

Human Computer Interaction

7. Smart and suggestive interfaces (b)

National Chiao Tung Univ, Taiwan

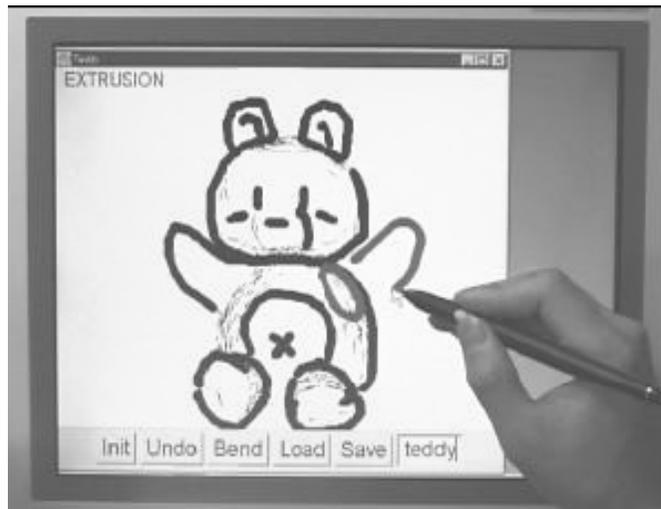
By: I-Chen Lin, Assistant Professor

Introduction

- Manipulating 3D objects in 2D interface devices.
- Special-purpose systems, in addition to architecture frames...
- How about plants, vehicles, human characters, animals, ..., etc.?

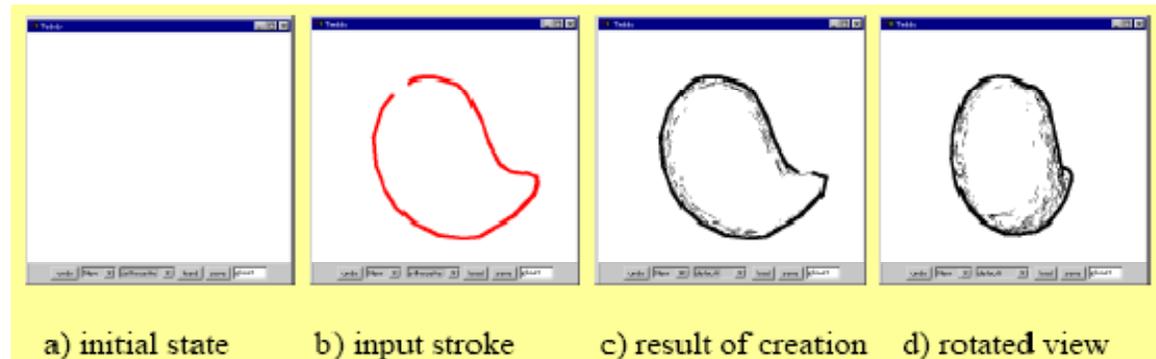
Teddy System

- T. Igarashi, S. Matsuoka, H. Tanaka, "Teddy: A Sketching Interface for 3D Freeform Design", Proc. ACM SIGGRAPH'99, pp.409-416.
- A sketching interface for stuffed animals or rotund objects (Q-version)

