2D sketch to 3D transform

Group project- Computer Graphics

Contributors:

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Introduction

Teddy is an application used to which converts a user defined 2D figure to a 3D model. We have tried to mimic its working by applying our current knowledge of computer graphics in mesh formations.

Milestones

01. *IMPLEMENTATION OF CANVAS*

02. *DELAUNAY TRIANGULATION*

03. *FINDING SPINE*

04. *ELEVATING THE SPINE*

05. *COMPLETING THE OBJECT*

Implementation of Canvas

- The canvas was based on the Bezier Curves assignment

- User inputs points on the screen and the code further works on it

- After the mid-evaluation we changed the code so that it could incorporate points directly on a 3d canvas
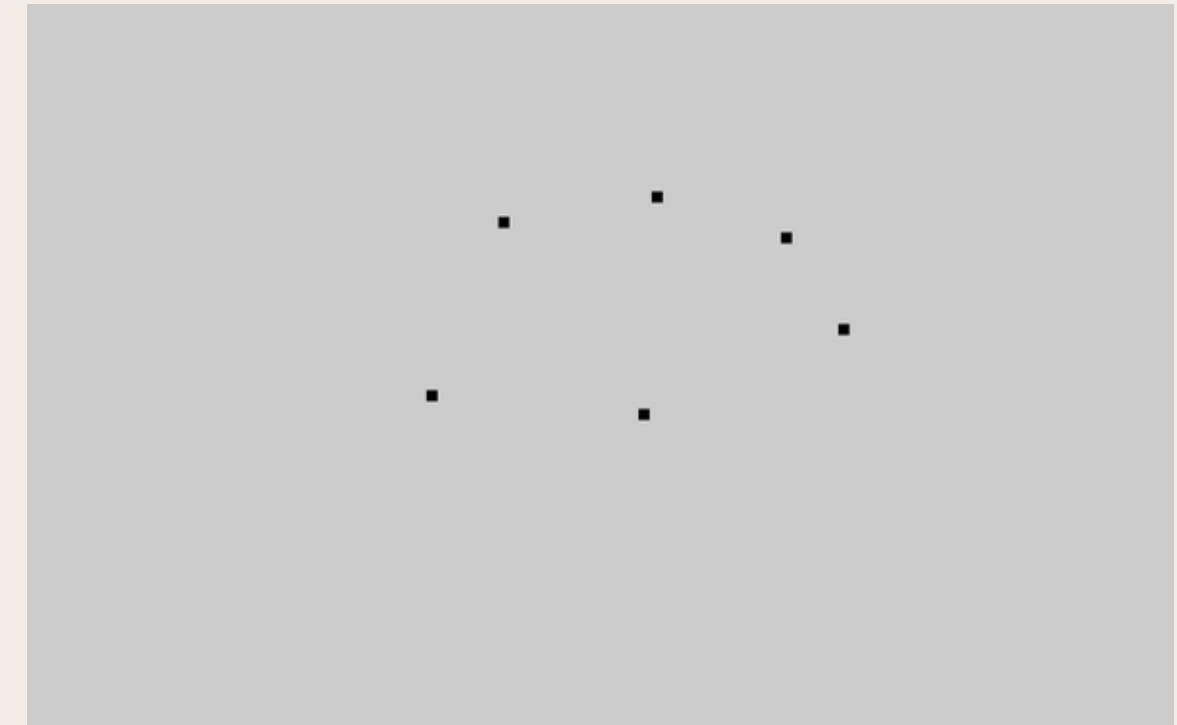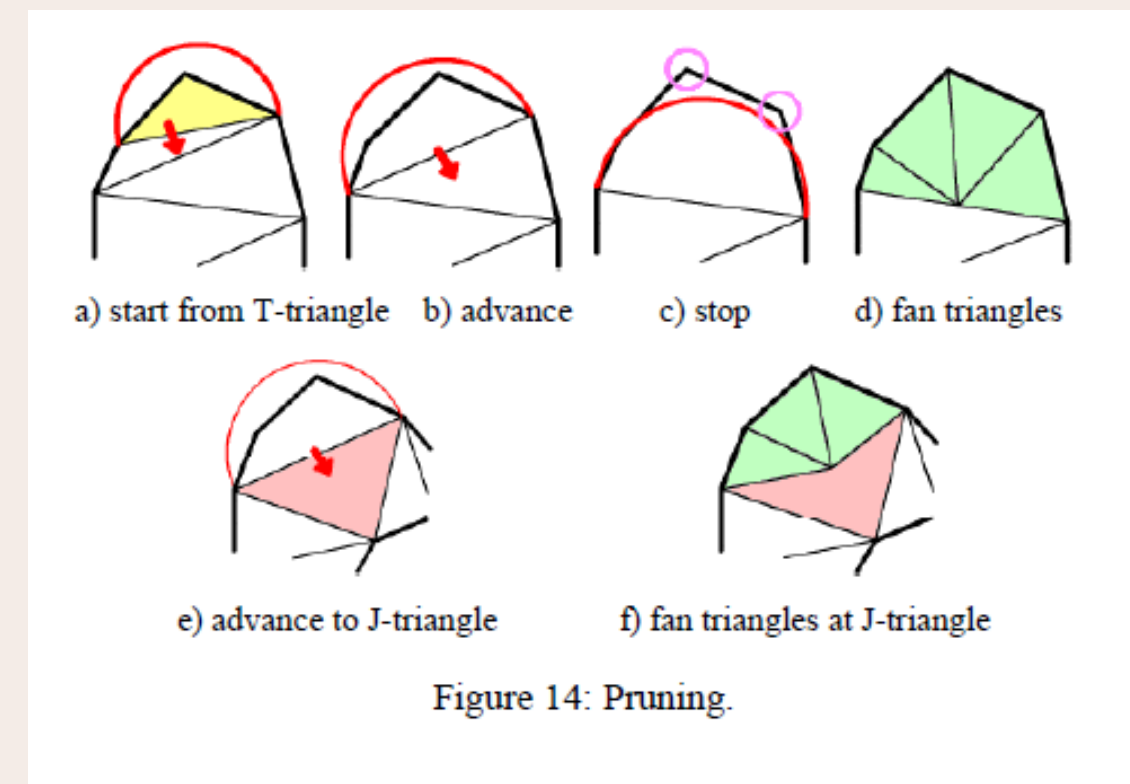
Delaunay Triangulation

