IoT(Internet of things)

Lesson:-1

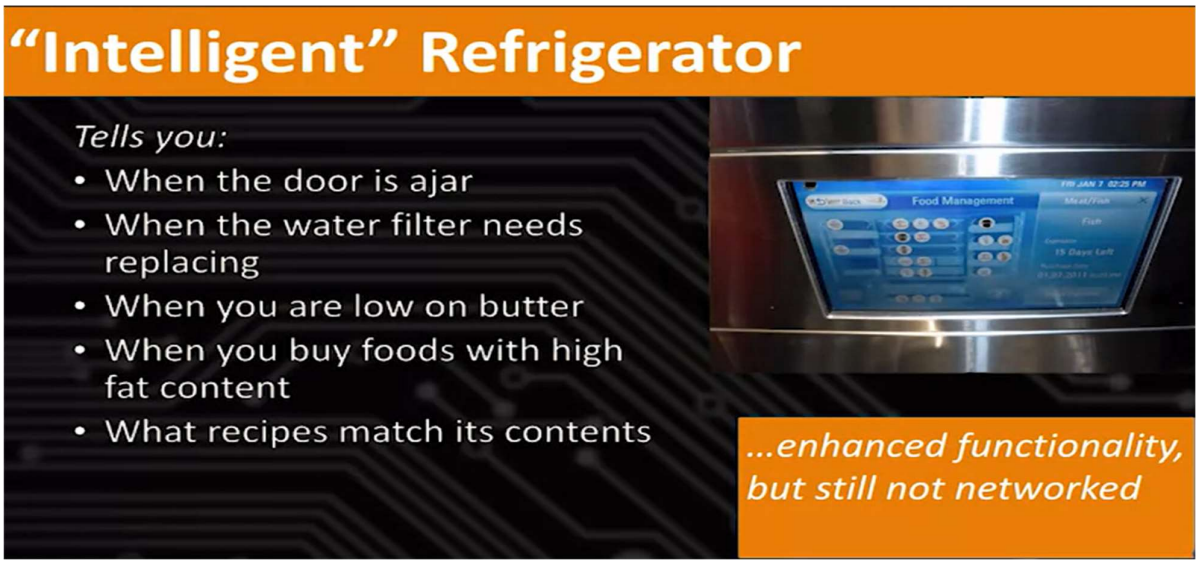
❖ What is The Internet of Things?

The term IoT, or Internet of Things, refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves.

- Start with a device (a “thing”) – anything besides a traditional computer
- Add Computational intelligence to improve the function of the device.
- Add a network connection to improve to the device to further enhance its function

IoT Devices

IoT Examples:- Smart Home Devices, Wearables, Connected Cars, Smart Appliances, Health and Medical Devices, Industrial IoT Devices, Security Devices .



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IoT Refrigerator

- Orders food items when stock is low
- Searches for lowest food prices
- Orders water filter when needed
- Anticipates your meals; orders food preemptively
- Searches news sites for worldwide food price trends
- Provides consumption information to businesses for marketing purposes

Greatly enhanced functionality
Internet required

IoT Devices

Computational technology is used to enhance a product –1950's car with electro-mechanical control

IoT Devices

21st century car – computer-based control systems enable fuel injection, anti-lock braking, etc.

IoT Devices

Internet access gives access to external computation and data ("the cloud")

