Animation and Rendering

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SCOPE, VIT-AP

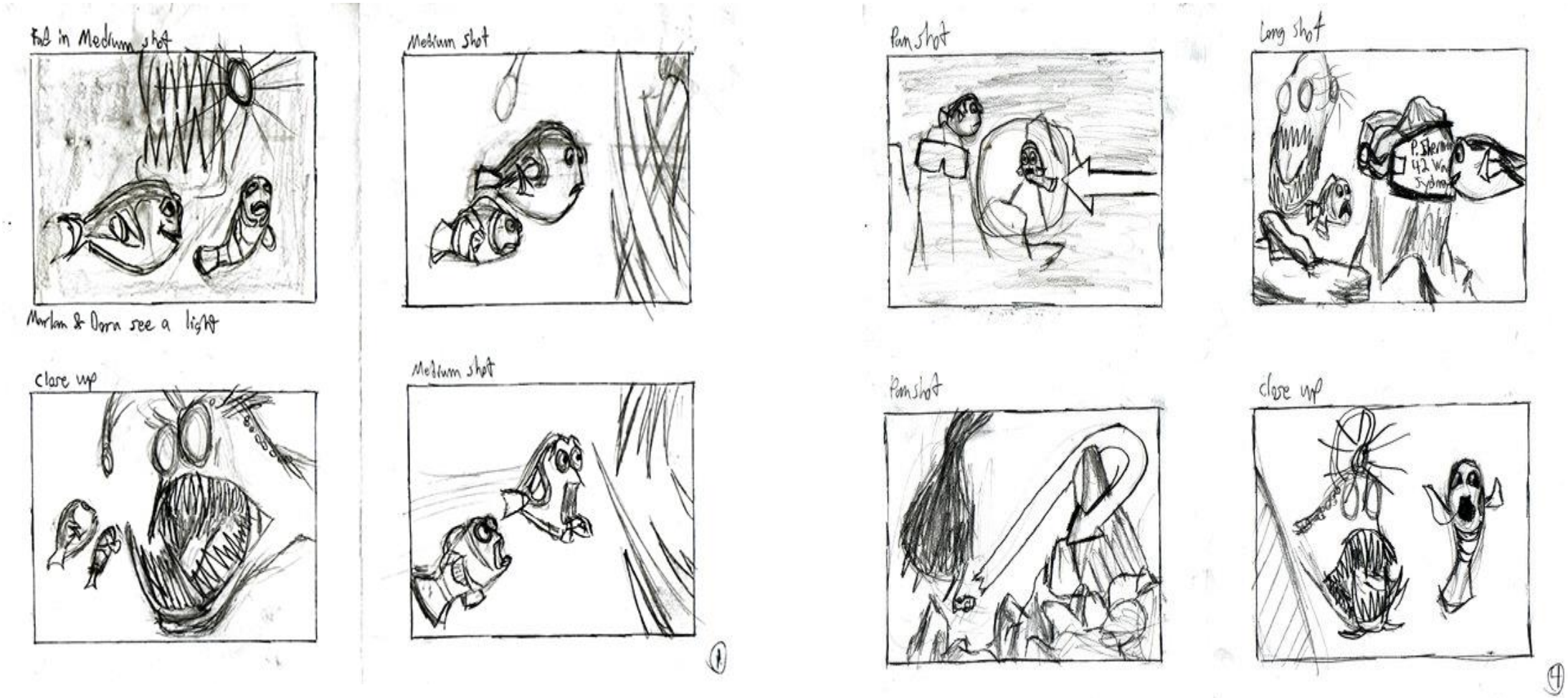
Animation

- Process used for generating animated images
- Application
  - Video games
  - Cartoons/movies
  - Mobile applications

