

# Human Computer Interaction

## 7. Smart and suggestive interfaces (b)

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# Introduction

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

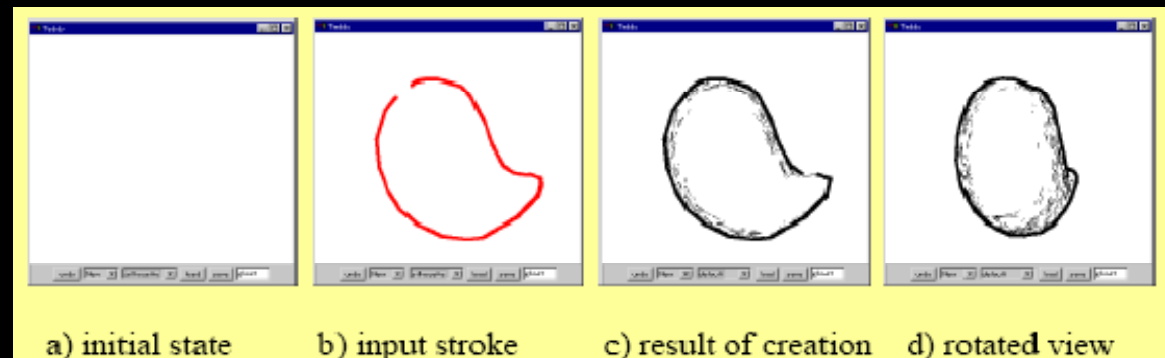
# Teddy System

- 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)

