3D object editors

and how they are building an object

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The Origins of 3D Editors

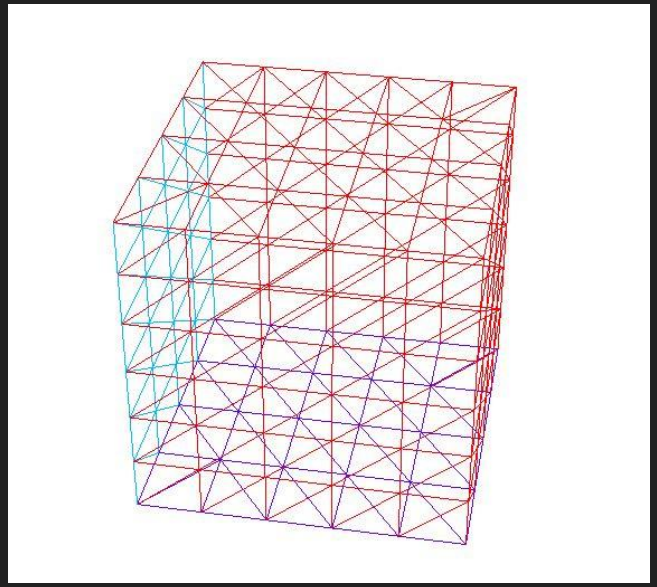
- Early 1960s: First computer-aided design tools (Sketchpad)
- 1970s: Emergence of basic wireframe 3D modeling
- 1980s: Commercial software appears (CATIA, AutoCAD)
- 1990s: Introduction of real-time rendering and animation tools
- 2000s: Widespread use in film, games

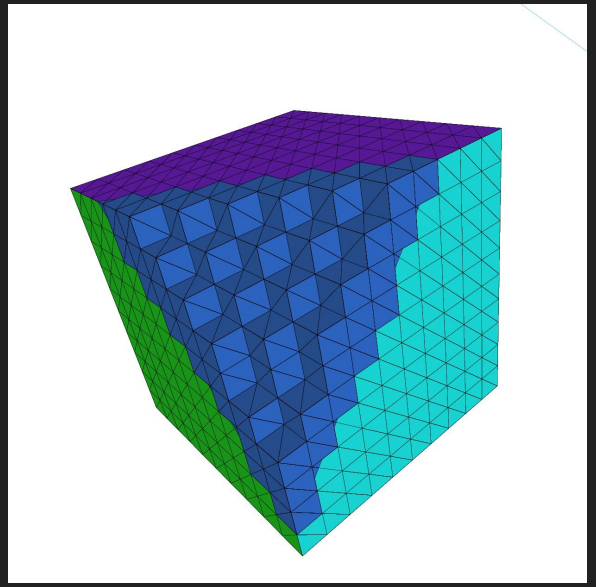
Recent Trends in 3D Editors (2010–2025):

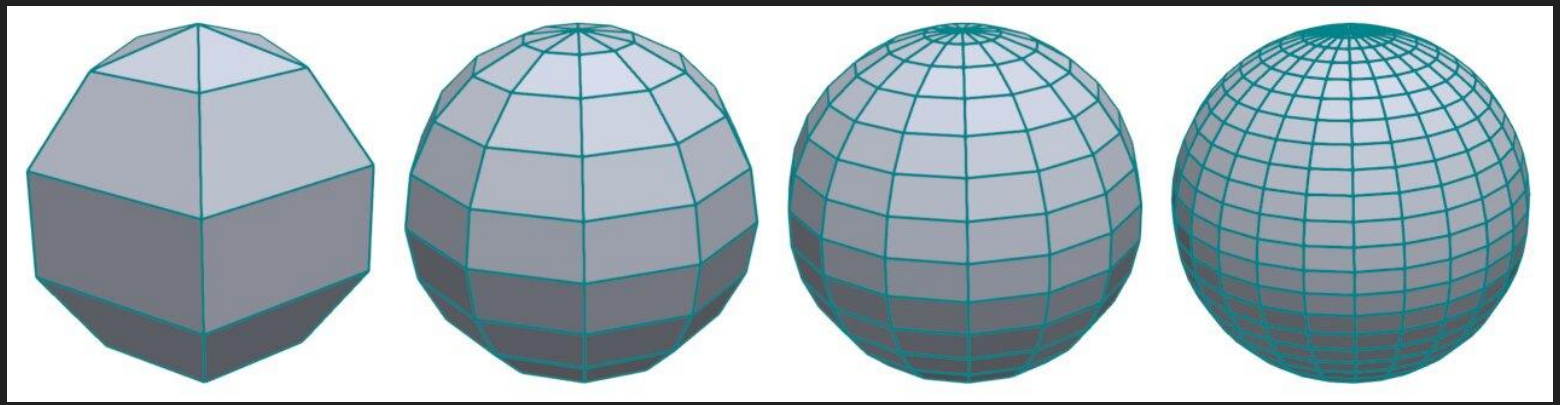
- Blender becomes a serious professional tool
- Real-time rendering becomes standard (Unity, Unreal Engine)
- Web-based editors emerge (Clara.io, Spline)
- AI tools enhance modeling and texturing (NVIDIA Omniverse, Adobe Substance 3D)
- 3D becomes mainstream: used in education, AR, medication

What is a Mesh?