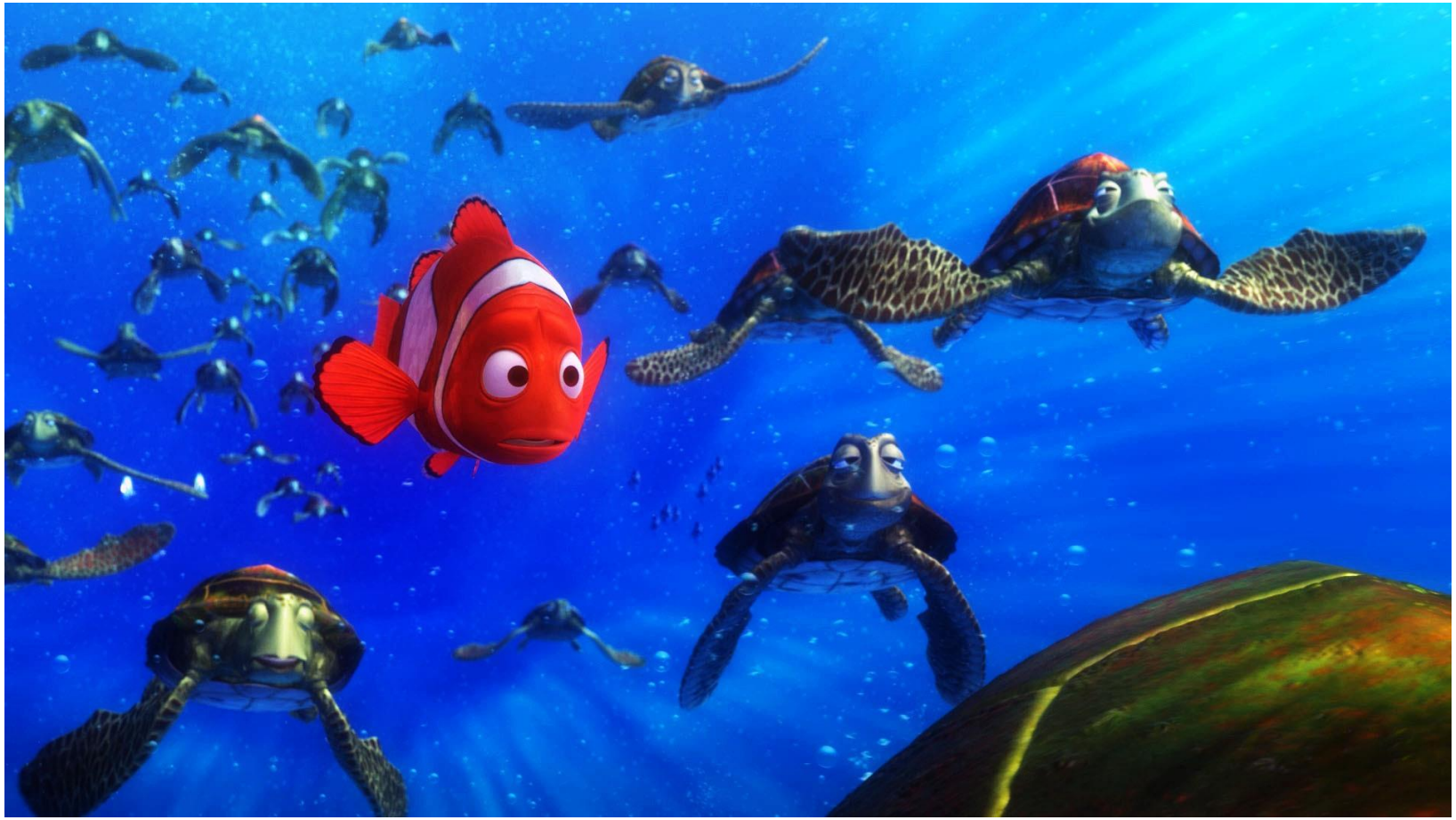
Designing animation sequence

- Story board layout
- Object and path definition
- Key frame specification
- Generation of in-between frames

