



# ROBOT TYPES

by  
Dr. Ahmet OZKURT  
@DEUEEE

some of images from the notes by  
Allison M. Okamura and  
Jean-Claude Latombe

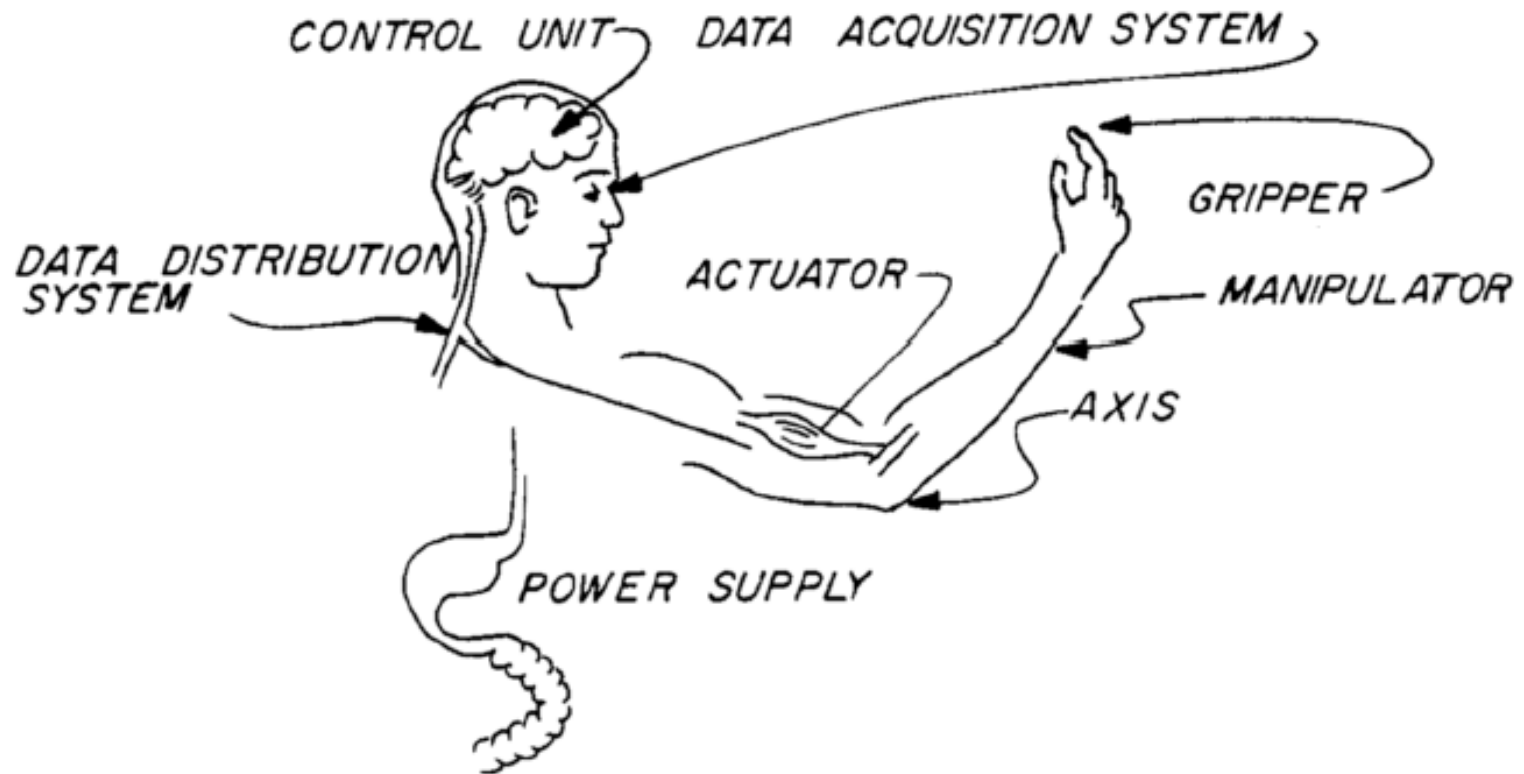
@ Stanford University

# Robot Types

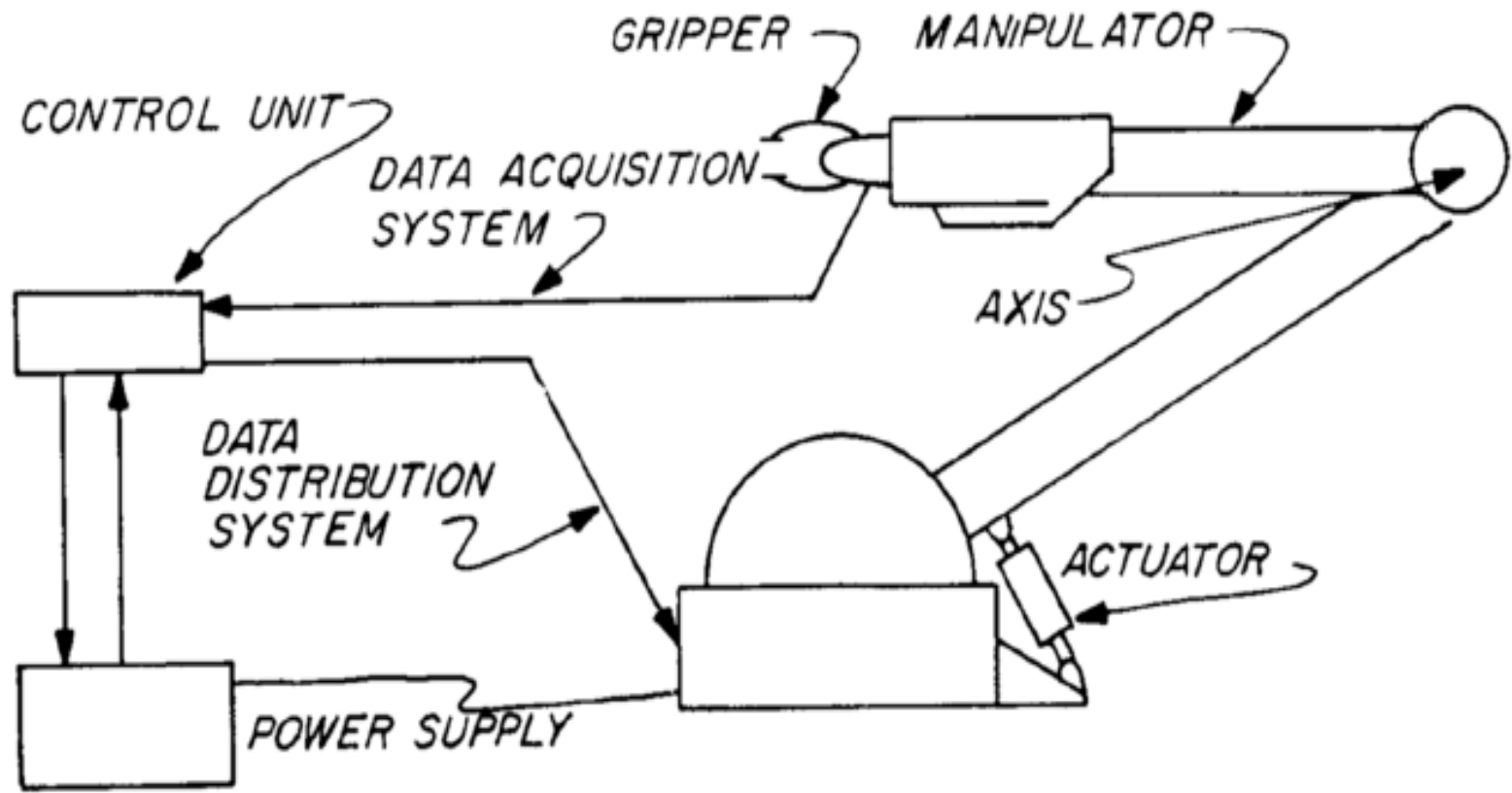


- Mobile Robots
- Manipulators