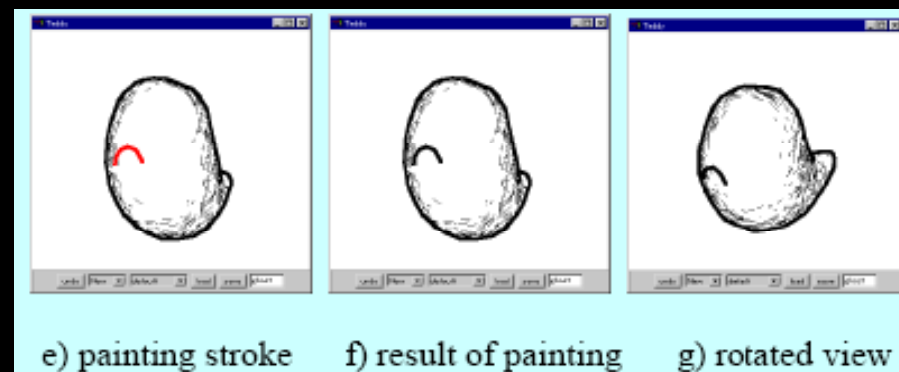


# Teddy System

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

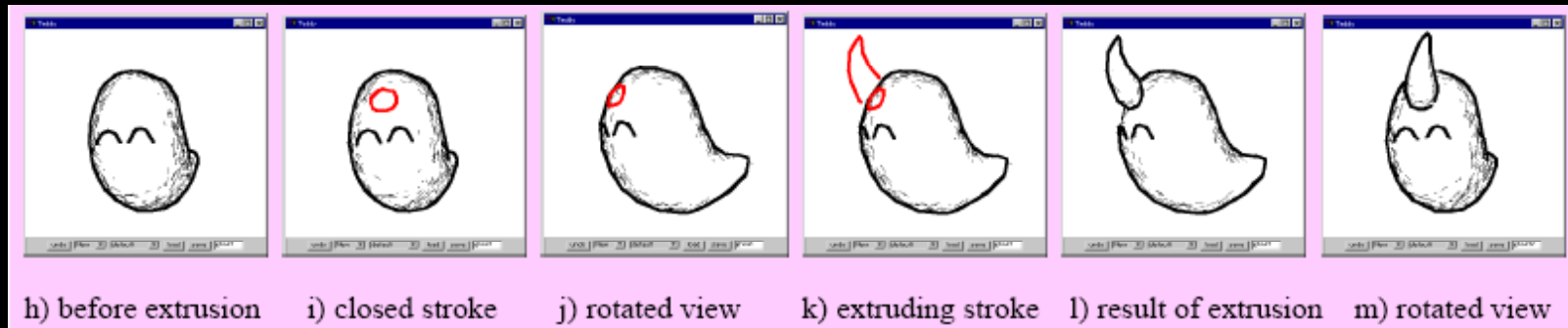


- Painting

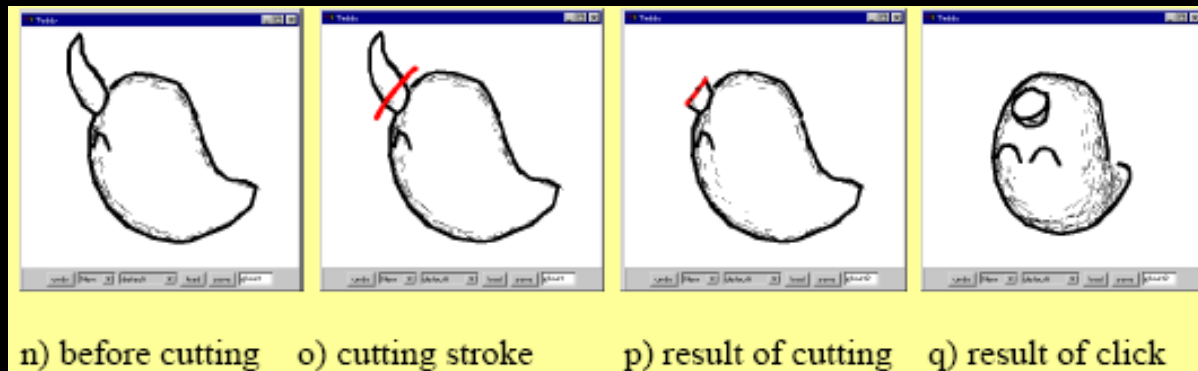


# Teddy System (cont.)

## ■ Extrusion

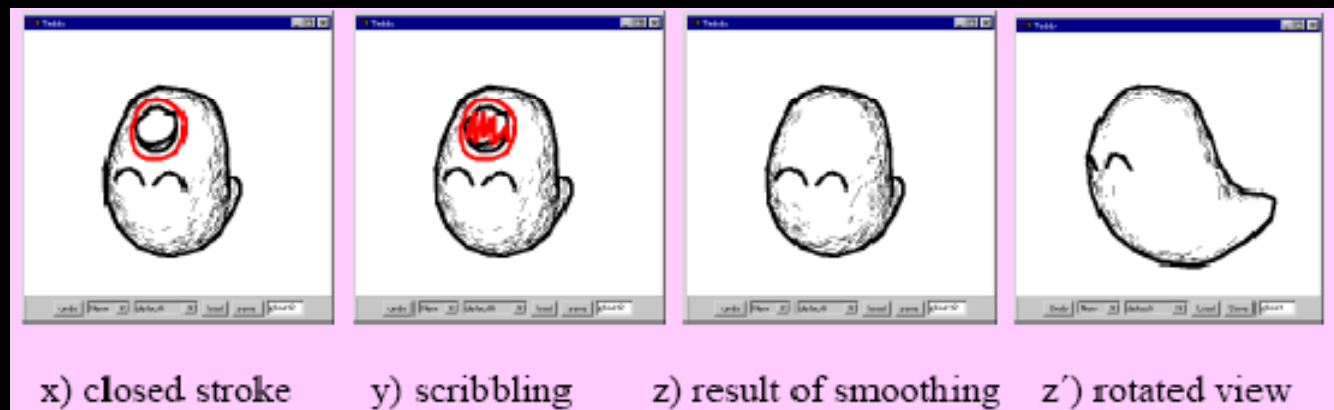
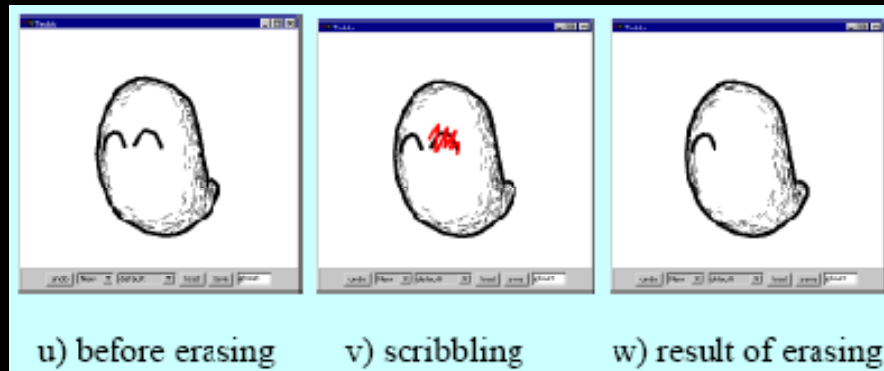


