University Institute of Engineering

First Year Engineering

sEXPREMENT :- 3.1

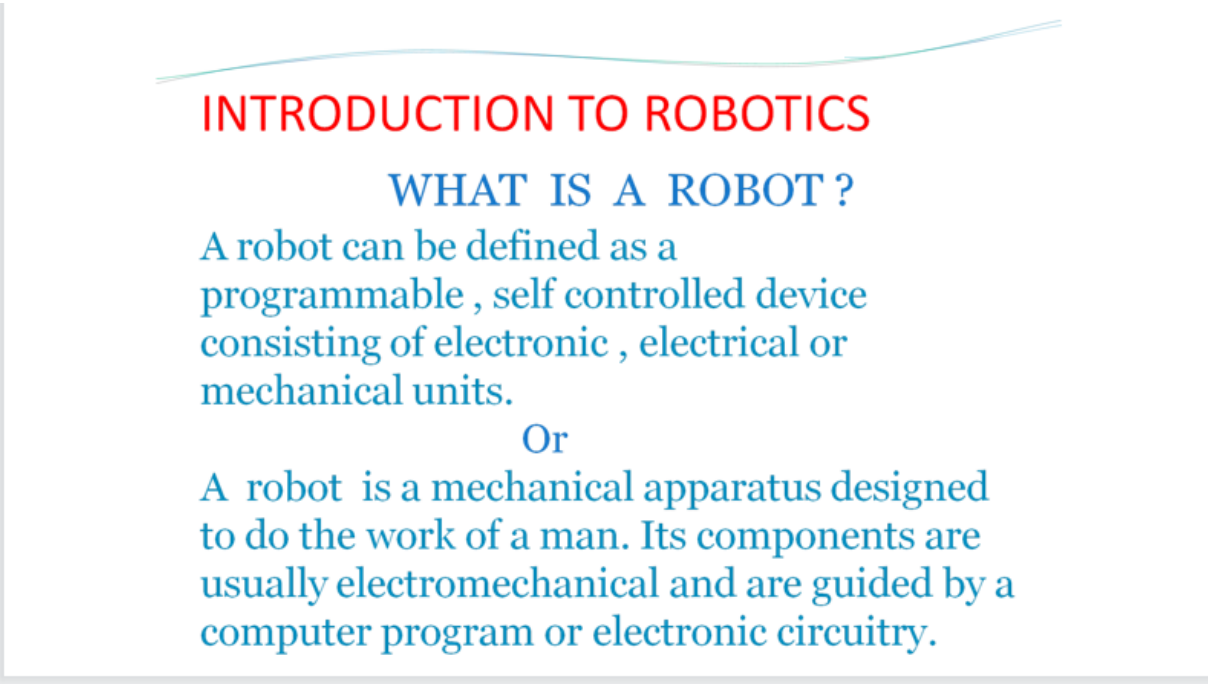
Student Name: **UID :**

Branch: Computer Science & Engineering **Section/Group:**

Semester: 2nd **Date of Performance: 15/04/22**

Subject Name: DISRUPTIVE TECHNOLOGIES - 2

Robot



Essential Characteristics of robots

- **Sensing:** The robot should be able to sense its surroundings and that is only possible with the help of sensors.

  Types of sensors:

  light sensors (eye) , touch sensors(hands) , hearing sensors(ears) or chemical sensors(nose)
- **Movement:** A robot needs to be able to move around its environment whether by rolling on wheels , walking , snaking or skating.
- **Energy:** A robot needs to be able to poweritself which depends upon its power resources e.g. batteries , power generators or fuel.
- **Intelligence:** A robot needs to be intelligent and smart which is only possible by the programmer person.

TYPES OF ROBOTS

- **Mobile Robots:** They are able to move around in their environment and not fixed to one physical location.
- **Industrial Robots:** They are used in industrial manufacturing environment e.g. welding , material handling , painting and others.
- **Domestic Or Household Robots:** Robots used at home such as robotic vacuum cleaner , robotic pool cleaner and sweeper.
- **Medical Robots:** Robots used in medicine and medical institutions e.g. surgery robots
- **Service Robots:** Robots that don't fall into other types by usage e.g. robots used for research.
- **Military Robots:** they are used in military e.g. bomb disposal robot , different transportation robots and reconnaissance drones