- Haptic Devices
- Humanoid Robots

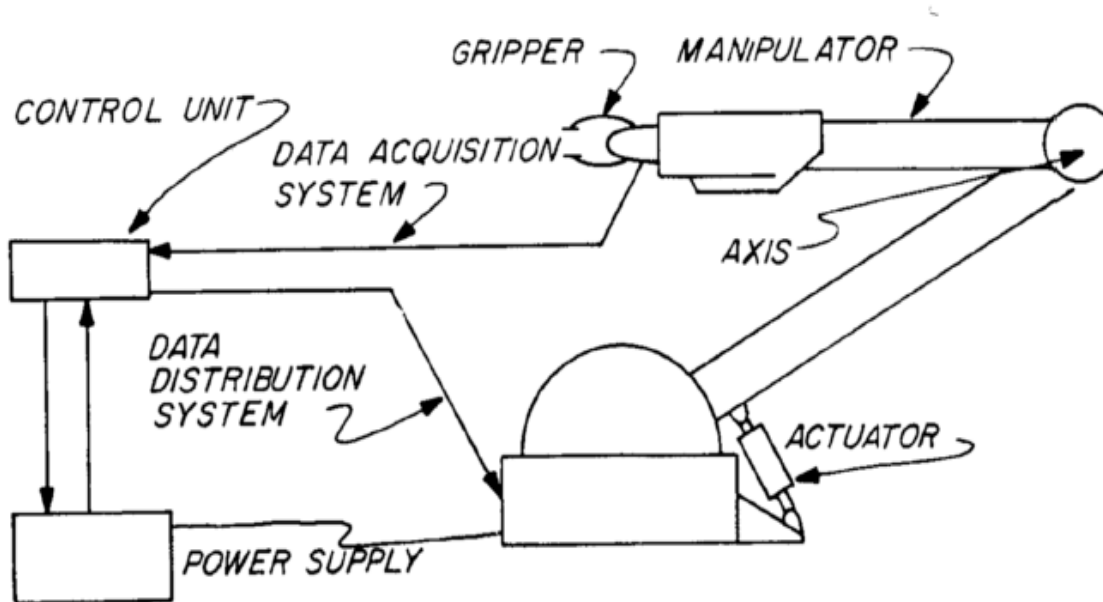
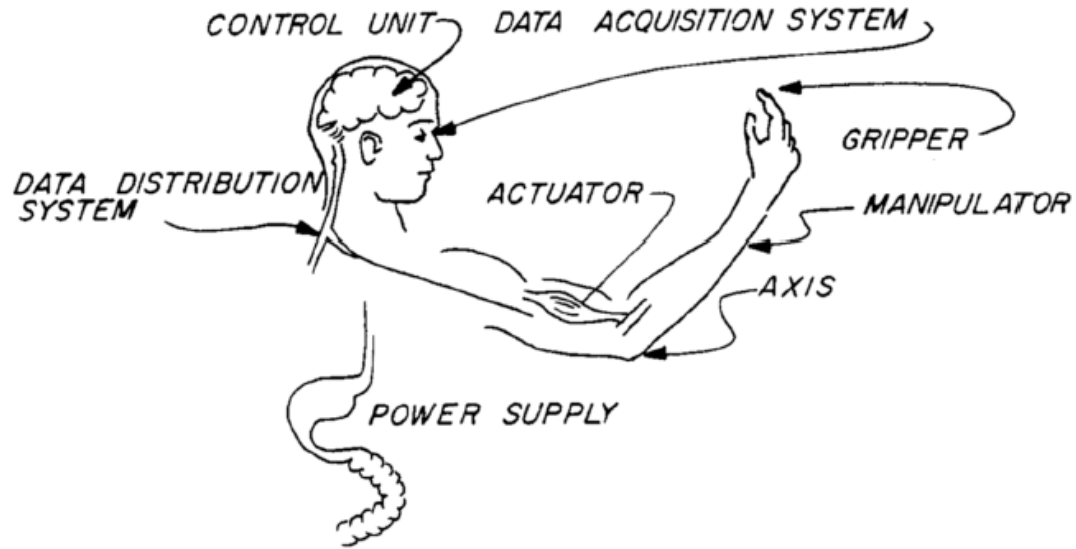
# Human Manipulator