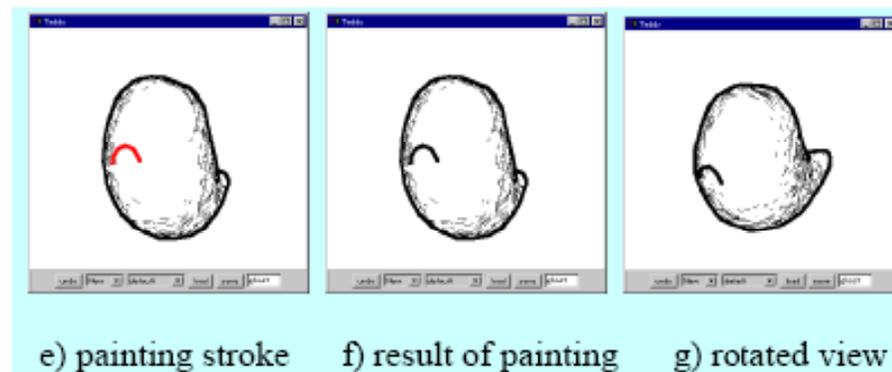


Teddy System

- What operations should be provided?
 - Silhouettes → 3D objects with volume

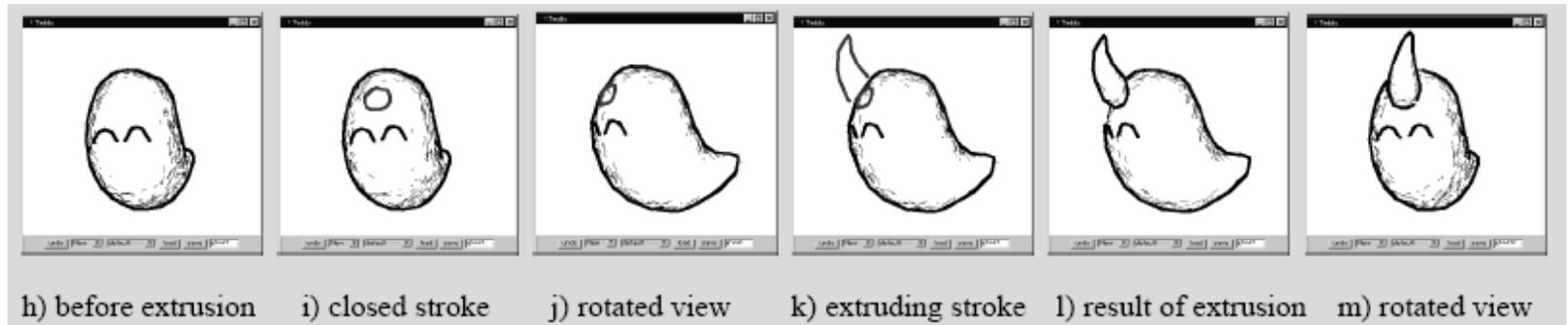


- Painting

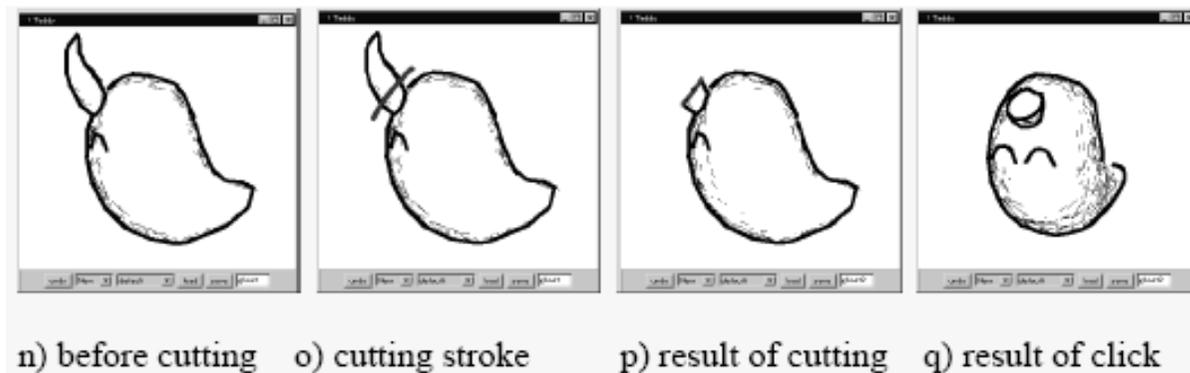


Teddy System (cont.)

