Animation for Computer Games
COMP 477/6311

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What is your favourite game?

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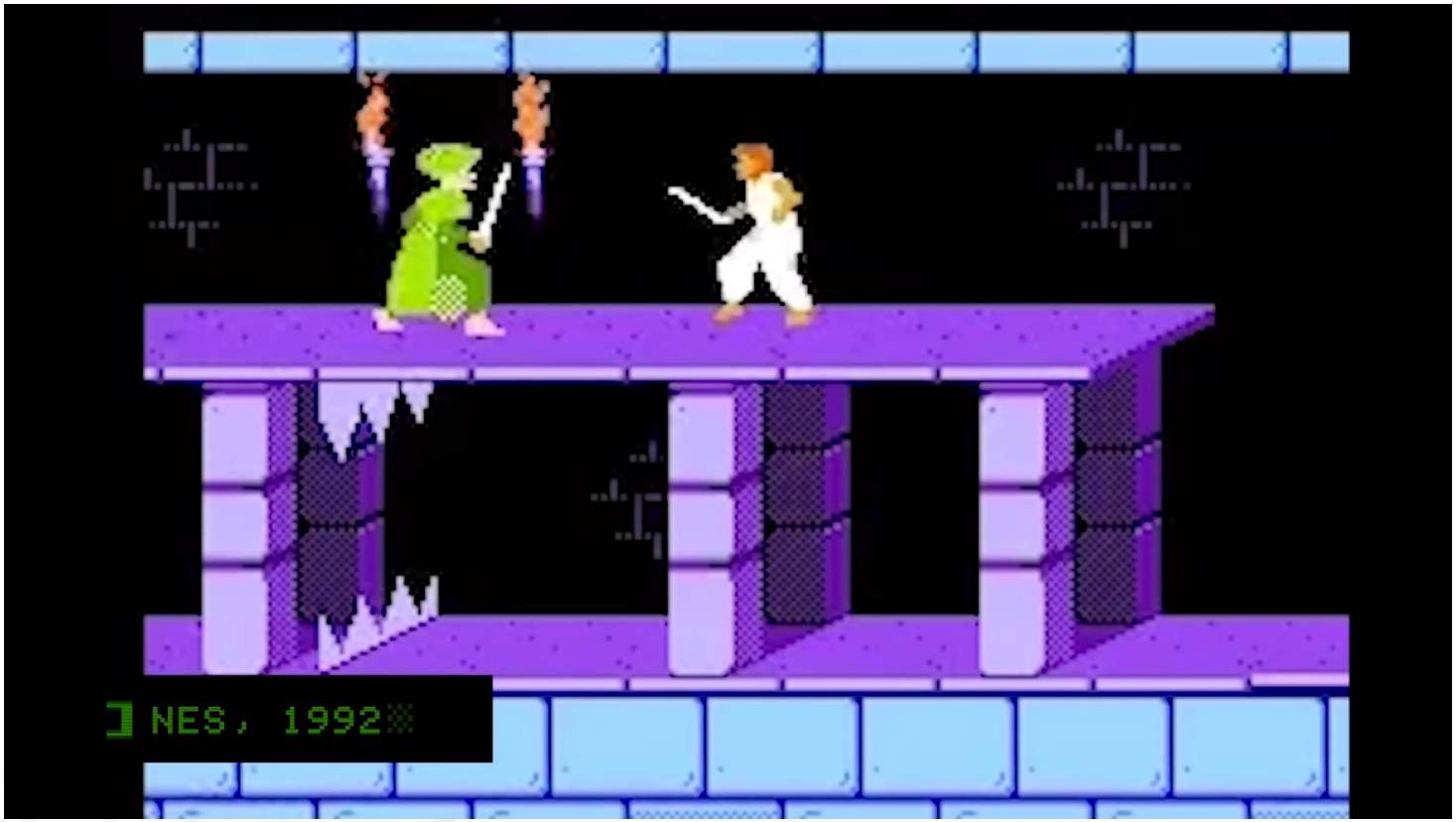


