



# CSE 165: 3D User Interaction

Lecture #3:  
Selection and Manipulation  
Part 1: Introduction

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# Announcements

- Sign up for video presentation
  - Deadline: Sunday Jan 20, 23:59pm
  - Only need to pick a date now – you can choose the video later
- Project 1 is on-line
  - Due Friday January 25 at 3pm

# Selection and Manipulation

# Why are Selection and Manipulation Important?

- Major methods of interaction with
  - physical environments
  - virtual environments
- Affect the quality of entire 3D interface
- Design of 3D manipulation techniques is difficult

# Selection vs. Manipulation

- Selection: specifying one or more objects from a set
- Manipulation: modifying object properties (position, orientation, scale, shape, color, texture, behavior, etc.)

# Goals of Selection

- Indicate action on object
- Query object
- Make object active
- Travel to object location
- Set up manipulation

# Selection Performance

- Variables affecting user performance
  - Object distance from user
  - Object size
  - Density of objects in area
  - Presence of occluding objects

# Canonical Parameters

- Selection
  - distance and direction to target
  - target size
  - density of objects around the target
  - number of targets to be selected
  - target occlusion
- Manipulation
  - Positioning
    - distance/direction to initial position
    - distance/direction to target position
    - translation distance
    - required precision of positioning
  - Rotation
    - distance to target
    - initial orientation
    - final orientation
    - amount of rotation