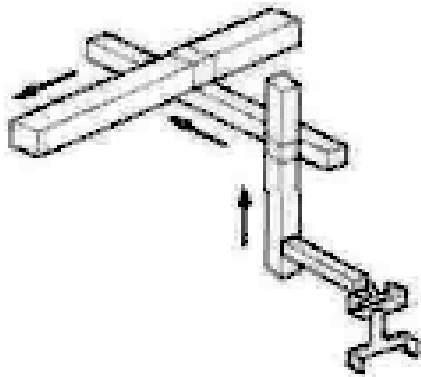
# Robot Manipulator



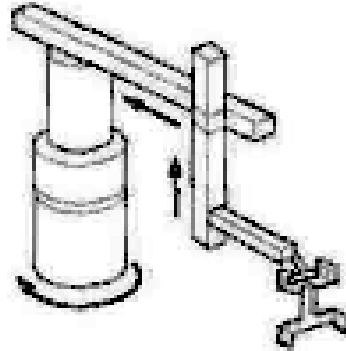
# Human Vs Robot



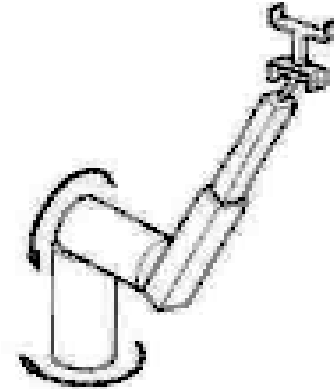
# Fundamental Robot Coordinate