## ■ Cutting

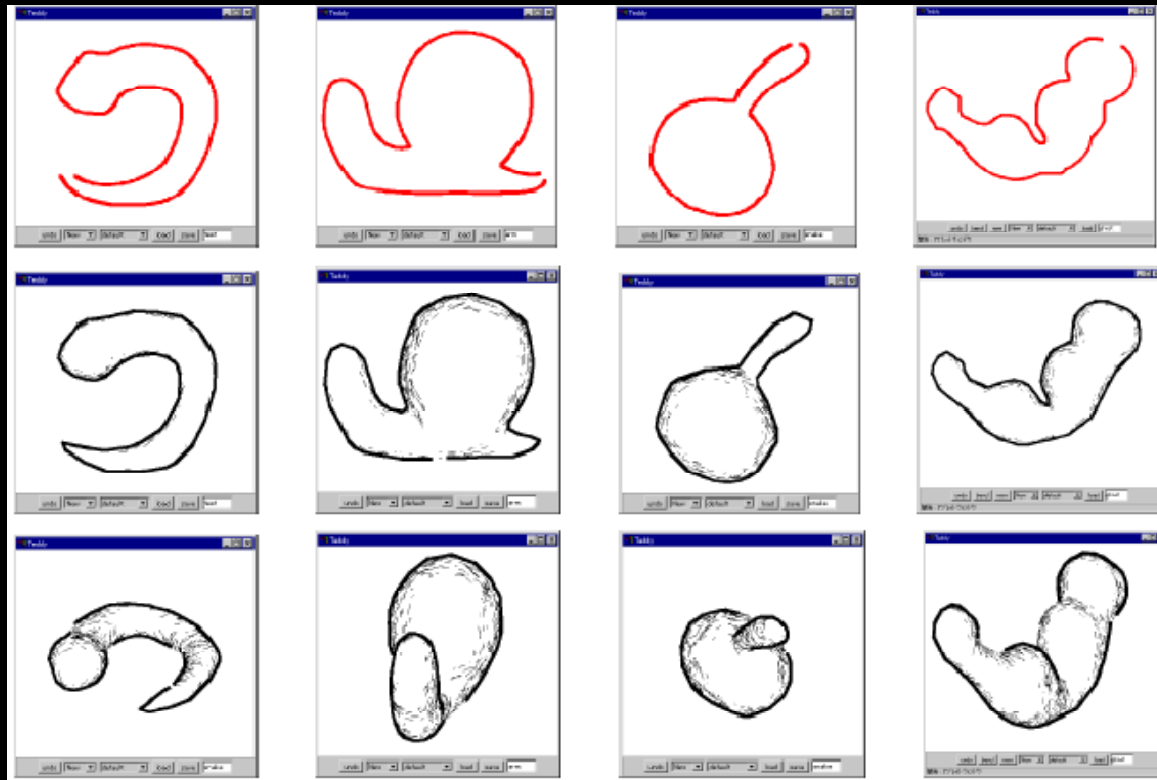


# Teddy System (cont.)

- Undo



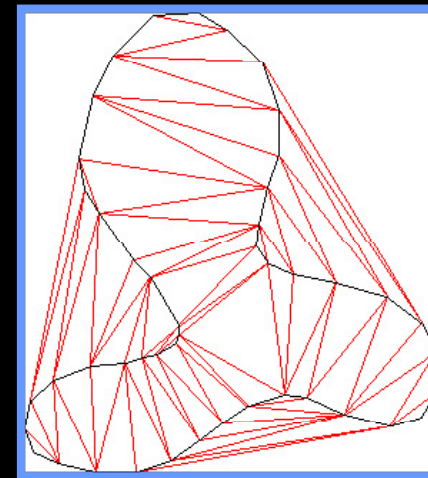
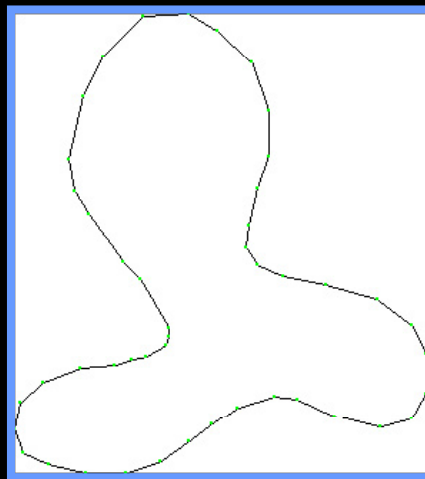
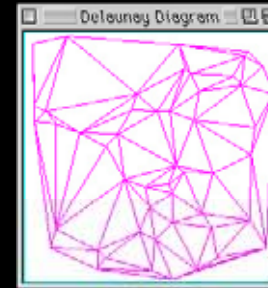
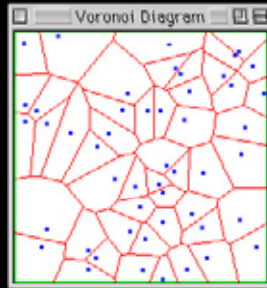
# Creating An Object