Outline

1. Procedural animation
2. Keyframe animation
   - Kinematics & skinning
   - Inverse kinematics
3. Physics-based animation
4. Performance capture

Outline

1. **Procedural animation**

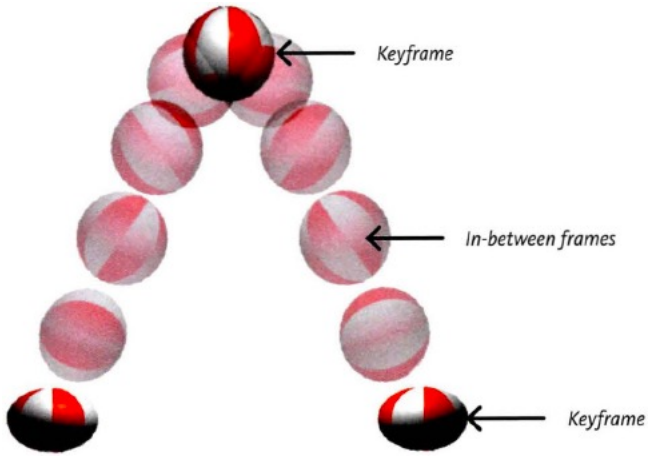
Outline

1. **Procedural animation**

Outline

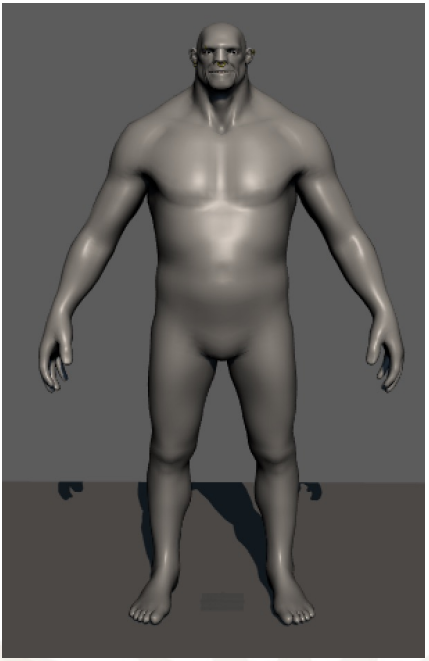
1. **Procedural animation**
   - **Pros:**
     - **very efficient**
   - **Cons:**
     - **relatively simple animations**

Character Animation using Keyframe Animation



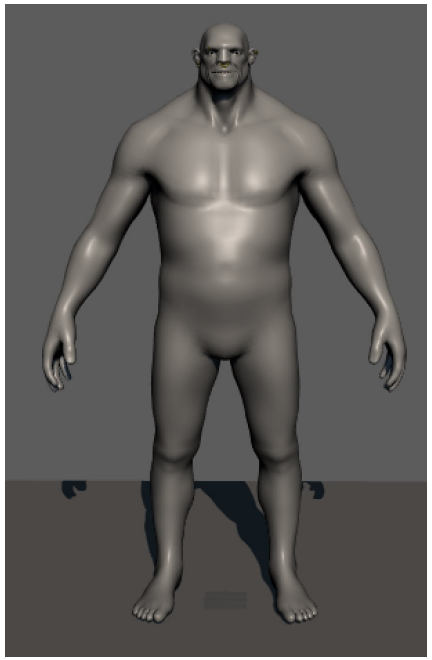
https://sites.google.com/site/bizzartso/comm-tech---keyframe-vs-cell-animation

