

Introduction to Computer Graphics

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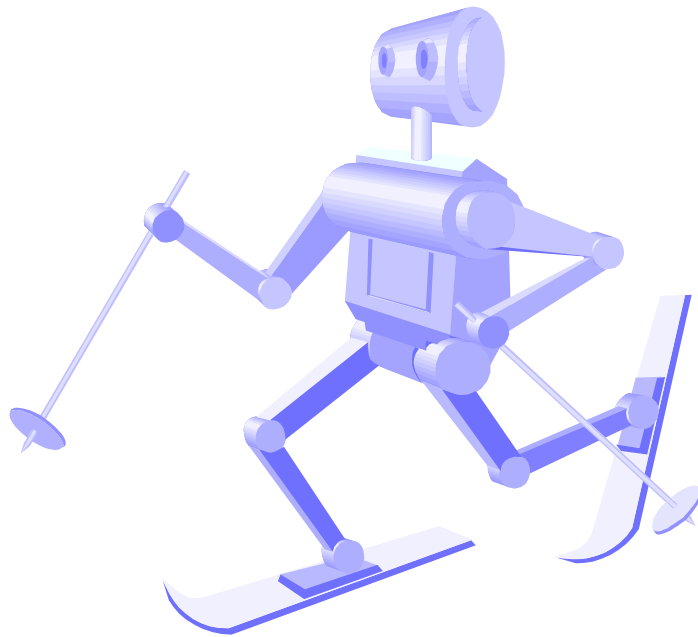
Lecture 18: Scene Graphs &
Trees in OpenGL

Outline

- Hierarchical Objects
- Scene graphs
- Trees

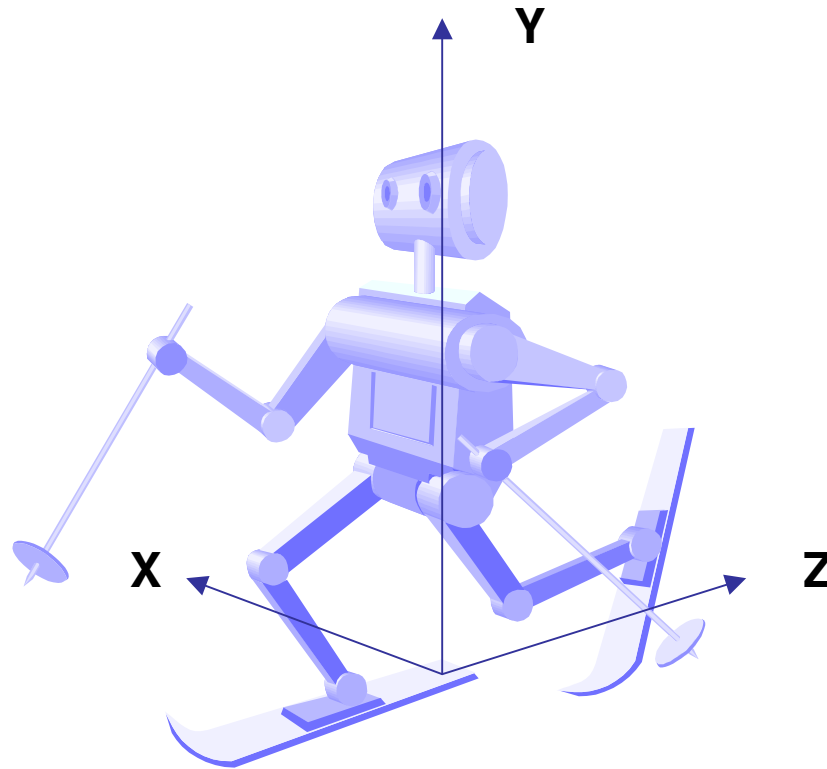
Hierarchical Objects

- Consider a robot
- Composed of head, torso, arms and legs
- Still further break down
 - arms: upper & lower & hands
 - Legs: upper & lower & feet



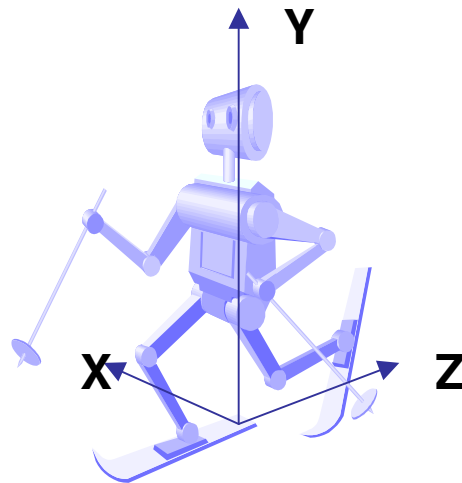
Describe attributes

- Head, hands, feet might have material property alike skin
- Upper & lower arms and legs, torso may have material alike clothing