- Delaunay triangulation algorithm gives non-overlapping triangles formed by the given set of points

- It creates the base of the object on which we further find spines and elevate
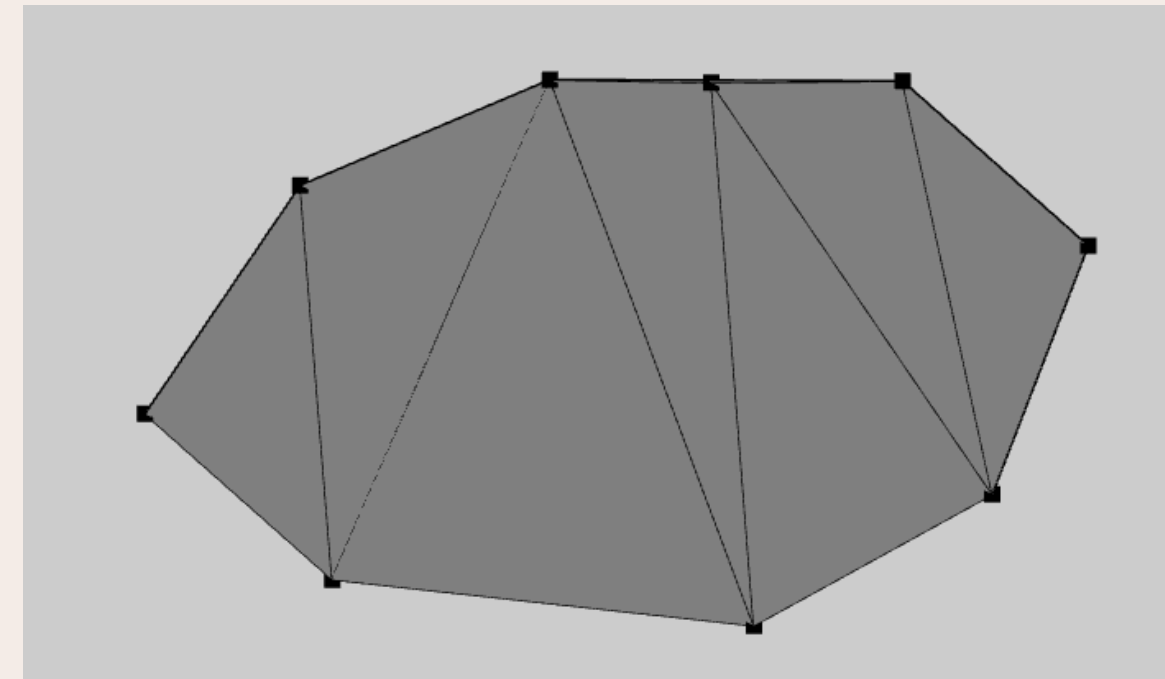
Pruning