- Inflating according to the “medial” axis?!

# Creating An Object (cont.)

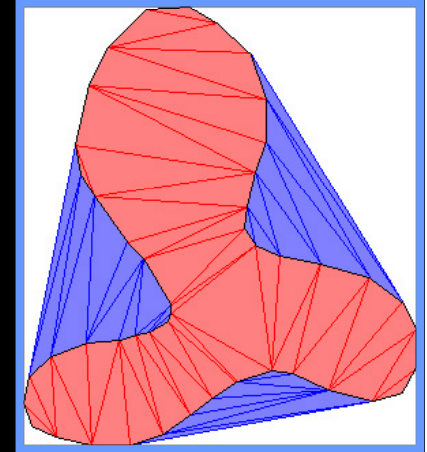
- Delaunay Triangulation
  - Voronoi diagram  $\leftrightarrow$  (dual) delaunay triangulation



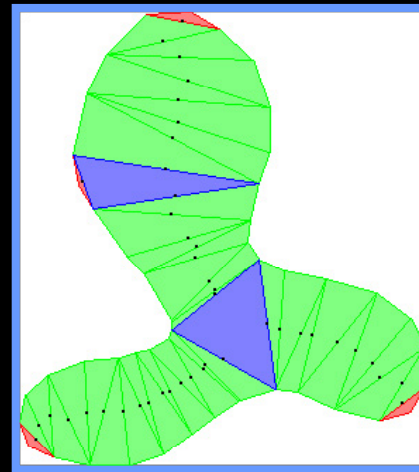


# Creating An Object (cont.)

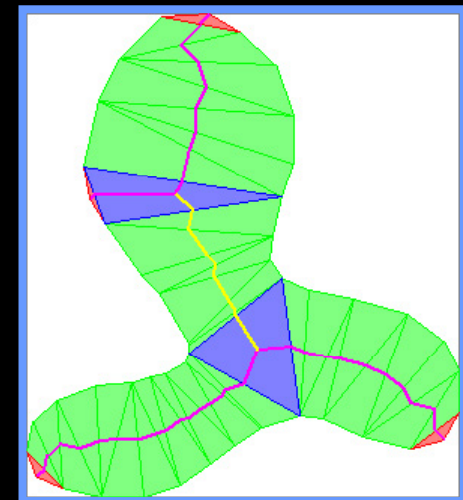
- Constrained delaunay triangulation (CDT)



- Triangle categories

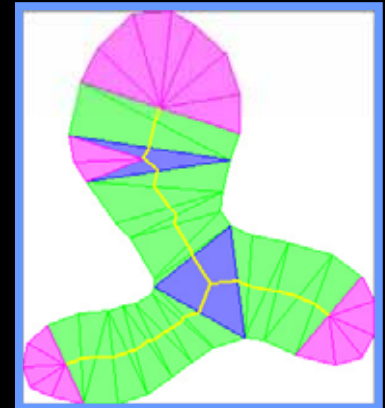


- Calculating chordal Axis

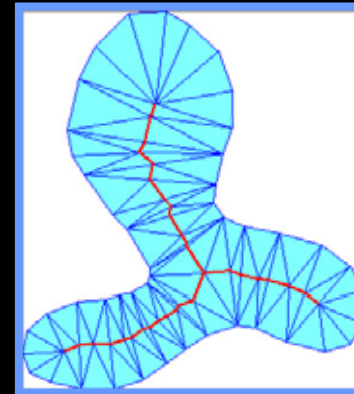


# Creating An Object (cont.)

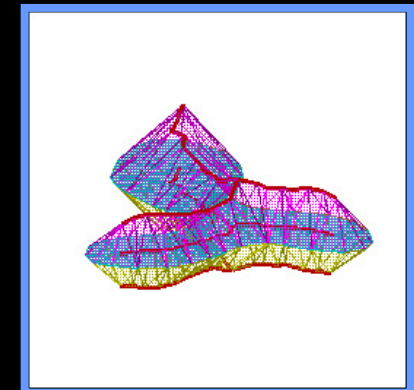
- Pruning of insignificant branches and fan triangles