■ Extrusion

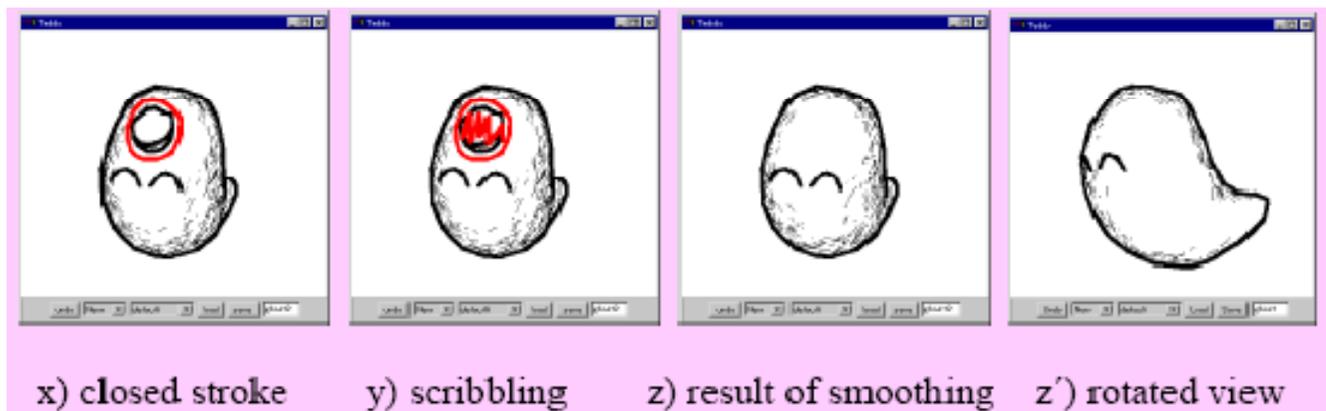
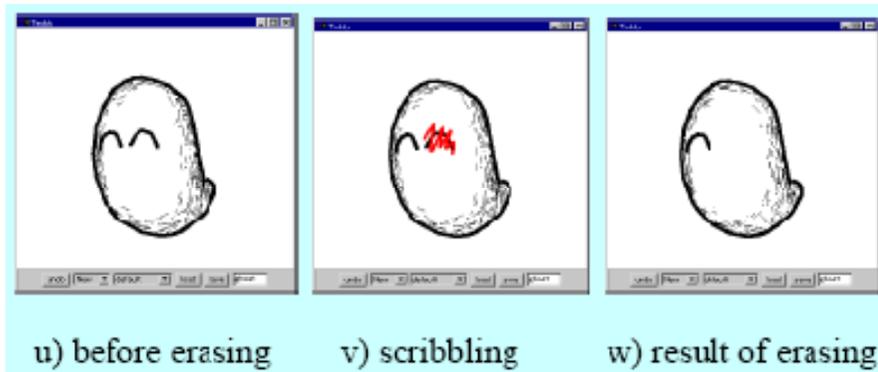