- Pruning is used to remove insignificant branches in the given 2D mesh.

- The resulting fan triangles help in the inflation of the elevated spine points and the boundary points of the object.

a) start from T-triangle   b) advance   c) stop   d) fan triangles

e) advance to J-triangle   f) fan triangles at J-triangle

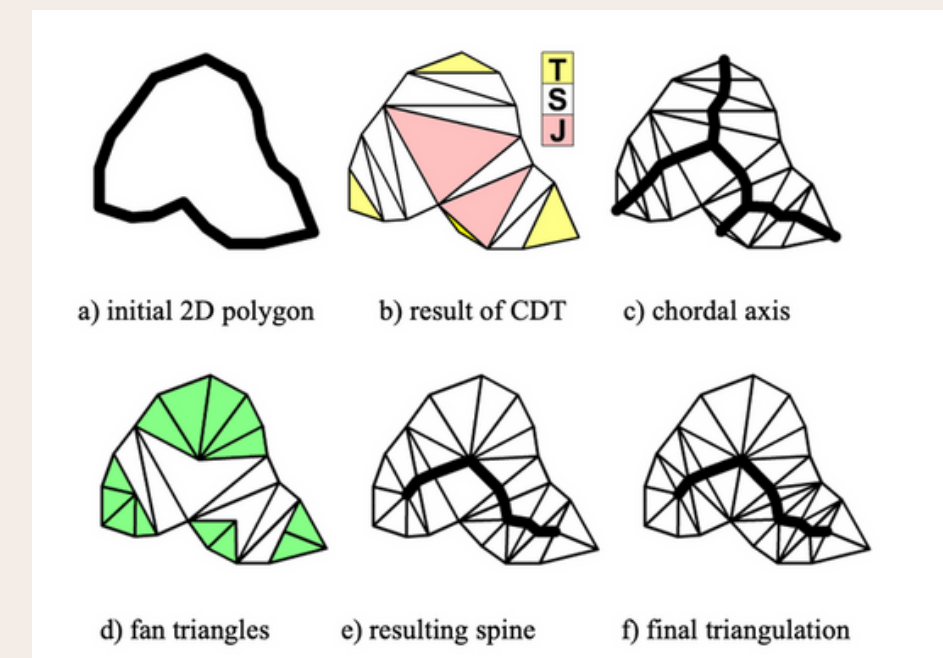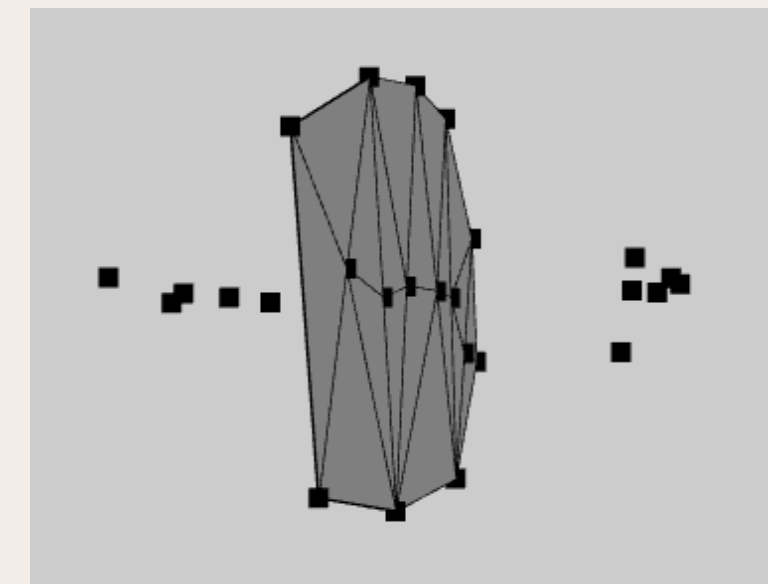Figure 14: Pruning.