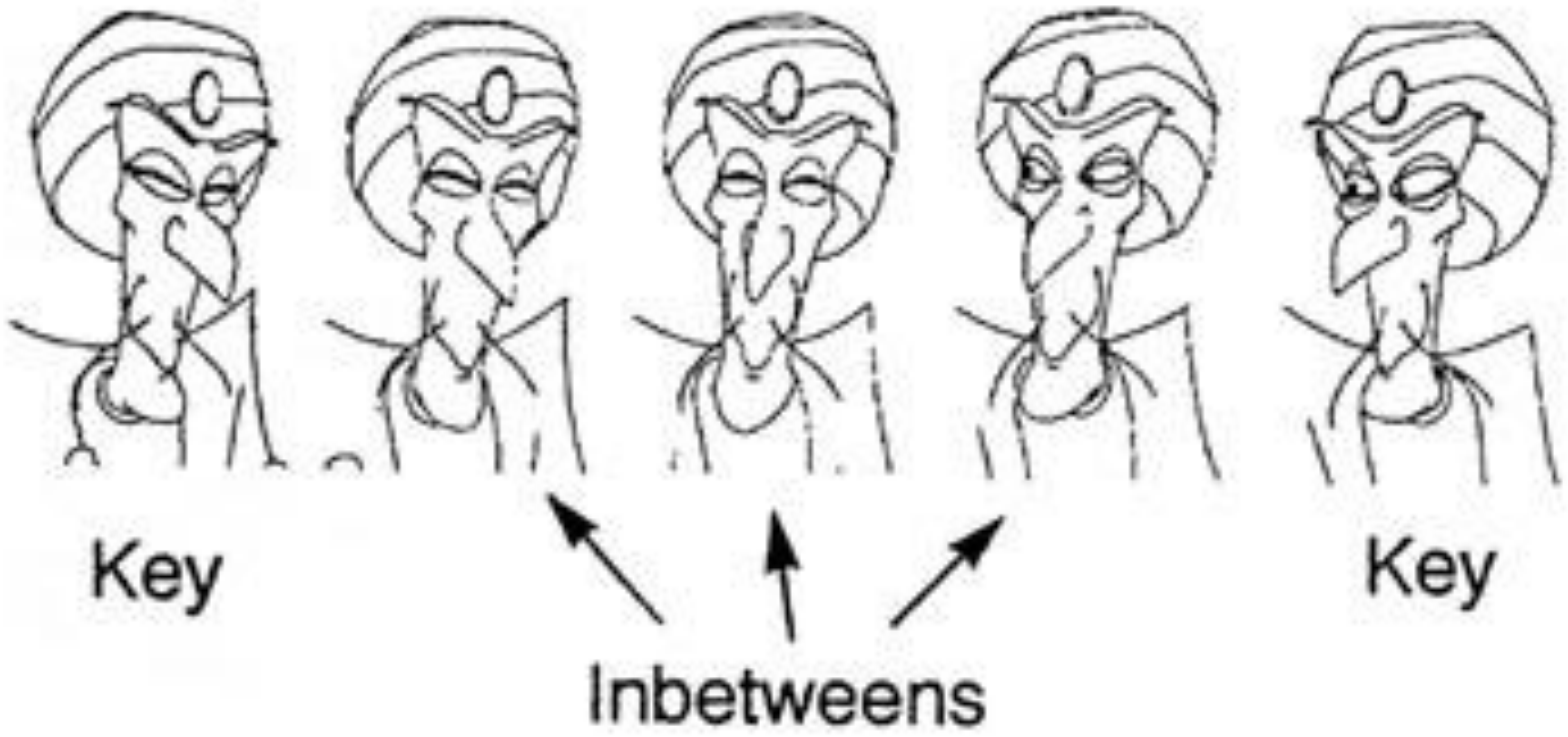
Story board


Fade in Medium shot
Marlan & Dorn see a light
Medium shot
close up
Medium shot
Pan shot
Long shot
Pan shot
close up