■ Cutting

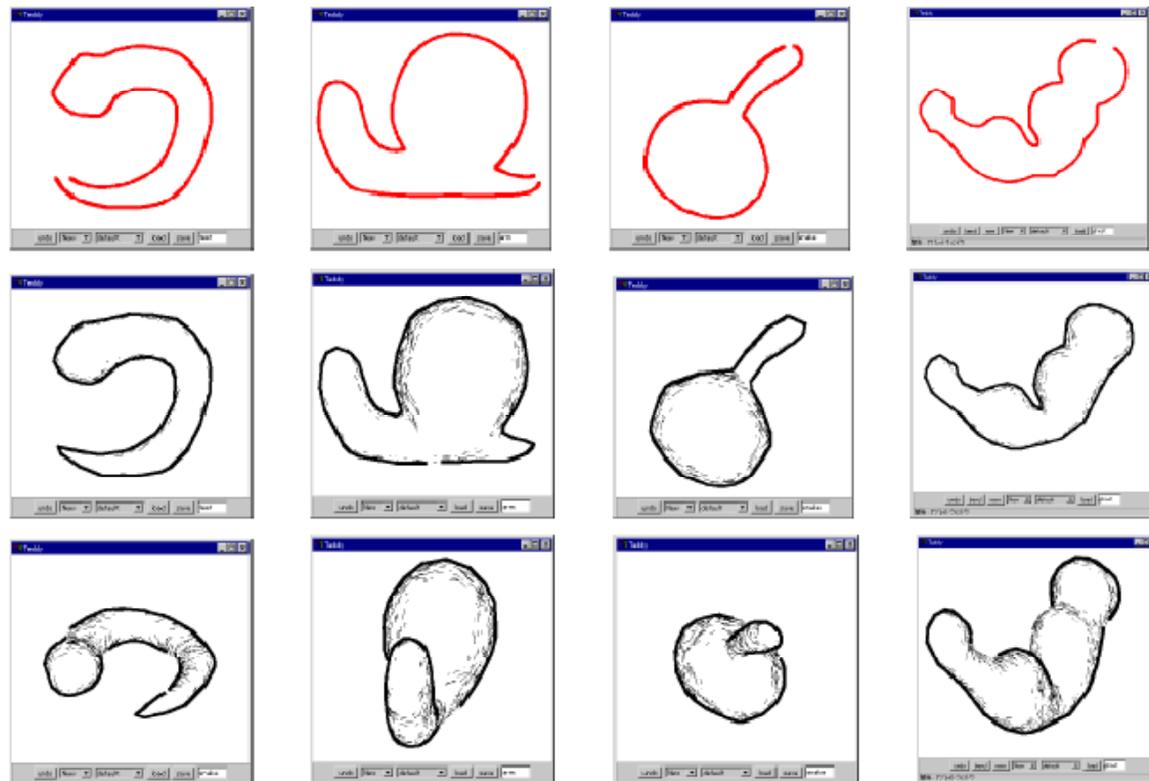


Teddy System (cont.)

■ Undo



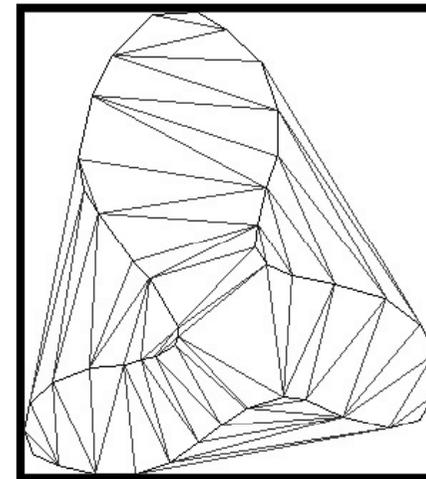
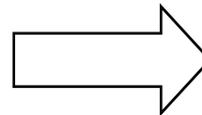
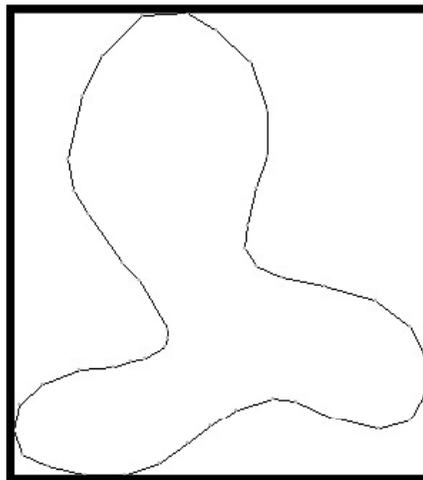
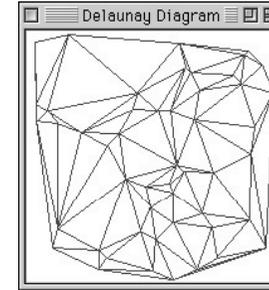
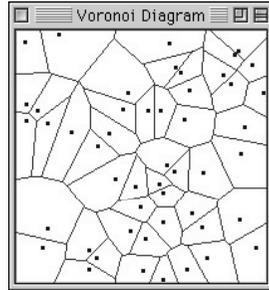
Creating An Object



- Inflating according to the “medial” axis?!

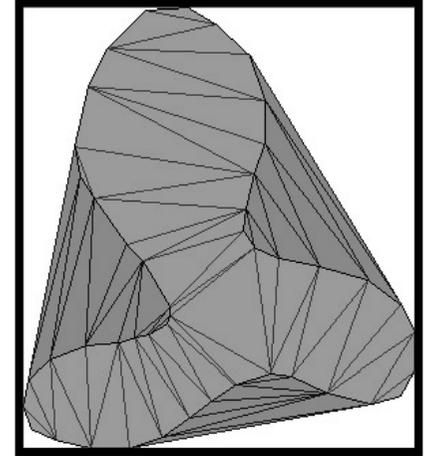
Creating An Object (cont.)

- Delaunay Triangulation
 - Voronoi diagram \leftrightarrow (dual) delaunay triangulation

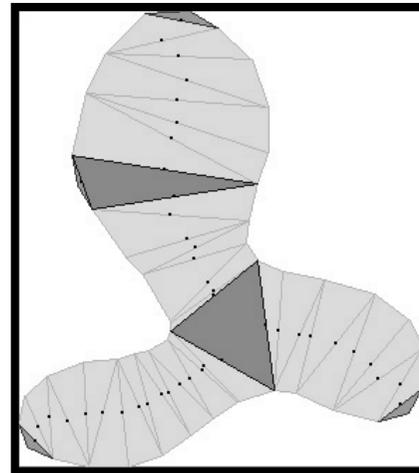


Creating An Object (cont.)