Finding spine

- The spine is the basic skeleton of the figure

- Formed by connecting the midpoints of the internal edges together

- Spinal points can be pushed up and down the z axis to make it 3d
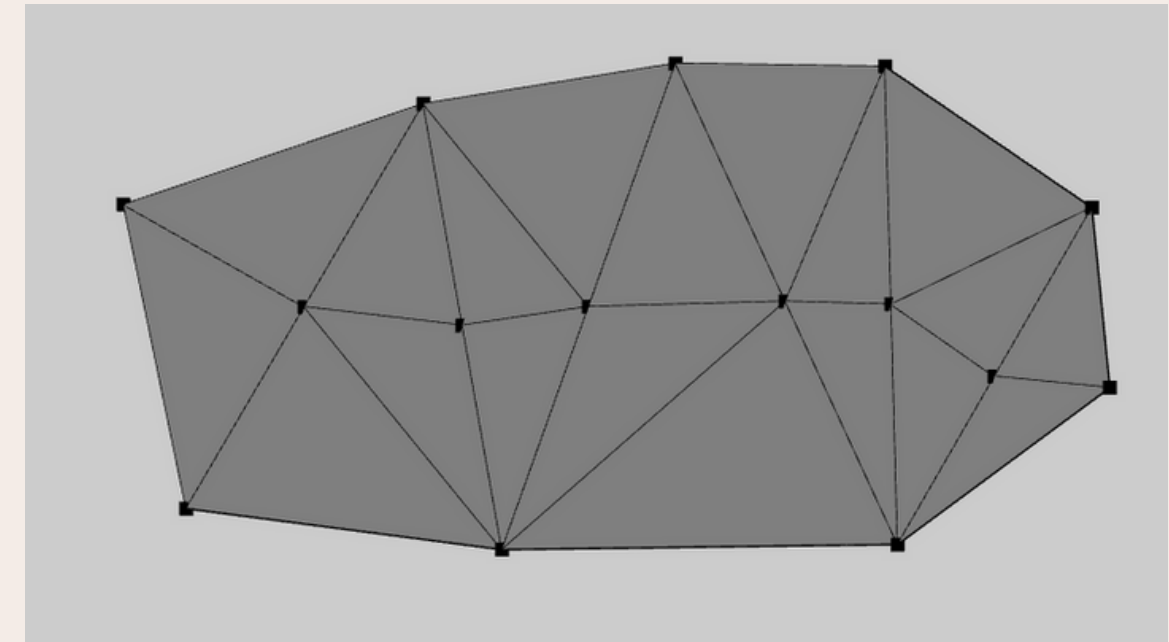
Elevating the spine