Frames



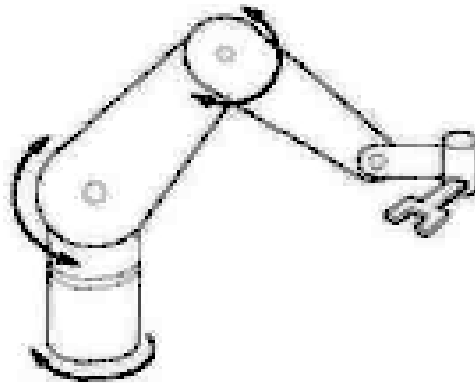
Cartesian



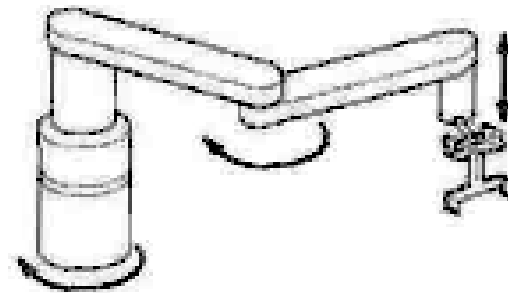
Cylindrical



Spherical

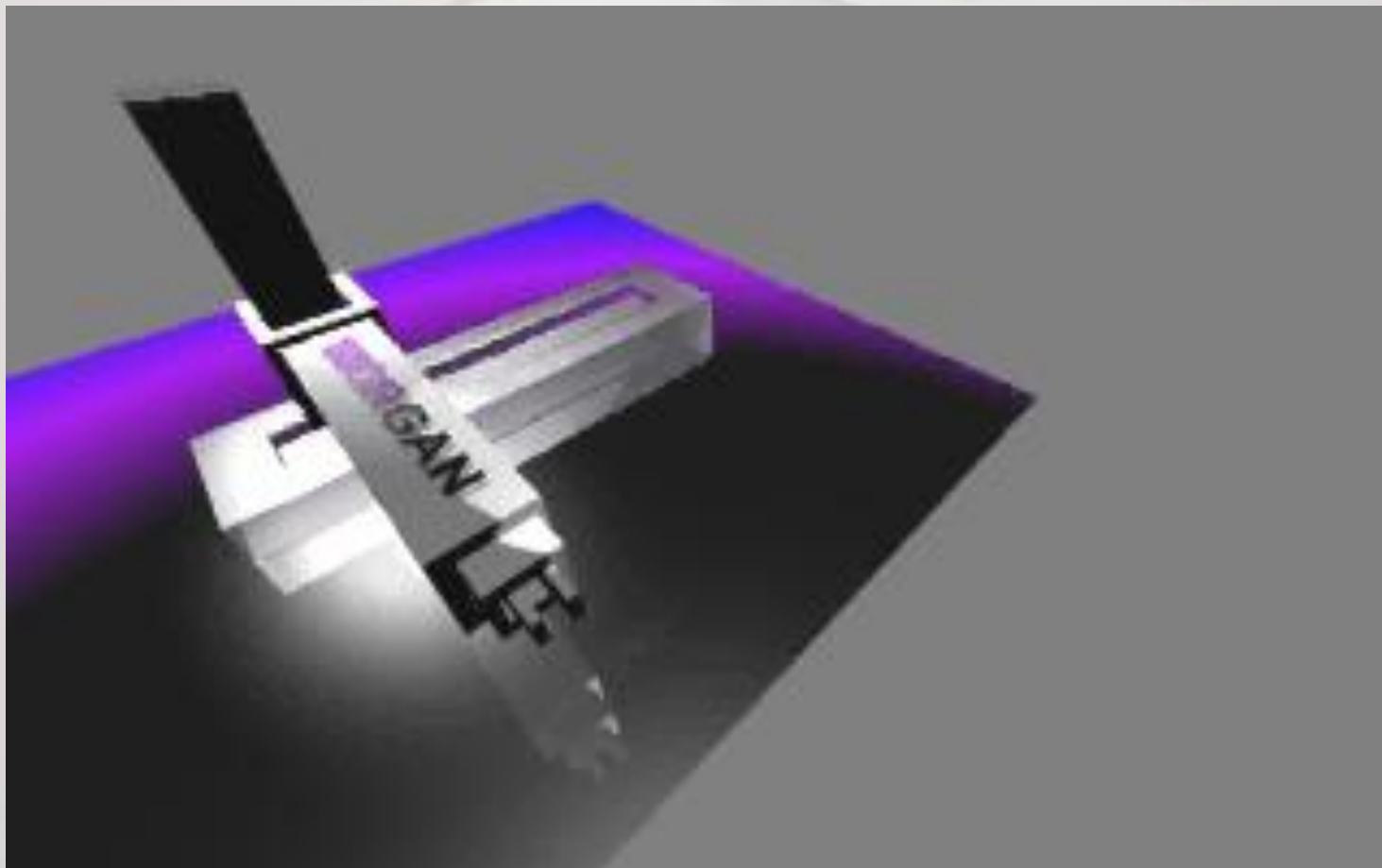


Articulated



SCARA