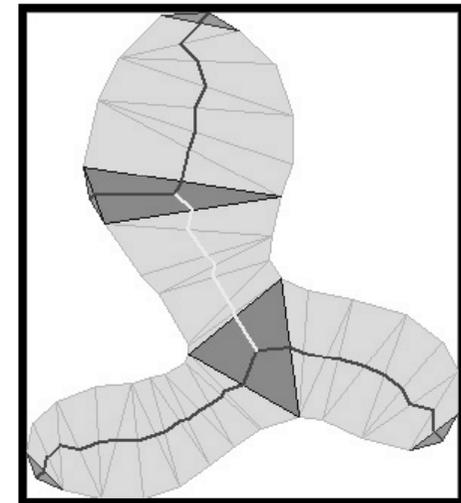
- Constrained delaunay triangulation (CDT)



- Triangle categories

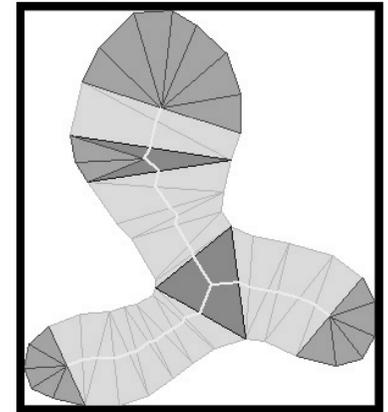


- Calculating chordal Axis

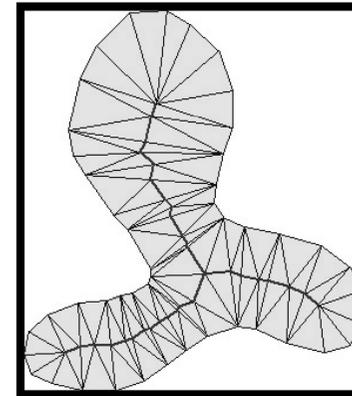


Creating An Object (cont.)

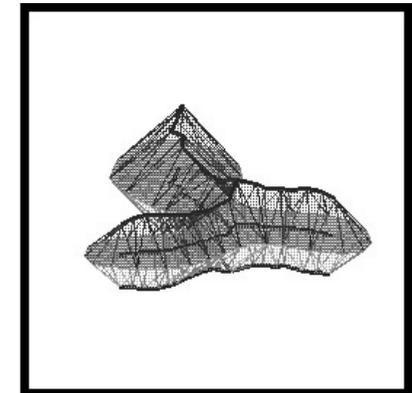
- Pruning of insignificant branches and fan triangles



