INTERNET OF THINGS

Assignment.

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Define IoT

The Internet of Things (IoT) refers to a network of physical objects - "things" — embedded with sensors, software, and other technologies that connect and exchange data with other devices and systems over the internet or other communication networks. These objects can range from everyday household items to sophisticated industrial tools.

How does IoT work:

IoT works through a combination of four key components:

1. Sensors/Devices — Collect data from the environment (eg., temperature, motion, location).
2. Connectivity — Transmit the data using Wi-Fi, Bluetooth, zigbee, cellular networks, etc.
3. Data Processing — Cloud servers or local devices analyze the collected data and make decisions.
4. User Interface — Results are displayed to users via apps, dashboards, or alerts. Based on the output, users can take action or automate responses.

Example: A smart thermostat senses room temperature (sensor), sends the data via Wi-Fi (connectivity), decides to turn on/off the AC (processing),

and notifies the user via a smartphone app (interface).

Applications of IoT

→ Smart Homes:
Automated lighting, security systems, smart thermostats.

→ Healthcare:
Remote patient monitoring, smart medical devices.

→ Agriculture:
Precision farming, smart irrigation systems.

→ Transportation:
Fleet tracking, autonomous vehicles, traffic monitoring.

→ Industrial IoT (IIoT):
Predictive maintenance, machine monitoring

→ Retail:
Smart shelves, customer behavior tracking

→ Environmental Monitoring:
Air and water quality sensors, disaster detection

Characteristics of IoT:

1. Connectivity - Seamless communication between devices.
2. Sensing - Ability to gather data from the environment
3. Intelligence - Data processing and decision-making capabilities.
4. Dynamic Nature - Devices can adapt and interact based on changing contexts.
5. Scale - Can connect billions of devices globally
6. Security - Requires secure communication and ~~of~~ data handling.
7. Heterogeneity - Involves diverse hardware, platforms and communication methods.
8. Interoperability - Devices from different manufacturers work together.