# Mesh Construction

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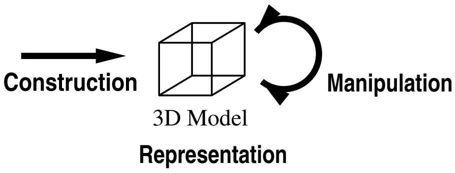
## 3D Modeling

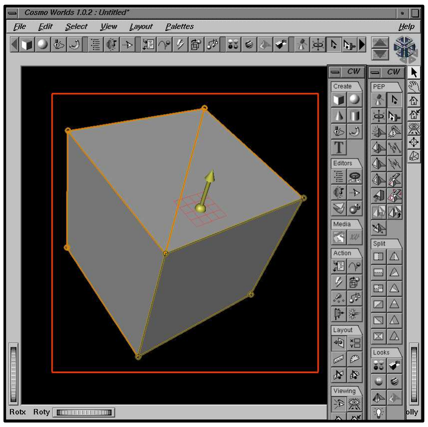
- **How do we ...**
  - represent 3D objects in a computer?
  - **construct 3D representations quickly and/or automatically with a computer?**
  - manipulate 3D objects with a computer?




## Mesh Construction

- **Interactive tools**
  - CAD programs
  - VRML modelers
  - etc.
- **Model Acquisition**
  - Laser scanning
  - Magnetic scanning
  - Robotic arm digitizing
  - Computer vision
- **Procedural Generation**
  - Sweeps
  - Fractals
  - Grammars
  - etc.

## Interactive Modeling



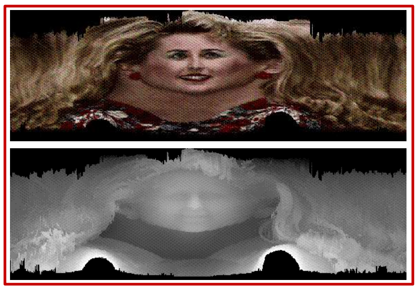
Cosmo Worlds

## Model Acquisition

- **Basic idea:**
  - Use sensors to determine vertex positions and mesh topologies for real–world objects
- **Methods**
  - Laser scanning
  - Magnetic scanning
  - Robotic arm digitizing
  - Computer vision

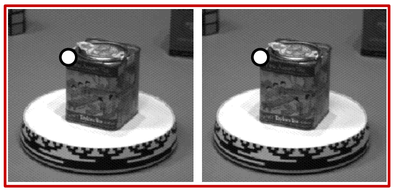
## Laser Scanning

Panoramic Color Image

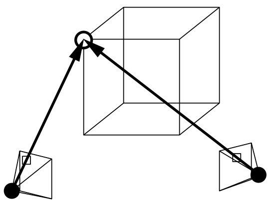


Panoramic Depth Image

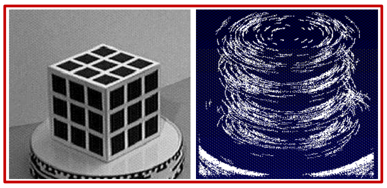
## Computer Vision



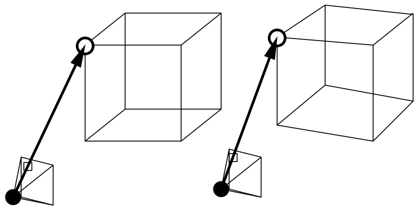
Stereo Matching



## Computer Vision



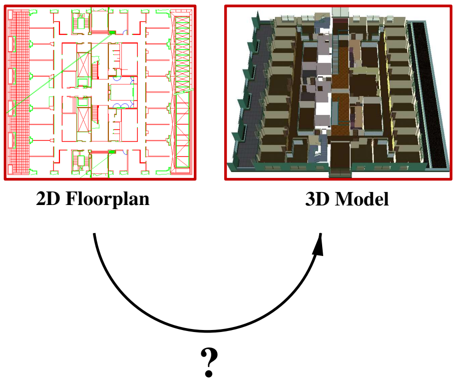
Structure From Motion



## Computer Vision

Constrained Optimization

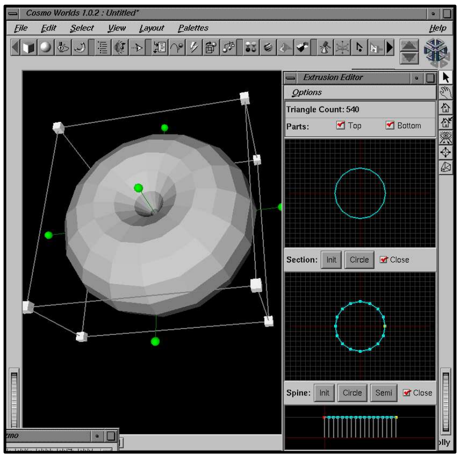
## Mesh Derivation




## Procedural Generation

- **Basic idea:**
  - Use algorithm to generate vertex positions and mesh topology
- **Methods:**
  - Sweeps
  - Fractals
  - Grammars
  - etc.

## Surfaces of Revolution

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