can transform human lives. It will expand the mobile ecosystem into new realm with faster download speeds and data transfer, negligible latency and more capacity and connectivity for billions of devices especially in the areas of artificial intelligence (AI), virtual reality (VR) and Internet of Things (IoT). 5G technology will transform every industry, making safer and speedy transportation, remote healthcare facility, precision agriculture, digitized logistics etc.

5G technology and India:

In India, 5G is officially available for commercial usage from October 1, 2022. Airtel and Jio telecom players have finalized a proper timeline for 5G services rollout in the country. Initially Airtel will offer 5G services in 8 cities including four metros and Jio will launch its 5G services across metropolitan cities including Delhi, Mumbai, Chennai, and Kolkata.

Starting of 5g network technology will help in good governance and will lead to higher economic growth in India by opening up new opportunities and societal benefits while cutting down on conventional barriers.

It is true that there are challenges related to infrastructure, investment, and health-related to 5G technology in India right now, but the government should address these challenges as soon as possible and implement

this technology in India. With the introduction of 5G technologies in India, economic, socio-strategic, etc., will bring dynamism in all areas and the development of the country will be further strengthened.

Less Trolling
- **V.Priyanka, III ECE**

Art by V.Priyanka.. III ᵗʰ ECE

Gate Questions –Microprocessors and Microcontrollers

- **K.Kaviyarasi, IV ECE**

1. Which of the following is a type of microprocessor?
a) CISC
b) RISC
c) EPIC
d) All of the mentioned
Answer: d

2.The microprocessor of a computer can operate on any information if it is present in _____ only.
a) Program Counter
b) Flag
c) Main Memory
d) Secondary Memory
Answer: c

3.Which of the following technology was used by Intel to design its first 8-bit microprocessor?
a) NMOS
b) HMOS
c) PMOS
d) TTL
Answer: c

4. Which of the following flag is used to mask INTR interrupt?
a) zero flag
b) auxiliary carry flag flag
c) interrupt flag
d) sign flag
Answer: c

5. Which of the following addressing mode is used by 8085 microprocessor for array and list operations?

a) Base-Register
b) Direst
c) Indexed
d) Immediate
Answer: c

6. What is the vectored address of RST-5?
a) 0010 H
b) 0032 H
c) 0028 H
d) 0030 H
Answer: c

7. How many address lines are required to connect a 4 KB RAM to a microprocessor?
a) 10
b) 16
c) 12
d) 20
Answer: c

8. Which of the following is false about LDA instruction?
a) It is a 3-byte instruction
b) It uses indirect addressing mode
c) It has 13 T-states
d) It doesn't affect any flags
Answer: b

9. DAA instruction is used to perform which type of addition?
a) BCD addition
b) Excess-3 addition
c) Binary addition
d) Octal addition
Answer: a

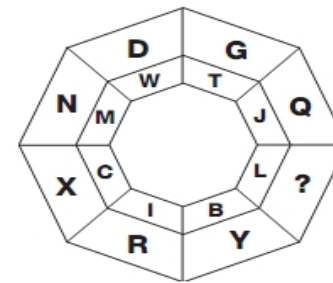10. Which of the following interfacing IC is a DMA controller?
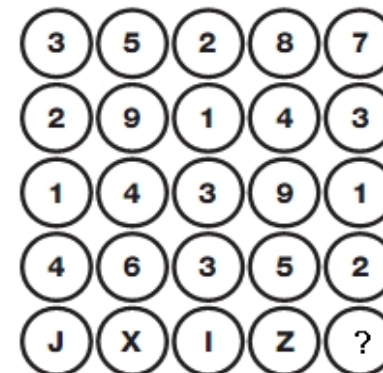a) 8257/37

b) 8155
c) 8253/54
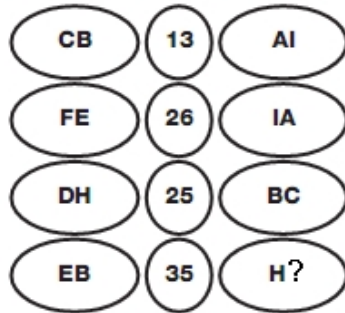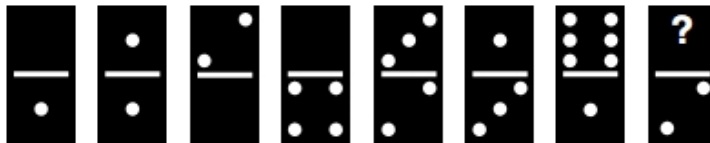d) 8279
Answer: a

PUZZLES

- *U.Bragathishwari , IV ECE*

1. Which letter replaces the Question mark?

2. Which letter replaces the Question mark?

3. Which letter replaces the Question mark?

CB	13	AI
FE	26	IA
DH	25	BC
EB	35	H?

4. How much number of dots replaces the question mark?

5. What time should last watch show?

Answers for the Puzzles :

1. **O** (In each segment of the diagram are a pair of letters, one of which is the same distance from the start of the alphabet as the other is from the end.)

2. **M** (In each column, add up each number and put the letter with this sum in the bottom circle.)

3. **G** (Convert each letter to its numerical value, and read each pair of values as 2 digit numbers. In each row, the number in the centre equals the difference between the 2 digit values on the left and right.)