Character Animation using Keyframes



Keyframe 1

Keyframe 2

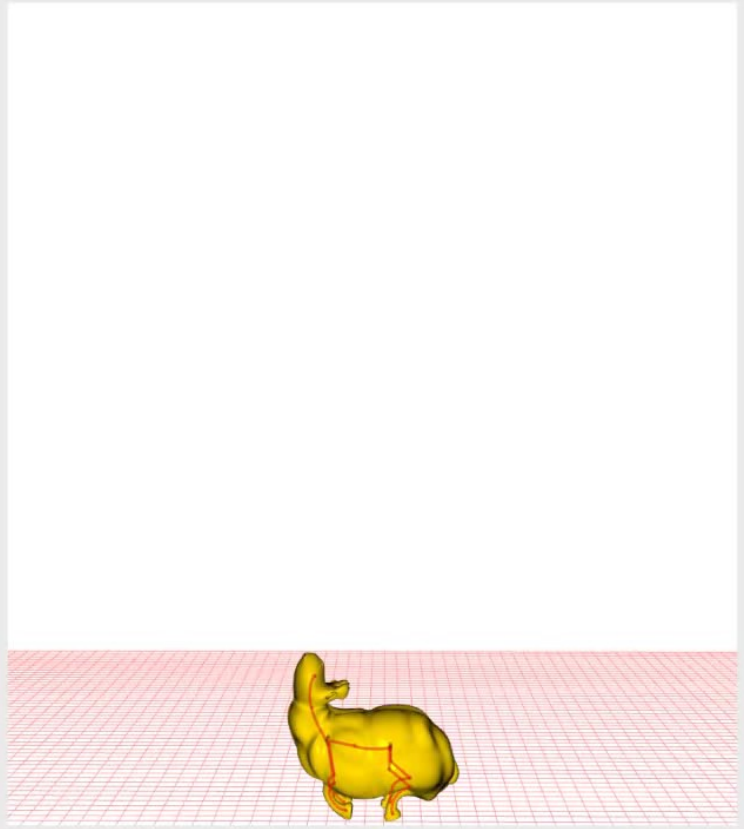


Keyframe 3

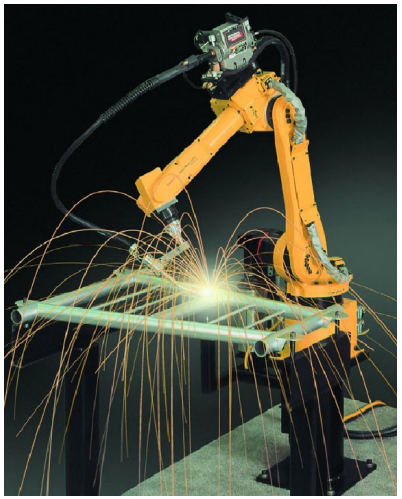
https://www.youtube.com/watch?v=c538zkwxgTQ

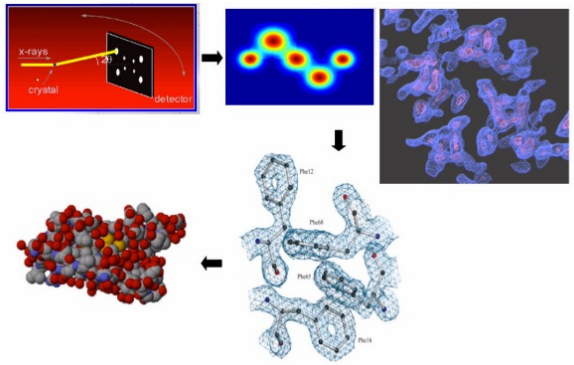
Character Animation using Keyframe Animation

Kinematics and skinning



Inverse Kinematics





Outline

1. Keyframe animation
   - Pros:
     - Efficient
     - Full control
   - Cons:
     - Still very tedious
     - Can still have a large number of keyframes to put

Outline

3. **Physics-based animation**
    1. **Time integration**
    2. **Springs systems**
    3. **Fluid simulation**
    4. **Cloth animation**
    5. **Rigid body simulation**
    6. **Collision detection and contact handling**

Outline

1. Physics-based animation
   - Pros:
     - Powerful
   - Cons:
     - Difficult to control
     - Not always tractable

Outline

3. Performance capture

1. Motion capture (MOCAP)
2. Facial performance capture

Outline

3. Performance capture
    3. Facial performance capture
    4. Animation control