Object and path definition

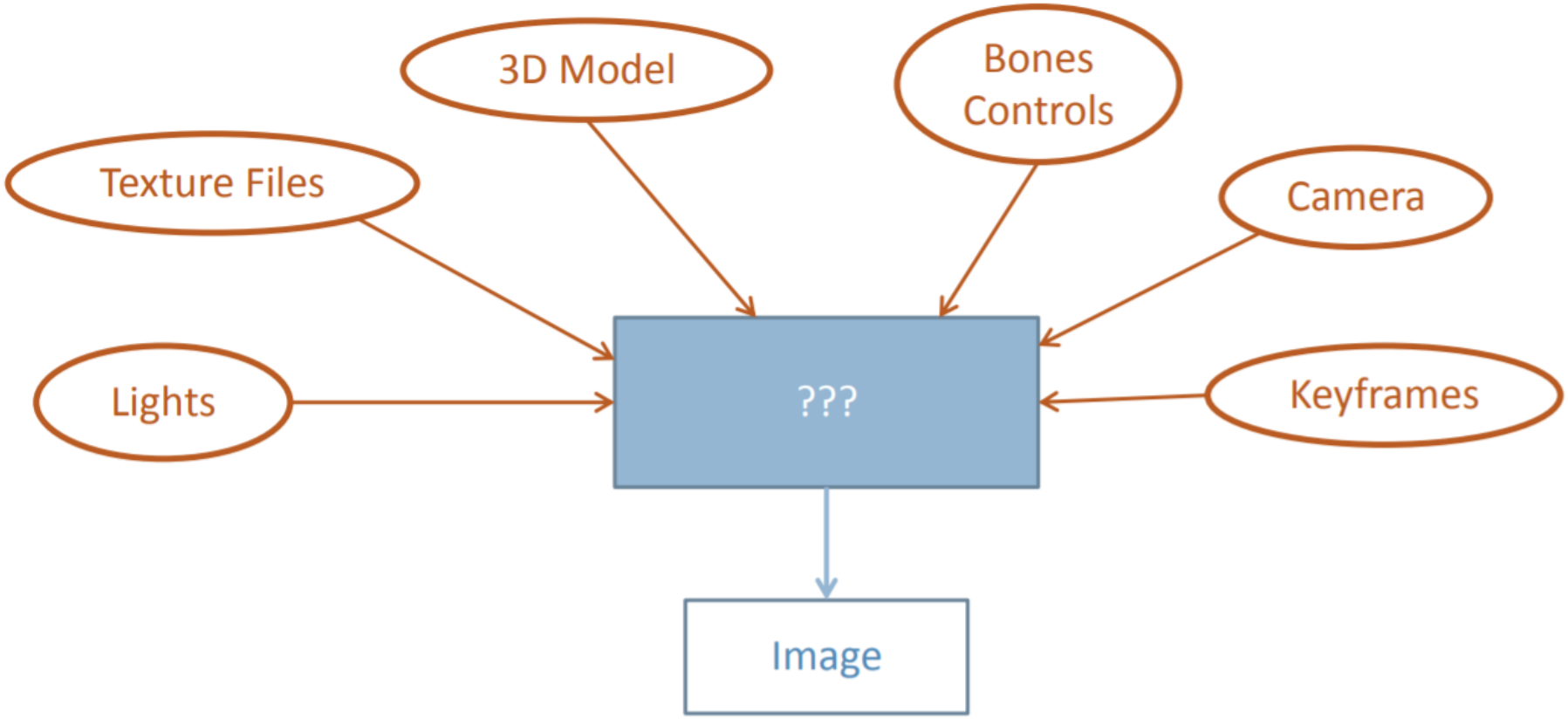


Key frames and in-between frames generation

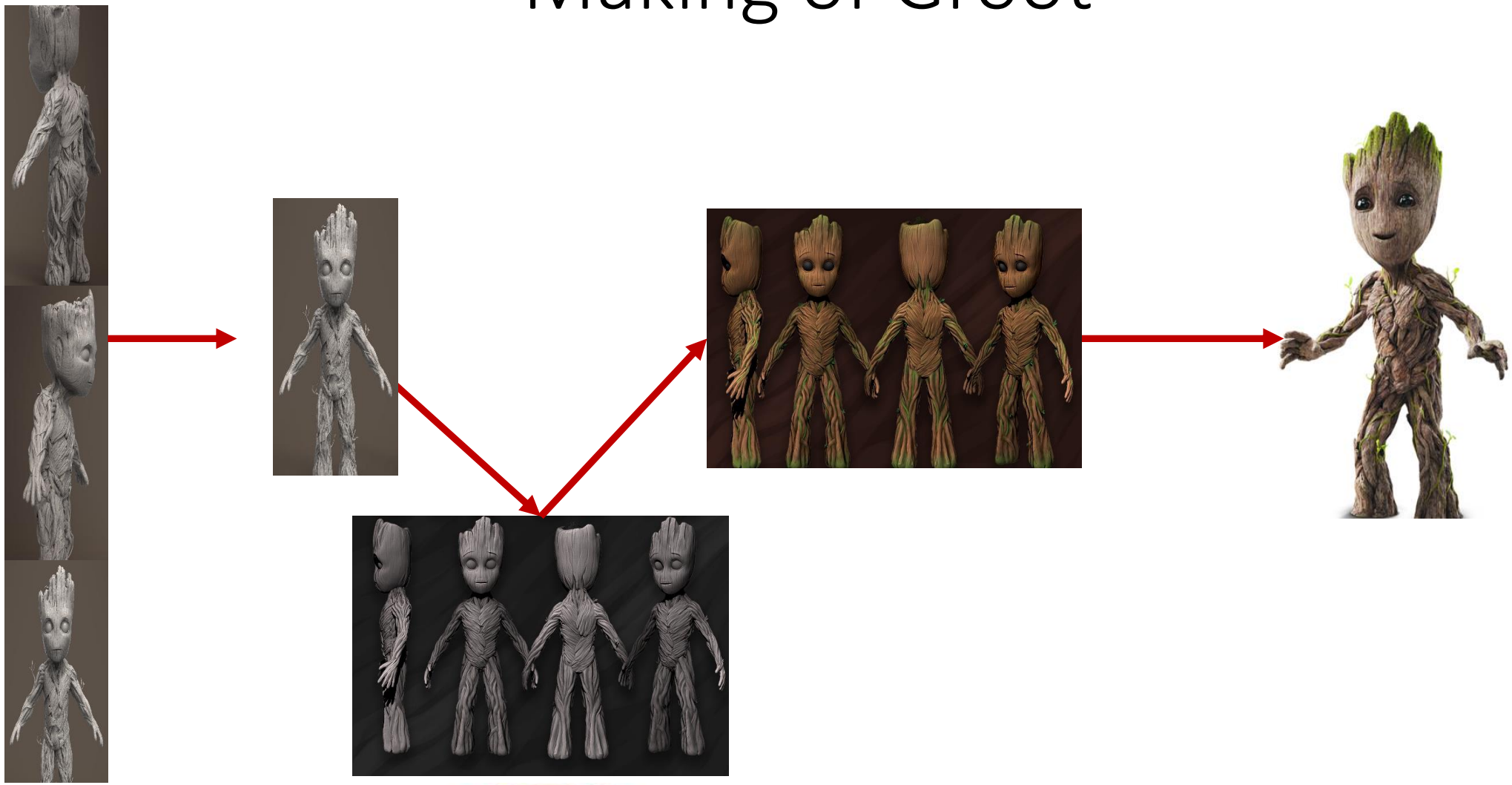


Animation

Rendering

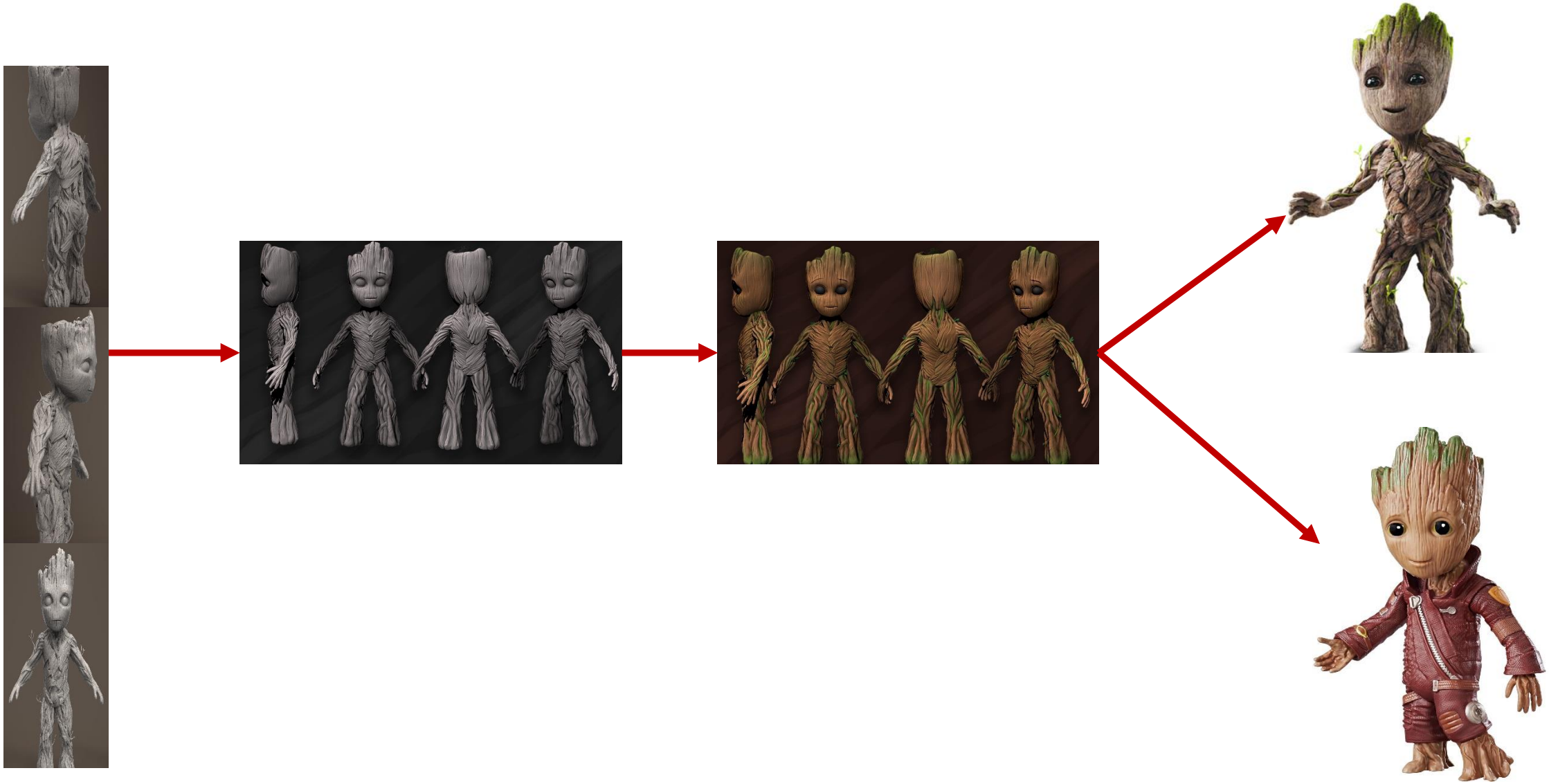

3D Model
Bones
Controls
Texture Files
Camera
Lights
???
Keyframes
Image

Making of Groot



3D Model + Bones Controls + Keyframes = Geometry

Rendering Groot



Rendering - Factors to be considered

- Projection
- Occlusion (technique used to calculate how each point in a scene is exposed to lighting)
- Color / Texture
- Lighting
- Shadows
- Reflections / Refractions (reflected rays/ transmitted rays)
- Indirect illumination (techniques used to add more realistic lighting to 3D scenes)
- Sampling / Antialiasing (technique used to reduce the visual defects that occur when high-resolution images are presented in a lower resolution)

Computer vision vs Image processing

Computer Vision:

- **Input**: Images
  Output: Knowledge of the scene (recognize objects, people, activity happening there, distance of the object from camera and each other, ...)
  Methods: Image processing, machine learning, ...

Image Processing:

- **Input**: Images
  Output: Images (Might be in different formats, for example compressed images). No knowledge of the scene is given.
  Methods: Different filtering, FFT,

Mathematical object models – A review

- **Algebra and Trigonometry (**Vectors and matrix)
- **Linear Algebra (**numerical representations of geometry)
- **Calculus/ Differential Geometry (**smooth curves and surfaces**)**
- **Numerical Methods (**represent and manipulate numbers**)**
- **Sampling Theory and Signal Processing (**Image processing(2D/3D)**)**
- **Physics (**animation/particles/model dynamics**)**
- **Optimization (**gaming**)**