# CARTESIAN

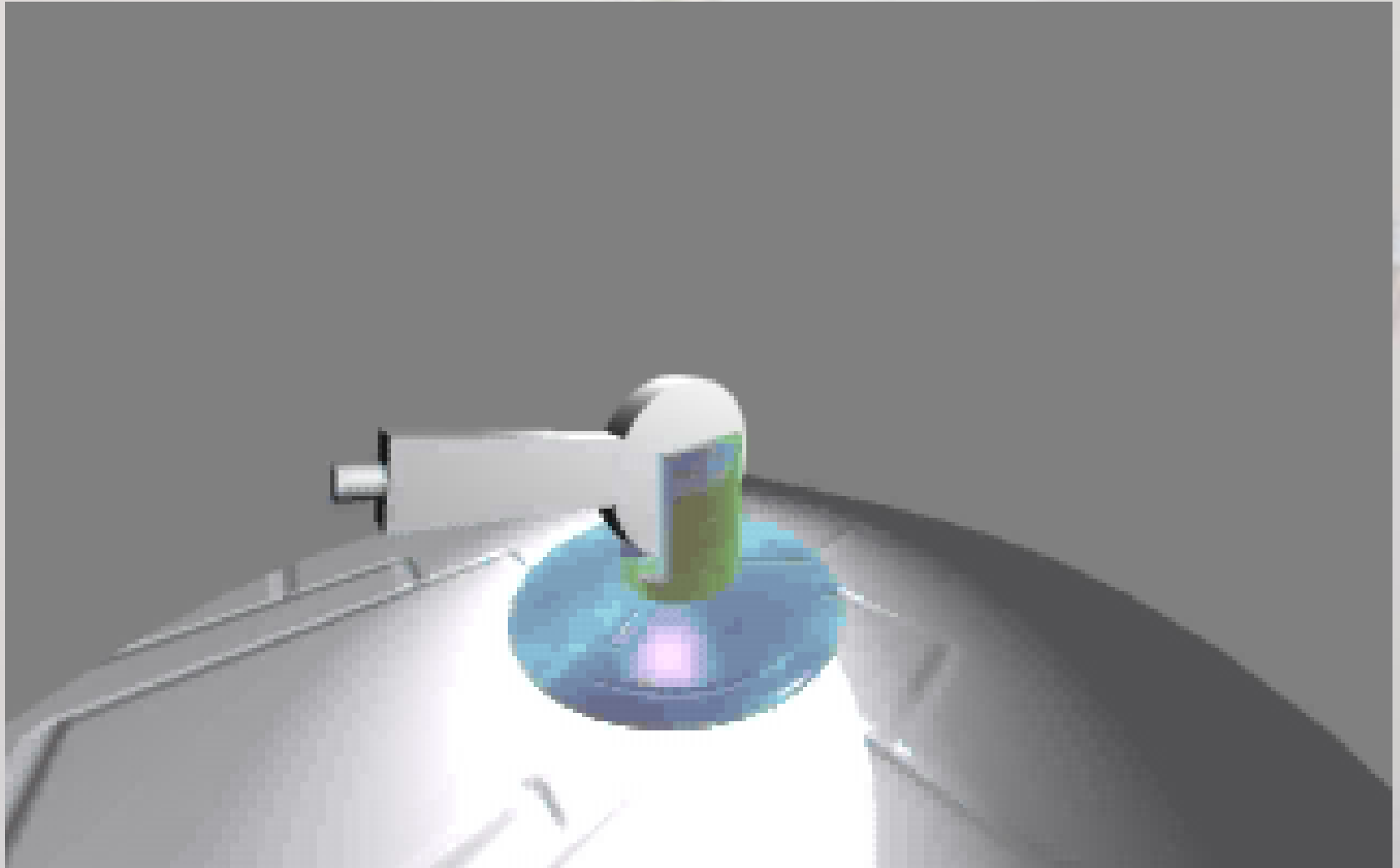


# CYLINDRICAL





# SPHERICAL

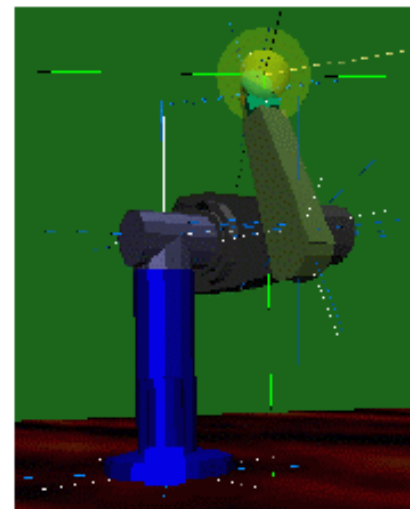
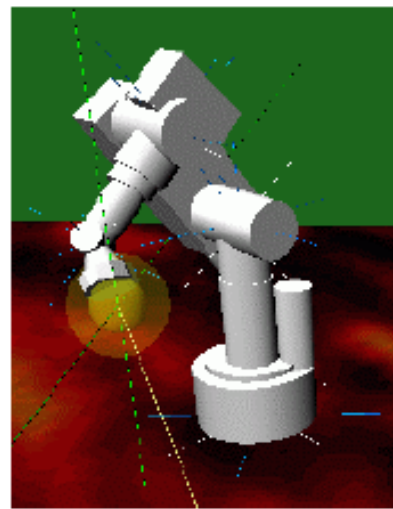
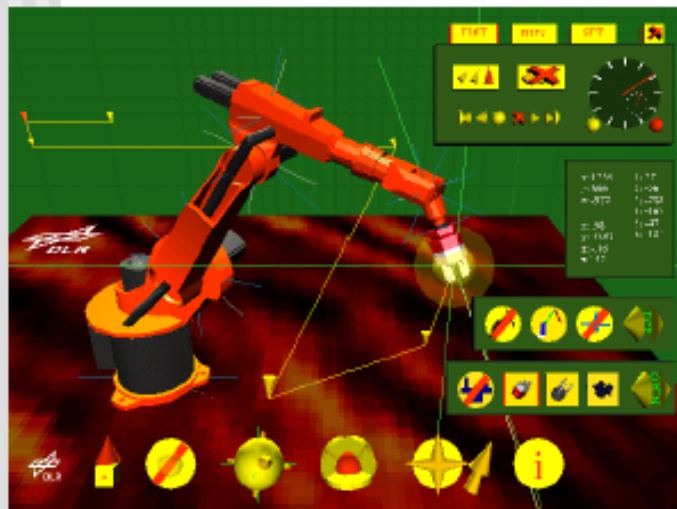