- The spine is the basic skeleton of the figure

- Formed by connecting the midpoints of the internal edges together

- Spinal points can be pushed up and down the z axis to make it 3d

a) initial 2D polygon   b) result of CDT   c) chordal axis

d) fan triangles   e) resulting spine   f) final triangulation

Completing the object

- We made a circle which has the internal edge as the diameter

- We sew these points using the triangulation

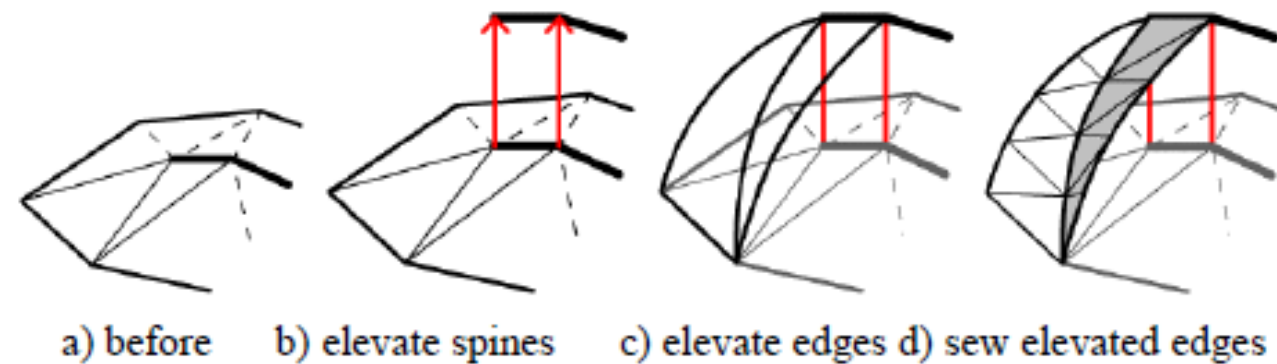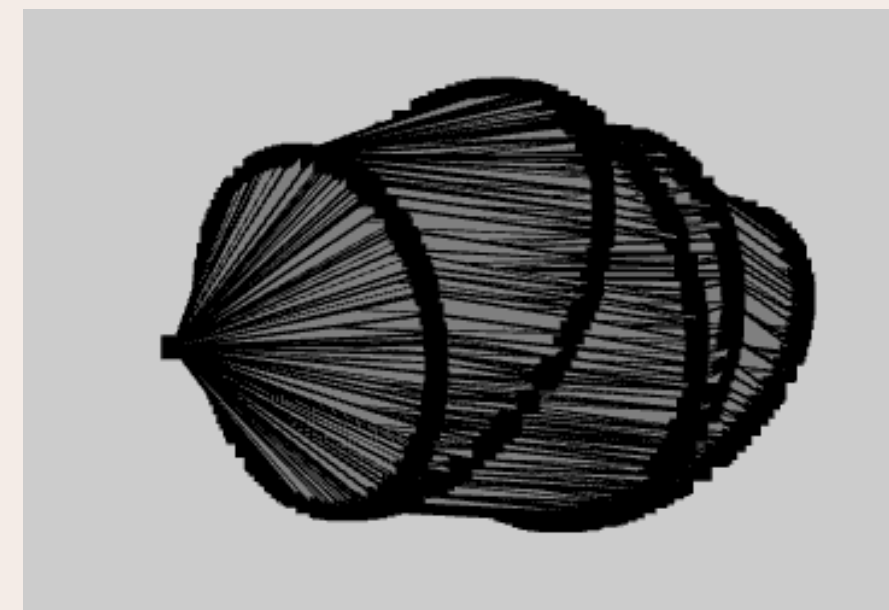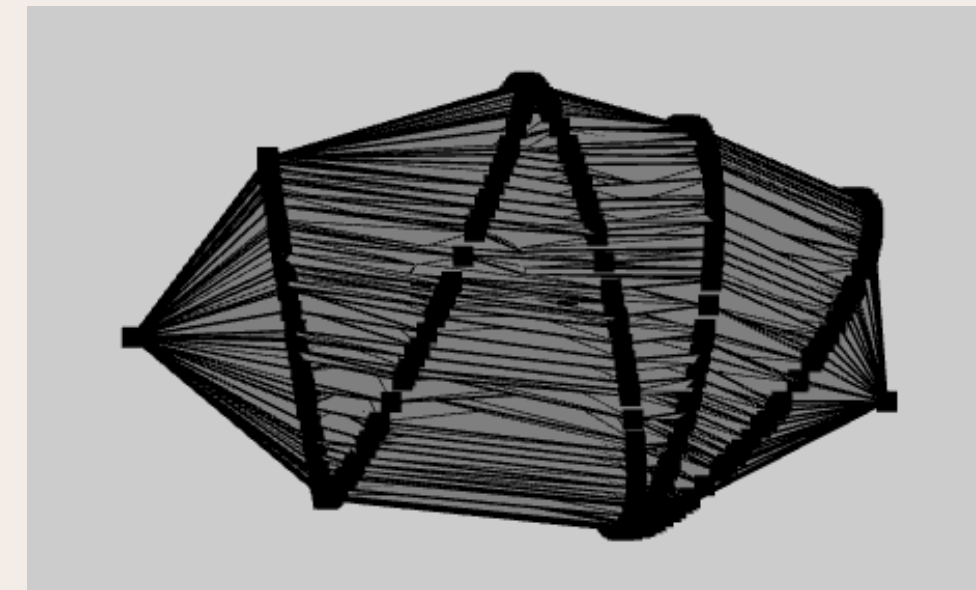a) before   b) elevate spines   c) elevate edges d) sew elevated edges

Figure 15: Polygonal mesh construction.

Thank You

https://www.overleaf.com/project/653233078a6ca9fff2 274d90