**1. What is DL (Deep Learning)?**

Deep Learning is a part of artificial intelligence that focuses on teaching computers to learn from large amounts of data using structures called neural networks. These networks are made up of many layers, allowing the system to learn features at multiple levels of detail.

It is used in many real-world applications such as:

* Identifying objects in images
* Translating languages
* Understanding speech
* Driving autonomous vehicles

Because it learns from raw data, deep learning often performs better as the amount of training data increases.

**2. What is a Neural Network and Its Types?**

A Neural Network is a digital system modeled after the human brain, where virtual “neurons” are connected in layers. Each connection has a weight that gets adjusted as the system learns.

**Types of Neural Networks:**

1. **Feedforward Neural Network:**  
   Data moves in a straight path from input to output without looping back.
2. **Convolutional Neural Network (CNN):**  
   Designed to process images by automatically detecting patterns like edges, textures, and shapes.
3. **Recurrent Neural Network (RNN):**  
   Ideal for working with sequences, such as text or time-series data, by maintaining memory of previous inputs.
4. **Generative Adversarial Network (GAN):**  
   Involves two networks competing against each other—one generates data and the other evaluates it—to produce highly realistic results.
5. **Autoencoders:**  
   These are used to compress data and then reconstruct it, often used for tasks like removing noise from images.

**3. What is CNN in Simple Words?**

A Convolutional Neural Network (CNN) is a deep learning model mainly used for analyzing visual information like images. Think of it as a system that learns to recognize shapes, patterns, and objects in a picture by breaking it down into small pieces and analyzing each part.

For example, in forest fire detection, a CNN can learn to spot flames or smoke in satellite images by focusing on color, texture, and shape.

**4. Notes on the Pipeline (as per lecture discussion)**

**Typical Pipeline for Forest Fire Detection Using Deep Learning:**

1. **Collecting Image Data:**  
   Gather forest images labeled as “fire” or “no fire” using drones, satellites, or public datasets.
2. **Data Preprocessing:**  
   Adjust image size, remove noise, convert to grayscale or RGB, and split into training and test datasets.
3. **Model Building:**  
   Choose and design a CNN model suitable for image classification tasks.
4. **Training Phase:**  
   Train the model on the labeled images so it learns how to distinguish fire from non-fire visuals.
5. **Evaluation and Testing:**  
   Measure how well the model performs using unseen images, and tune it based on results.
6. **Real-Time Application:**  
   Integrate the trained model into a live monitoring system that alerts authorities when fire is detected.