- Final triangulation and spines

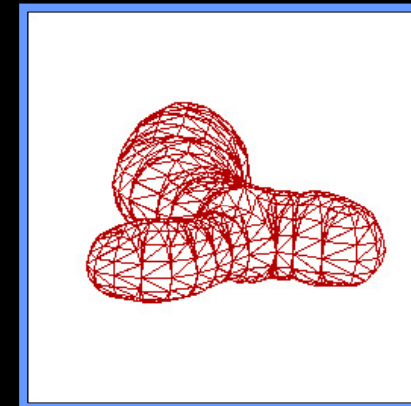
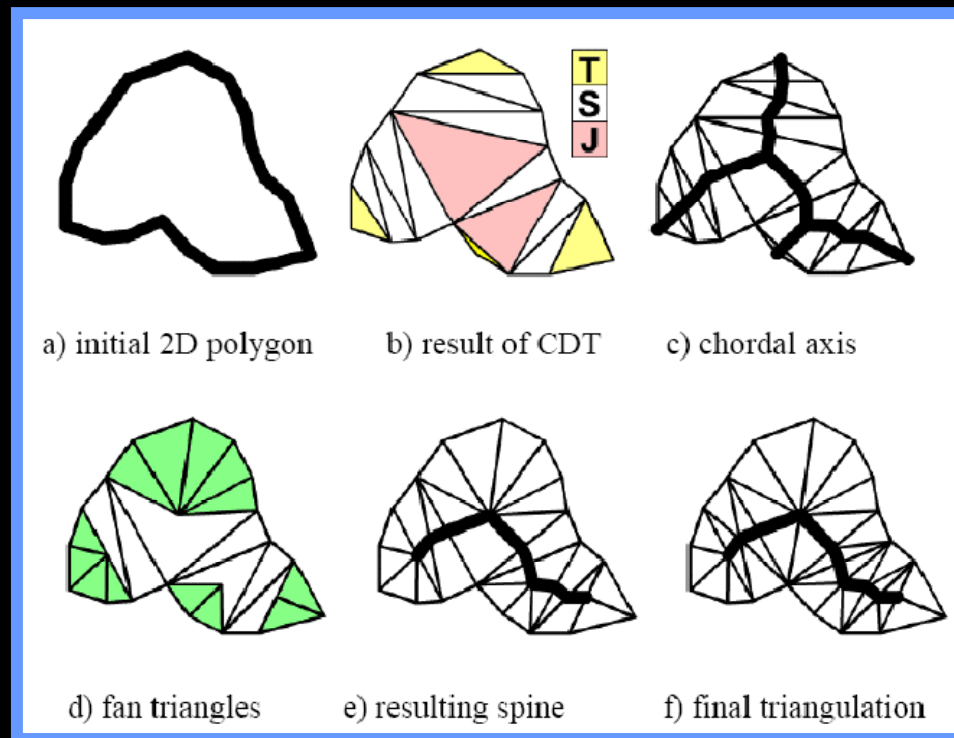
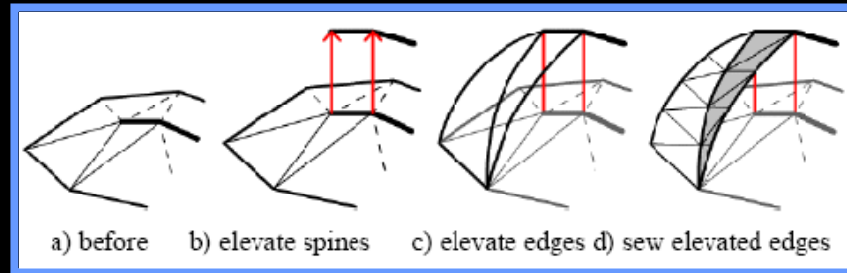