# ARTICULATED



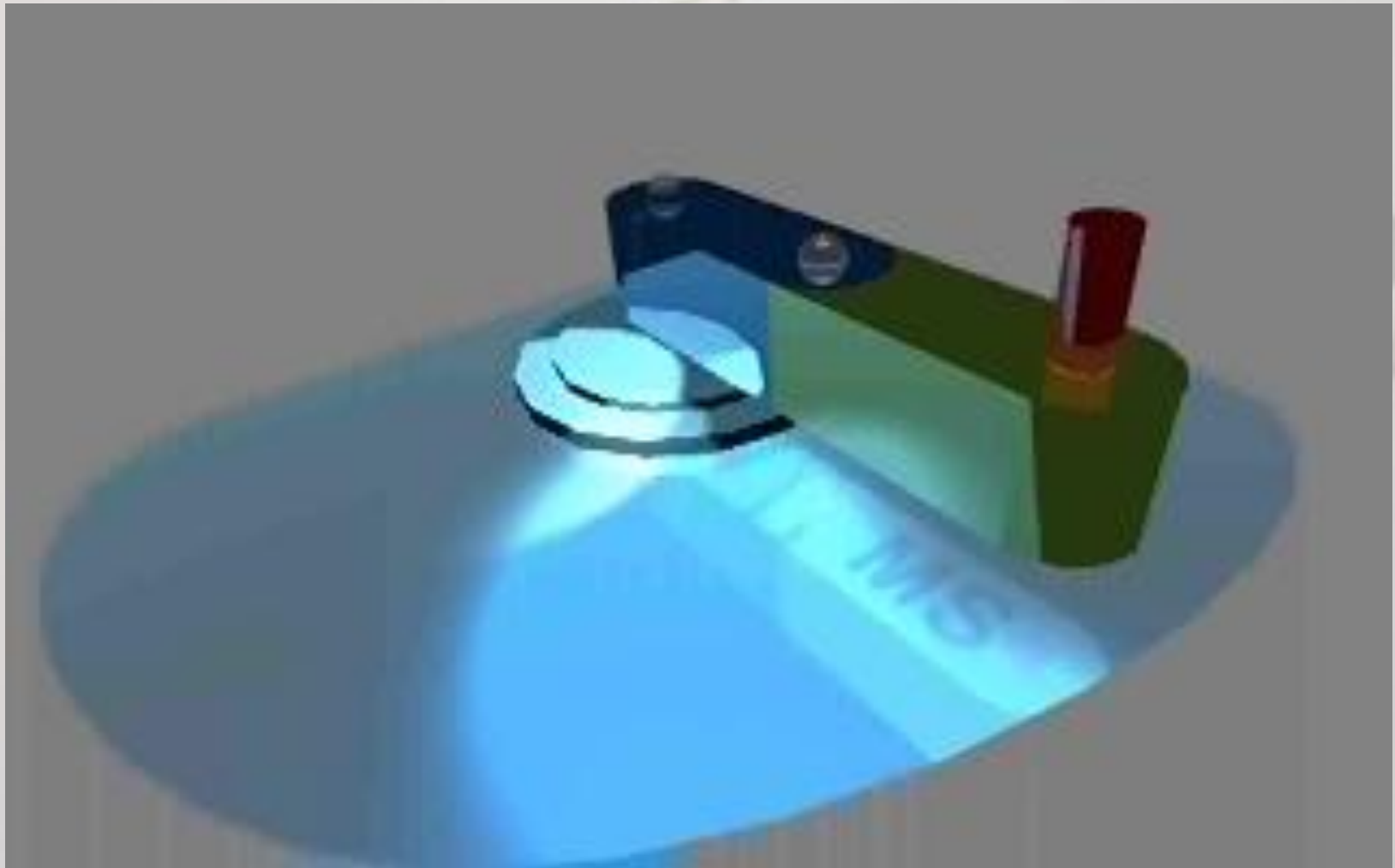
# Articulated Manipulator

- Also called jointed, elbow, or anthropomorphic manipulator
- Least intrusion into the workspace

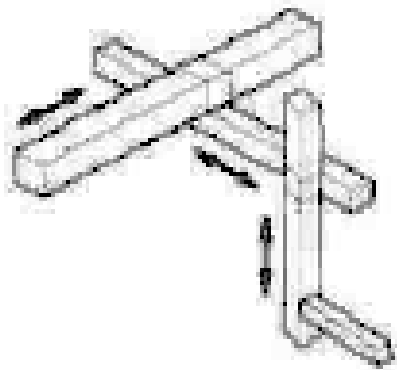


*VRML models from Gerd Hirzinger*

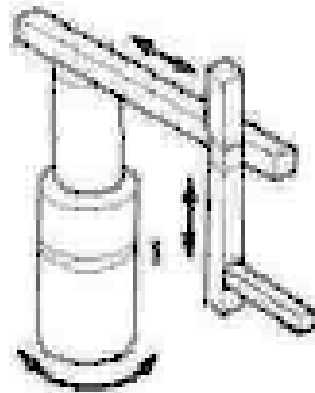
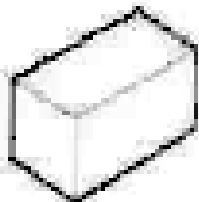
# SCARA