- A mesh is a collection of vertices, edges, and faces
- Defines the shape of a 3D object
- Most common face type: triangle (or quad)
- Can be manually modeled or generated procedurally
- Stored as polygonal data (OBJ, FBX, STL)

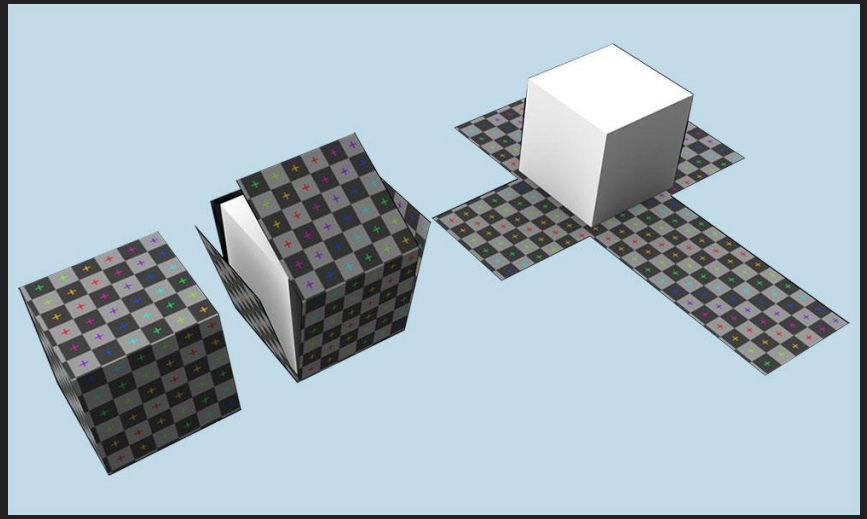


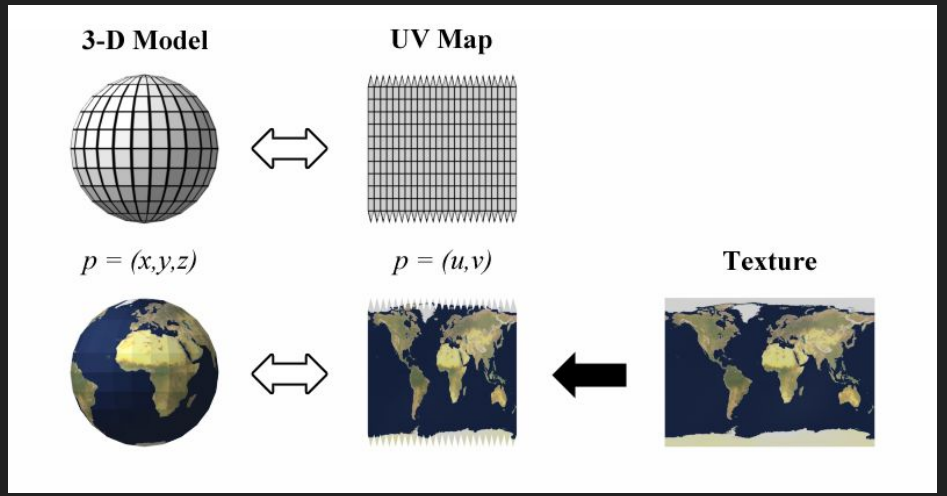




What is UV Mapping?

- Maps a 2D texture onto a 3D model
- “U” and “V” = texture space coordinates
- Each face on the mesh gets UV coordinates
- Essential for applying textures properly
- Can be manual or automatic (smart UV unwrap)




3-D Model
UV Map
p = (x,y,z)
p = (u,v)
Texture

What is Texturing?

- Adds visual detail to a 3D model’s surface
- Uses 2D images (textures) mapped via UV coordinates
- Common types:
  - Diffuse/albedo: base color
  - Normal map: fake surface detail (bumps)
  - Specular/roughness: controls shininess
  - Displacement: real geometry alteration
- Textures are often hand-painted or photogrammetry-based

Shaders

- Small programs running on the GPU
- Control how objects look: color, light interaction, transparency, etc.

Skeleton

- An internal bone structure for a 3D model
- Enables movement and animation by deforming the mesh

Lighting

- Simulates light sources in the 3D scene
- Adds realism through highlights, shadows, and reflections

Thank you for your attention!