- 1970's logistical tagging – barcode

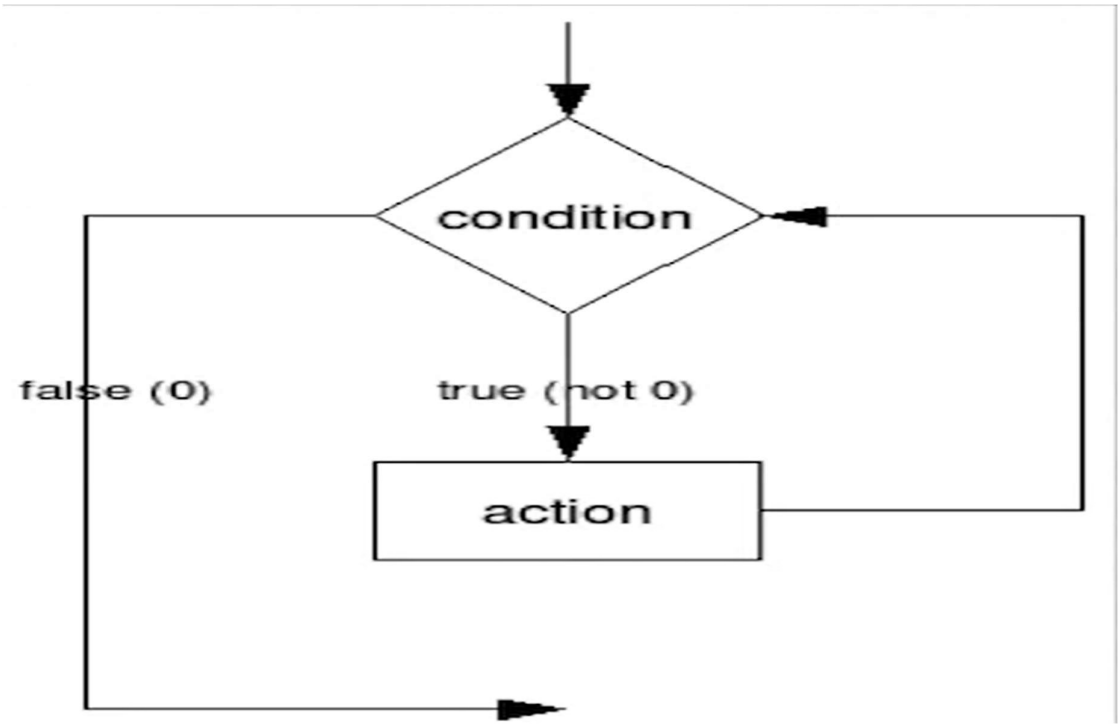
IoT Devices Are Unique

IoT devices have a main function separate from computation

- Cars drive, phones make calls, TVs displays shows
- Computation is a means to an end

Computers.. Compute!

The main function of a computer is to compute -any type of program can be executed



IoT Devices vs. Computers

Computers are general-purpose

- OK at executing anything
- Not particularly efficient for type of code

IoT devices are special-purpose

- Software and hardware are efficient for the task -but inefficient for other tasks
- A music player is great for playing -but terrible for playing video
- Laptops can do both -but less efficiently

Lesson:-2

Trends Supporting IoT

- Convergence of several trends
- Cost of hardware has decreased
    - ENIAC 1945: $500,000
    - Generic laptop computer today: $500

IoT Trend: Computational Ability

- Many IoT devices need significant computation and speed
    - Speed-to-text, audio processing, network communication
    - ENIAC, 1945: instructions per second – 5,000
    - Laptop, today: instructions per second – 18 billion

IoT Trend: Internet Access

- Internet available almost everywhere in the developed world
    - Some parts of the world still ack easy access, but this is being addressed
- Wireless access (cell phone, Wi-Fi) enables networking with cheap infrastructure
    - Less need to install physical cables
- Data costs are fairly low
    - This point is arguable, but many can afford it
- Data bandwidth is high
    - Can stream multiple movies in real-time