- Final triangulation and spines

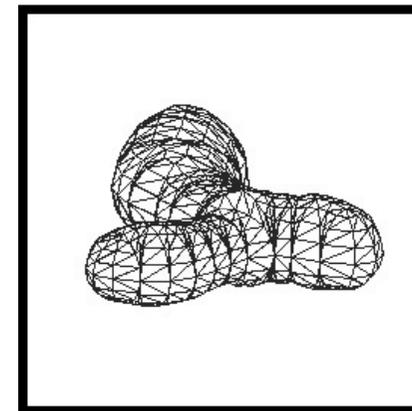
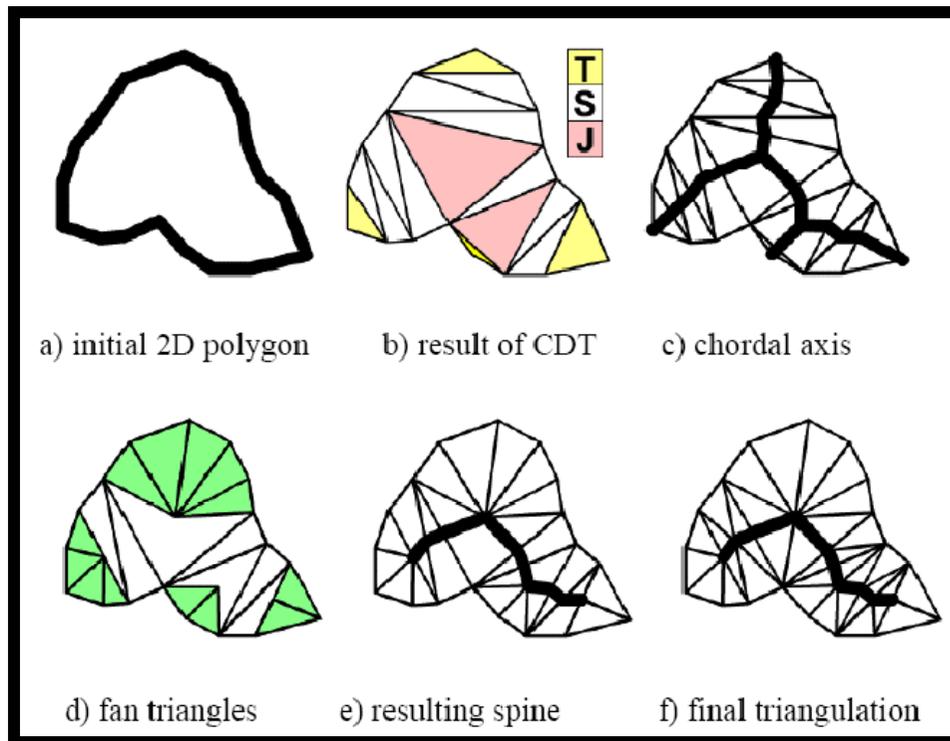
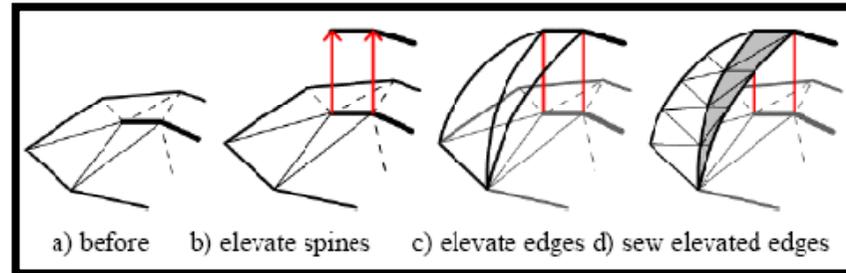


- Elevating Spines and Triangles

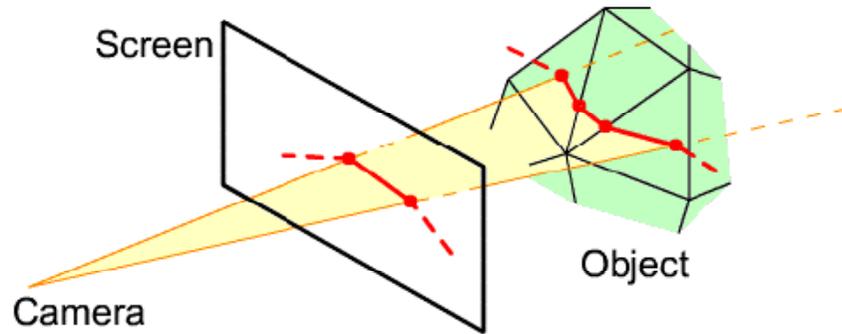


Creating An Object (cont.)

