Computer Animation

Creating animation sequences
- path specification
- object definition
- key frames
- in-betweening

Displaying animation sequences
- raster animation

Parametric equations in animation

Displaying animation sequences

- Movies work by fooling our eyes
- A sequence of static images presented in a quick succession appears as continuous flow

Why animation works

- The eye cannot register images faster than approximately 50 frames per second
  (30 is just about adequate)
- If a gap in the projection occurs, the eye seems to perform spatial interpolation over the gap

Steps of a simple computer animation

1. Creating animation sequences
   - object definition
   - path specification (for an object, a camera or a segment)
   - key frames
   - in-betweening
2. Displaying the sequences
   - raster animation
   - colour-table animation

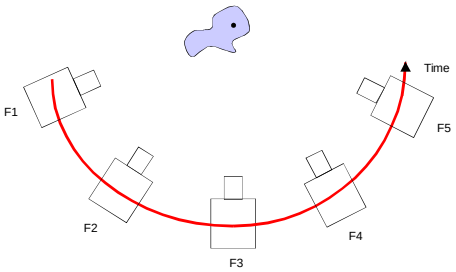
CREATING ANIMATION SEQUENCES

Path specification

- Impression of movement can be created for two basic situations, or for their combination:
  - static object, moving camera
  - static camera, moving object
- The path defines the sequence of locations (for either the camera or the object) for the consecutive time frames

Examples

Static object, moving camera



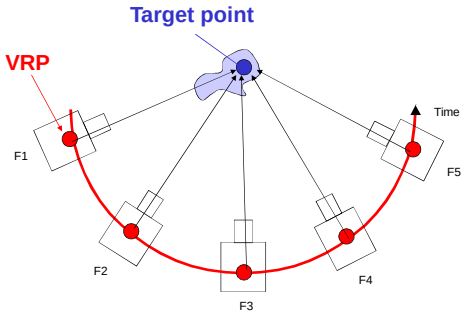
Static object, moving camera

- The path specifies the spatial coordinates along which the camera moves
- The path is usually specified for a single point, e.g. the VRP

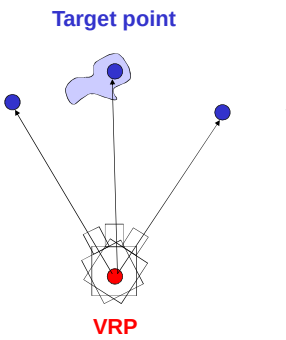
Static object, moving camera

- During movement, the target point in the World coordinate system can
  - remain the same (e.g. when walking or flying around the object to see it from all directions);
  - change (e.g. standing in one location and looking round, or moving along a given path and showing the view seen by the observer while moving).

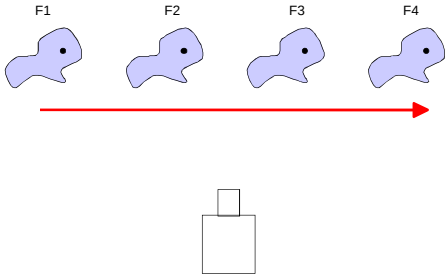
Static object, moving camera



Static object, moving camera



Static camera, moving object



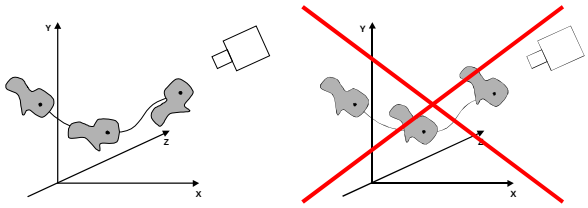
Static camera, moving object

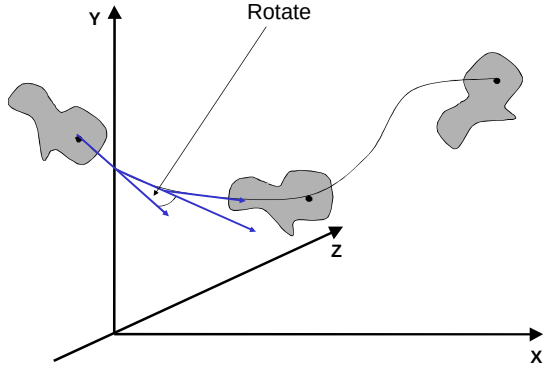
- Path specifying the object movement has to be defined
- The path is defined as the spatial coordinates along which the object moves

Static camera, moving object

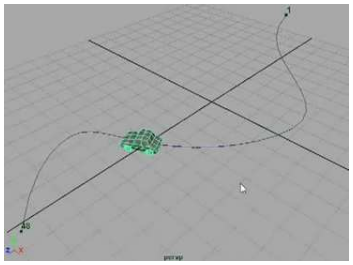
- Objects and their parts are defined in a local coordinate system
- Animation path is defined in the World coordinate system
- The path is specified for a single point, e.g. the centre of the object's local coordinate system
- Coordinates of the actual points describing the object are calculated afterwards

It is important to remember that when the object moves along the path, not only its position changes, but also its orientation





Example of path specification



http://www.ideepix.nl/ARIL/3D/maya/?show=31