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❖ **At work**

- Motion sensors detect your presence
- RFID readers detect entry/exit

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Lesson:-3

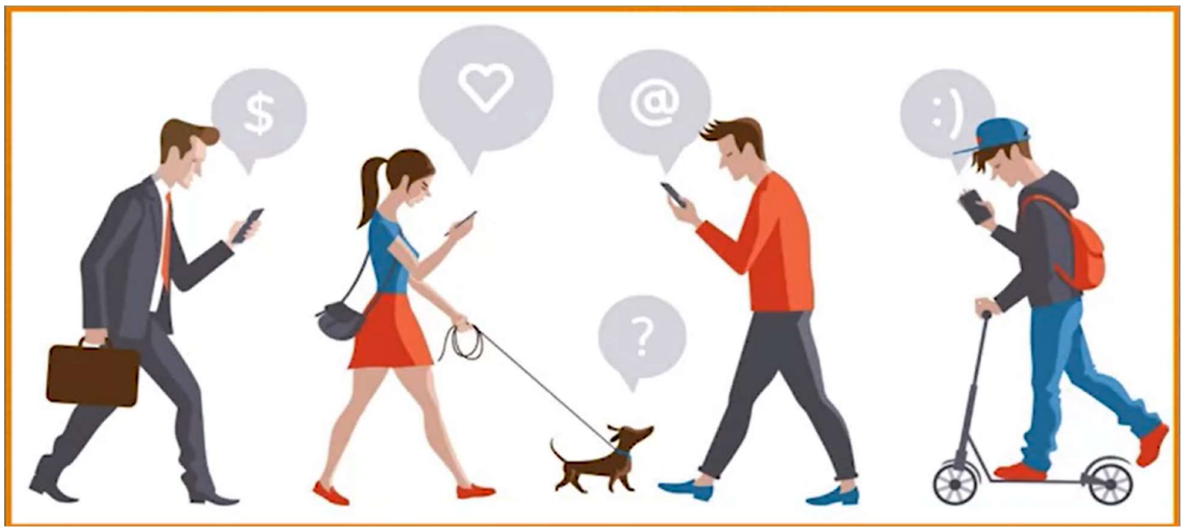
Societal Benefits of IoT

- IoT makes life easier
  - What food do I need?
  - Are my accounts balanced?
- Independence from people
  - IoT devices handle things you needed humans for
  - Fewer doctor visit; no trips to the supermarket
- Link to the world !
  - Information access
  - Global interactions between people are possible

Risks, Privacy, and Security

IoT Risks

- Social isolation



- Dependence on technology and infrastructure
  - IoT requires power and network
  - Network outages and blackouts are more critical

Privacy and Security

- Observation by IoT devices is pervasive
  - Location: cell phone
  - Health: health monitor

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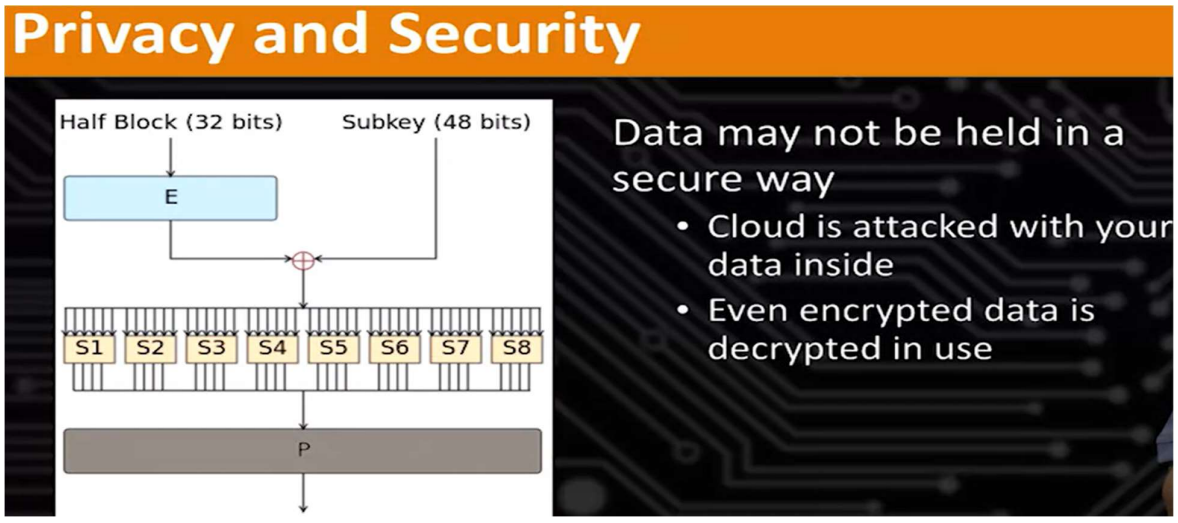
- Media watching habits: TV/media system
- Purchasing habits: credit card, cellphone
- Driving habits: car incident recording

- Data may be used to market to you
    - Health problem? Drugs may be marketed to you

- Purchasing an IoT device may give the manufacturer permission to use or shell your data.
    - Consumer agreement contracts can be cryptic
- Data may be used by insurance agencies
    - Were you speeding at the time of the accident?
    - Do you have any undiagnosed health problems?



QUIZ

1. My watch displays the current weather downloaded from the Internet. My watch is an IoT device.

Ans: True

2. Which of the following could be an IoT device?

Ans: a lamp, a couch, a pen

3. An IoT device can most easily be differentiated from a standard computer based on

Ans: interface with the user and the world

4. The following trend is NOT related to the growth in IoT technology:

Ans: Increase in computer monitor size over time.

5. IoT devices are likely to be more vulnerable to cyberattacks than standard computers.

Ans: True

6. Which of these security approaches is feasible for most IoT devices?

Ans: Regular installation of product firmware updates.

7. IoT devices gather private information about users. Which statement is most true about the security of that data?

Ans: Users must rely on data-collecting agencies to securely store and transmit their data.

8. Although people are aware of the dangers of cyberattacks, they often do not understand the risks to IoT devices.

Ans: True

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