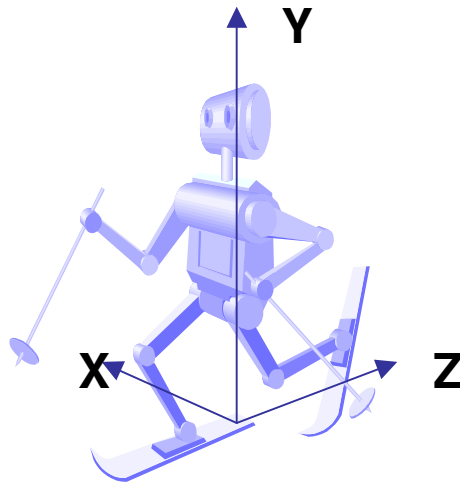
Describe valid motion:

- Head rotates around y
- Upper arm rotates around shoulder -> elbow translates
- Lower arm rotates around elbow -> hand translates
- Upper leg rotates at hip -> knee translates
- Lower leg rotates at knee -> foot translates



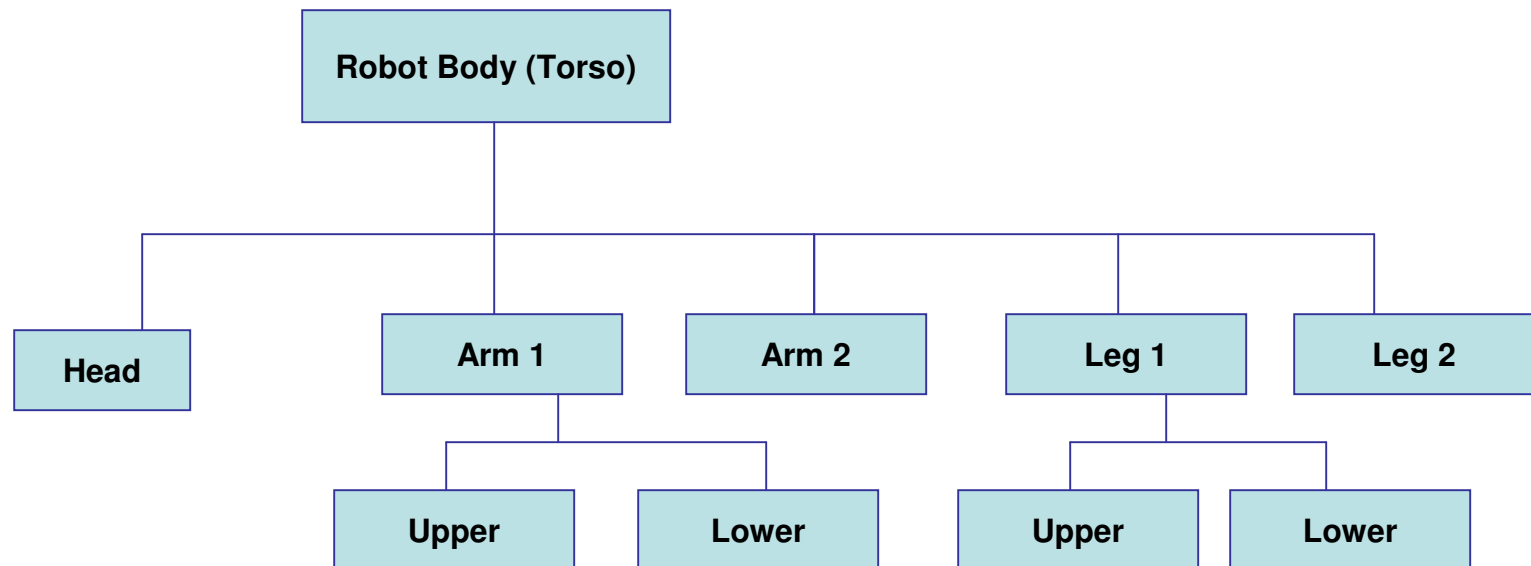
Represent Part motion hierarchically

- Shoulder position (or top of upper arm) w/ respect to torso
- Elbow position (or bottom of upper arm) w/respect to shoulder & rotation
- Hand (or lower arm bottom) w/respect to elbow & rotation



Scene graphs

- Data structure to represent hierarchical nature of object or scene
- Allows an explicit representation of where to place separators
- In OpenGL this means where to place `glPushMatrix()/glPopMatrix()` or `glPushAttrib()/glPopAttrib()`



Node properties