4. **3** (Starting on the left and working to the right, take pairs of dominoes and calculate the sum of the dots they are displaying. This sum follows the sequence 3, 6, 9 and 12.)

5. **5:19** (Starting with the watch on the left, add 42 minutes to the time shown to give the time on the next watch to the right.)

Questions based on Digital Electronics

- *S.Sivapriya, III ECE*

1. Which of the following is correct for Digital Circuits?
   a) Less susceptible to noise or degradation in quality
   b) Use transistors to create logic gates to perform Boolean logic
   c) Easier to perform error detection and correction with digital signal
   d) All of the mentioned
2. What is a Circuit?
   a) Open-loop through which electrons can pass
   b) Closed-loop through which electrons can pass
   c) Closed-loop through which Neutrons can pass
   d) None of the mentioned
3. Which of the following is a type of digital logic circuit?
   a) Combinational logic circuits
   b) Sequential logic circuits
   c) Both a & b
   d) None of the mentioned

4. Which of the following options comes under the non – saturated logic family in Digital Electronics?
   a) Emitter – coupled Logic
   b) High-Threshold Logic
   c) Integrated – injection Logic
   d) Diode – Transistor Logic

5. What is a switching function that has more than one output called in Digital Electronics?
   a) Multi-gate function
   b) Multi-output function
   c) Multiple-gate function
   d) Multiple-output function

6. Which characteristic of IC in Digital Circuits represents a function of the switching time of a particular transistor?
   a) Fan – out
   b) Fan – in
   c) Power dissipation
   d) Propagation delay

7. When can one logic gate drive many other logic gates in Digital Electronics?
   a) When its output impedance is low and the input impedance is low
   b) When its output impedance is high and the input impedance is high
   c) When its output impedance is high and the input impedance is low
   d) When its output impedance is low and the input impedance is high

8. Which of the following digital logic circuits can be used to add more than 1 – bit simultaneously?
   a) Full – adder
   b) Ripple – carry adder
   c) Half – adder
   d) Serial adder

9. When does a negative level triggered flip-flop in Digital Electronics changes its state?
   a) When the clock is negative
   b) When the clock is positive
   c) When the inputs are all zero
   d) When the inputs are all one

10. Which of the following options represent the synchronous control inputs in an S – R flip flop?
   a) S
   b) R
   c) Clock
   d) Both S and R

Answers :
   1. d) All of the mentioned
   2. b) Closed-loop through which electrons can pass
   3. d) None of the mentioned
   4. a) Emitter – coupled Logic
   5. b) Multi-output function
   6. d) Propagation delay
   7. d) When its output impedance is low and the input impedance is high
   8. b) Ripple – carry adder
   9. a) When the clock is negative
   10. d) Both S and R

Events Conducted in the Department

S.No	Date	Resource Person	Topic
1.	09.02.2023 & 10.02.2023	Dr.S.Marshal Dr.Sathyaseelan Shanmugam Mrs.A.Suganya Dr.S.Selvamuthu kumaran	ICSSR Sponsored Seminar "Social Engineering Attack Techniques and Prevention"

Editors Desk

Eleven General Tips to Beat the Heat

1. Wear loose clothing.
2. Digesting food during the summer months is especially difficult. Eat-in small quantities frequently to avoid indigestion and bloating.
3. Wear sunglasses to protect your eyes from the harsh rays of the sun.
4. Protect your skin from the ultraviolet rays by putting on generous amounts of sunscreen.
5. Avoid excessive caffeine consumption.
6. Try to stay indoors during the afternoons.
7. Avoid fast food, deep-fried or street food.
8. Drink plenty of water and other fluids.
9. Do not skip working out.
10. Keep your packaged drinks' consumption under control as they contain high amounts of added sugar.
11. Consume seasonal fruits and veggies.

Send your suggestions to:

Dr.K.R.Vinothini, AP/ECE –Editor / *LEMON NEWSLETTER*

lemonece2013@gmail.com

Student Editors :

1. U.Bragathishwari, IV ECE
2. Maheshkumar.B, IV ECE
3. M.Yogeshwaran, III ECE
4. S.Ashika, III ECE

Department Vision

To create globally competent engineers in Electronics and Communication Engineering to meet the industrial progress for betterment of the society

Department Mission

1. To create an academic ambience for quality education in the field of Electronics and Communication Engineering

2. To make the best use of modern tools and software for teaching and research activities

3. To promote industry-institution interaction for skill-based learning of students from rural society

4. To inculcate moral and ethical values with a sense of professionalism.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO's):

1. To provide the students with a strong foundation in the required sciences in order to pursue studies in Electronics and Communication Engineering.

2. To gain adequate knowledge to become good professional in electronic and communication engineering associated industries, higher education and research.

3. To develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolve

4. To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

5. To inculcate in the students a professional and ethical attitude and an ability to visualize the engineering issues in a broader social context.

PROGRAMME OUTCOMES:

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in

multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

➢ PSO1: Design, develop and analyze electronic systems through application of relevant electronics, mathematics and engineering principles

➢ PSO2: Design, develop and analyze communication systems through application of fundamentals from communication principles, signal processing, and RF System Design & Electromagnetics.

➢ PSO3: Adapt to emerging electronics and communication technologies and develop innovative solutions for existing and newer problems