■ Target shape

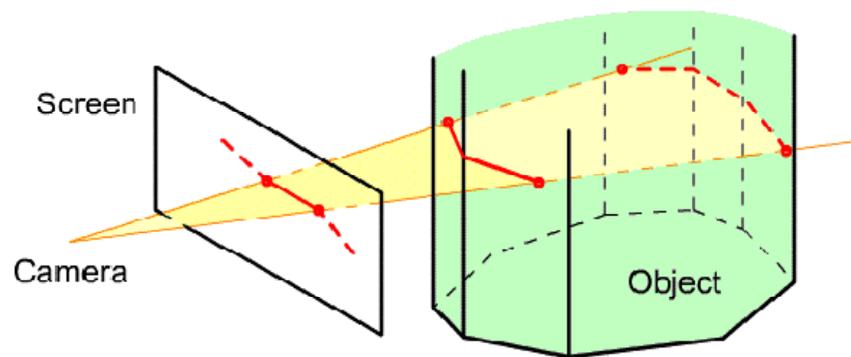
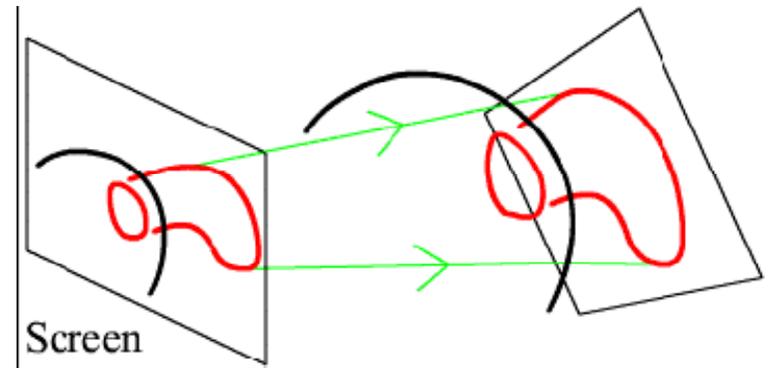


Operations



Painting a line

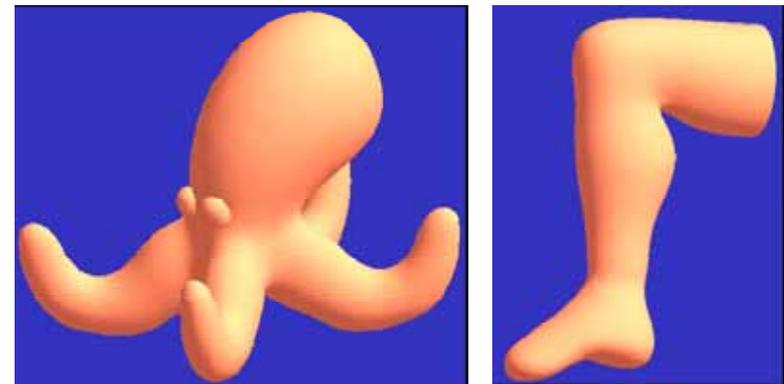
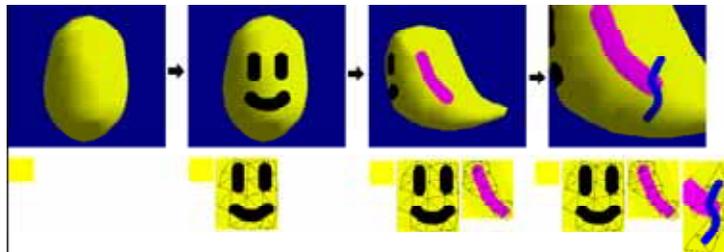
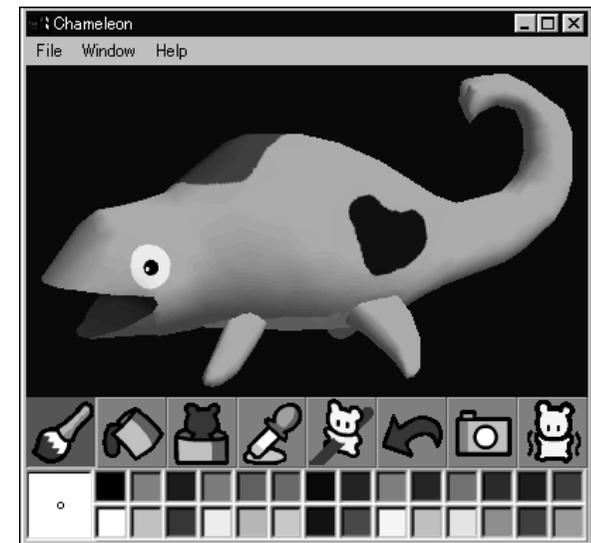
Extrusion



Cutting

Teddy

- Teddy's ease of use has the potential to open up new application areas for 3D modeling.
 - 10-min rules
- Rapid prototyping ...



Advanced interfaces

- Is there any tedious or labor-intensive job or interface?
- Thinking about
 - Users' goals, intentions
 - Redundant operations ?
 - Customs ?
 - Domain knowledges ?
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