Uses and Advantages of Robots

- ✓ Used in vehicles and car factories
- ✓ Mounting circuits on electronic devise e.g. mobile phones
- ✓ Working where there might be danger e.g. nuclear leaks and bomb disposal
- ✓ Surgeons are performing robotic surgeries to avoid jiggles and movement in microscopically aided surgery or brain surgery
- ✓ Mail delivery to various mail stations throughout the building in large corporations
- ✓ Toy robots are a good source of entertaining for the kids e.g. dancing and talking robots
- ✓ Robots do not get bored or tired and they can work 24/7 without salary and food

Disadvantages Of Robots

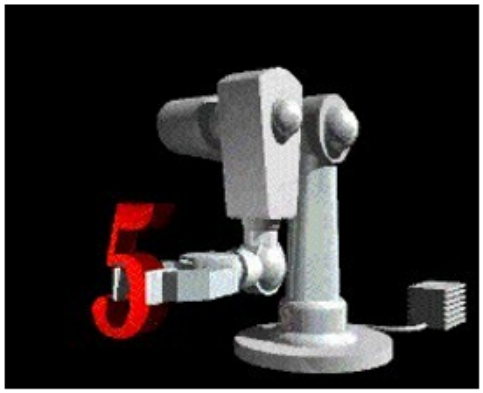
- ❑ It needs a high supply of power
- ❑ People can lose jobs in factories
- ❑ It needs maintenance to keep it running
- ❑ It cost a lot of money to make or buy a robot as they are very expensive
- ❑ A robot can not respond in time of danger as human can

Characteristic of a Robot

- Repeatability
- Manual control
- Automatic control
- Speed of operation

What are the parts of a robot?

- Manipulator
- Pedestal
- Controller
- End Effectors
- Power Source



University Institute of Engineering

First Year Engineering

Manipulator

(Mimics the human arm)

- **Base**
- **Appendage**
  - **Shoulder**
  - **Arm**
  - **Grippers**

Here robot is considered as **industrial robot** called as **robotic manipulator or robotic arm.**

This arm is roughly **similar to human arm.**

It is modeled as **chain of rigid links interconnected by flexible joints**.

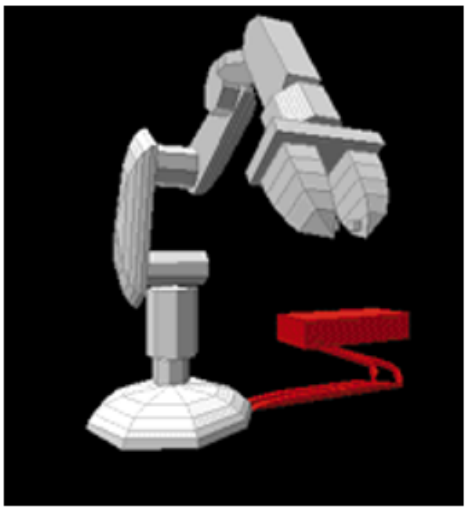
Links corresponds to :**chest, upper arm, fore arm**
Joints: **shoulder, elbow, and wrist.**
At end of arm is an **end effector (tool, gripper or hand).**

Pedestal

- Supports the manipulator.
- Acts as a counterbalance.

Controller

(The brain)



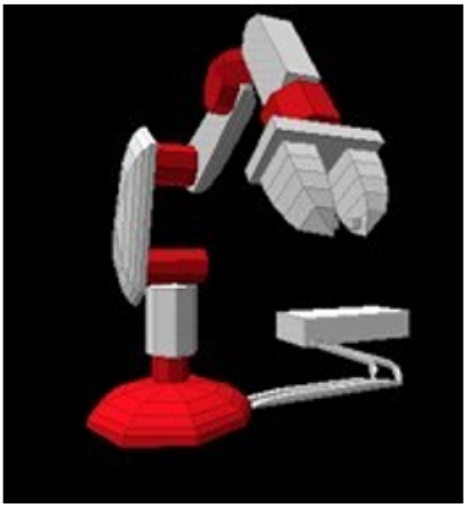
- Issues instructions to the robot.
- Controls peripheral devices.
- Interfaces with robot.
- Interfaces with humans.

End Effectors

(The hand)

- Spray paint attachments
- Welding attachments
- Vacuum heads
- Hands
- Grippers

Power Source



(The food)

- Electric
- Pneumatic
- Hydraulic

University Institute of Engineering

First Year Engineering