- Elevating Spines and Triangles

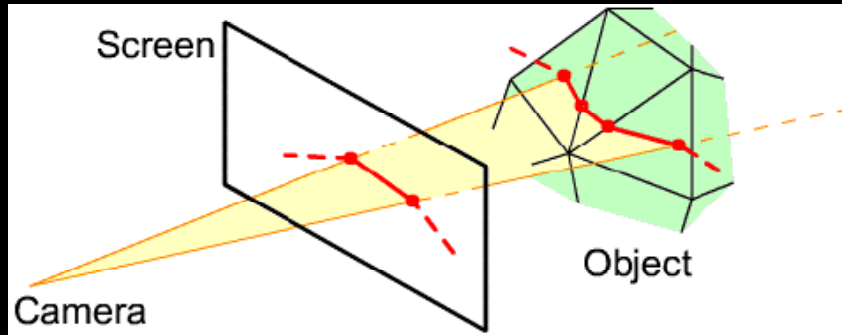


# Creating An Object (cont.)

## ■ Target shape

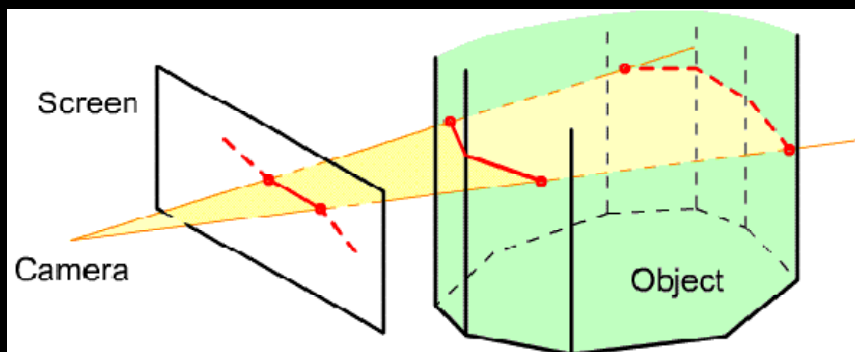
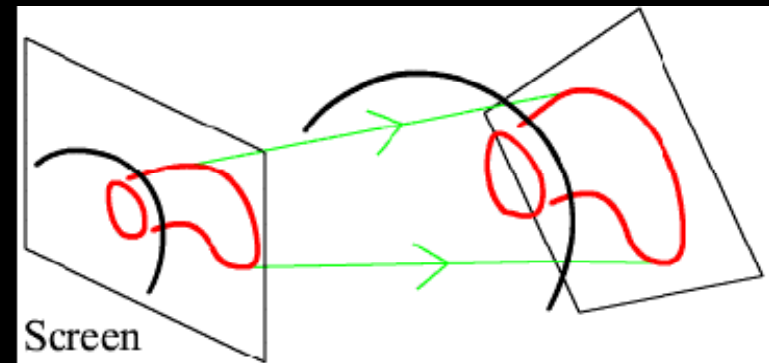


# Operations



Painting a line

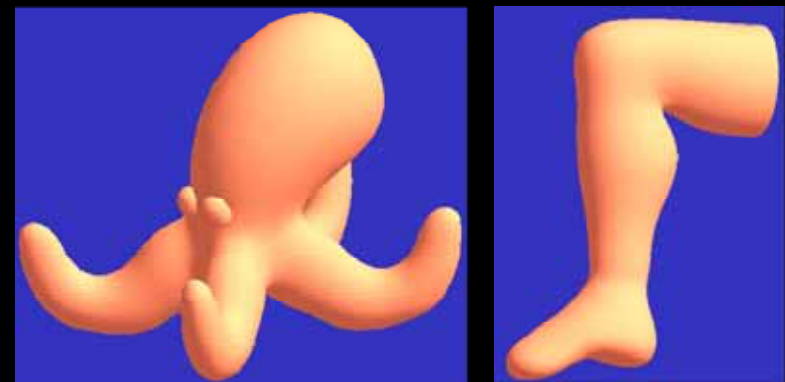
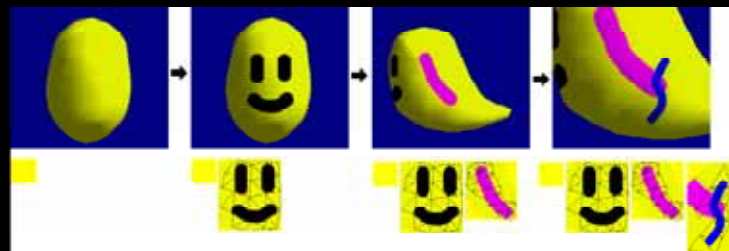
Extrusion



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

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