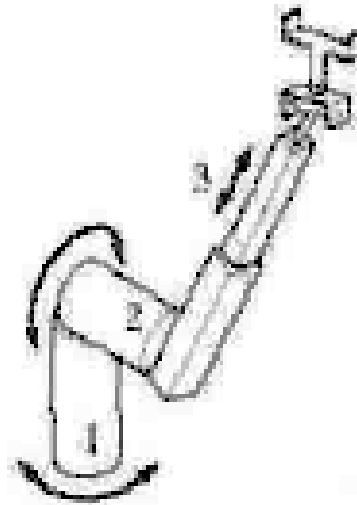
# Typical Workspaces



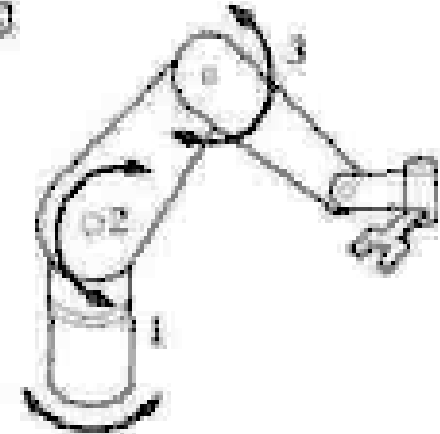
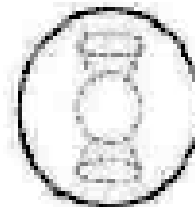
Cartesian



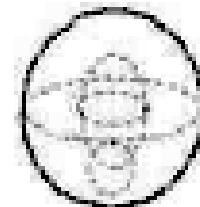
Cylindrical



Spherical



Articulated



Typical workspaces for common robot configurations.

# Manipulator Examples

- Medical robots (teleoperated)



da Vinci (Intuitive Surgical, Inc.)

Surgical Site

# Manipulator Examples

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- Space shuttle arm (teleoperated)



# Manipulator Examples

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- Painting robots
- Interesting issues in coverage, path planning



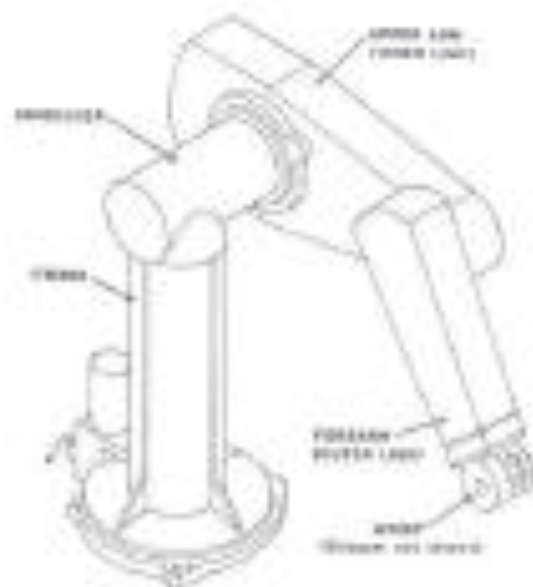


# Manipulator Examples

- Industrial robots (teleoperated & autonomous)



Conan (Alstom Schilling Robotics)



PUMA Robot

# Manipulator Examples

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- Binary Robots



JHU Binary Robot

# Mobile Robot Examples

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- Search and Rescue
- Remote-controlled
- Robust, Tethered

Center for Robot-Assisted Search and Rescue (University of South Florida)



# Mobile Robot Examples

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- Guides (museum, tourist attractions, etc.)

Rhino (CMU/Bonn ICS)





# Mobile Robot Examples

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- Walking and running robots (one or more legs)
- Purpose:
  - Handle uneven terrain
  - Help us understand biological locomotion



“Sprawlita” (Stanford)

# Mobile Robot Examples

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- Hopping robots use accurate dynamic models of the system
- Specialized controllers stabilize the system



3D Biped (MIT)

# Mobile Robot Examples

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- Soccer-playing robots
- Cooperating Agents









# Example: Haptic Device

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- 3dof actuation
- Torque not important for many virtual environments
- However, 6dof positioning is important



# Humanoid Robots

