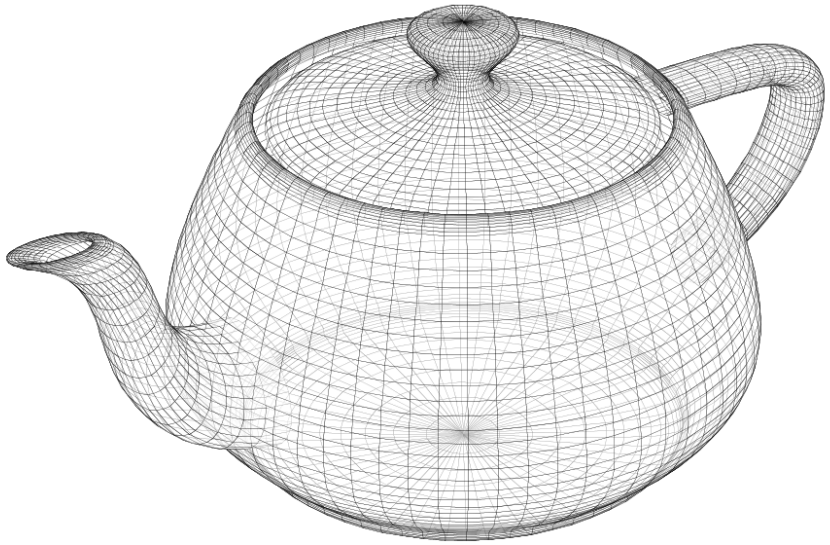
Geometric Data in WebGL



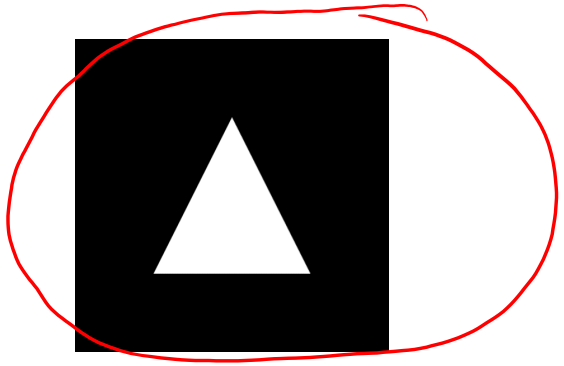
CS 418: Interactive Computer Graphics

Professor Eric Shaffer

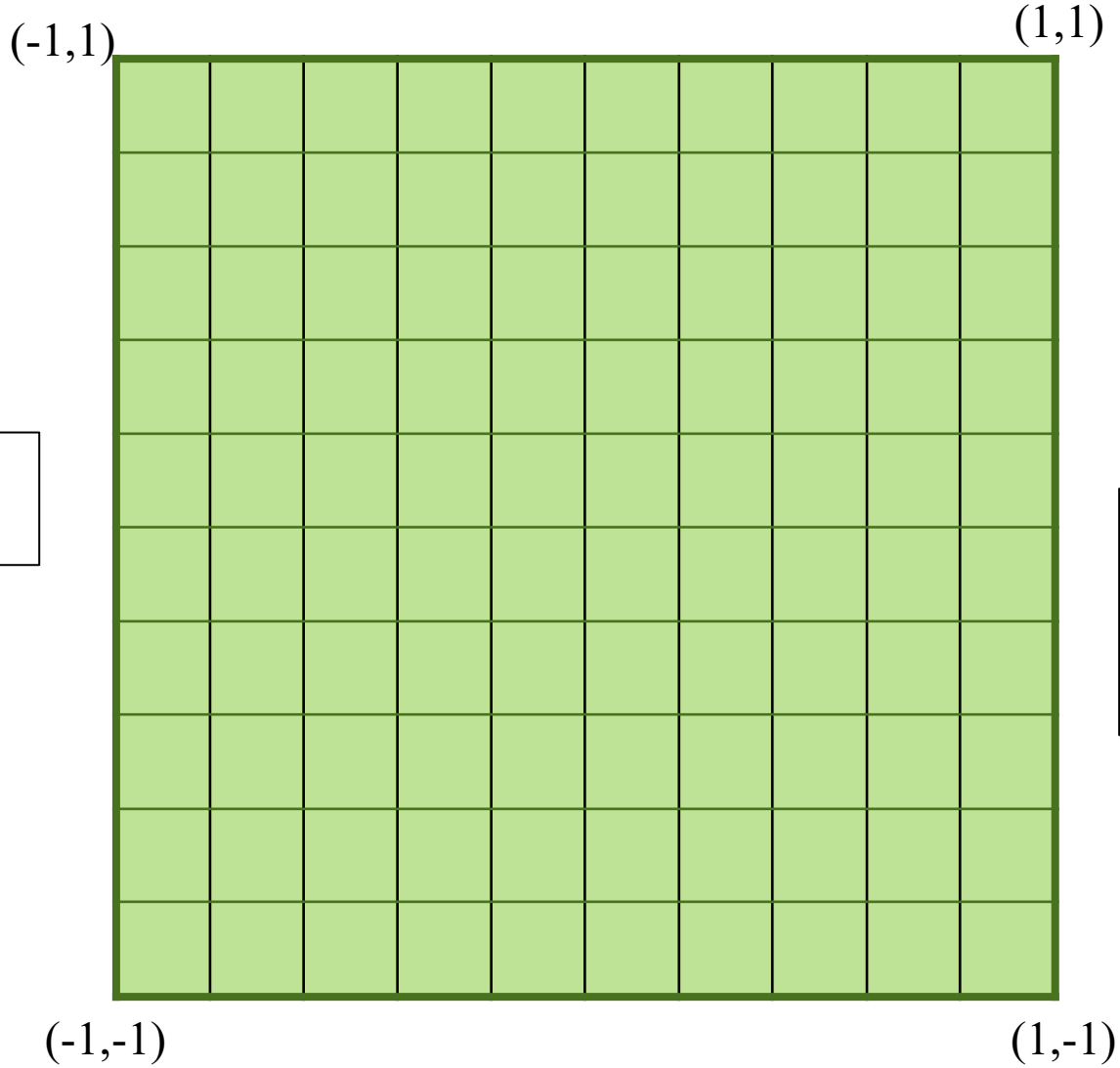
Slides courtesy of Professor John Hart

ILLINOIS

Clip Coordinates



The WebGL view volume goes from [-1,-1,-1] to [1,1,1]



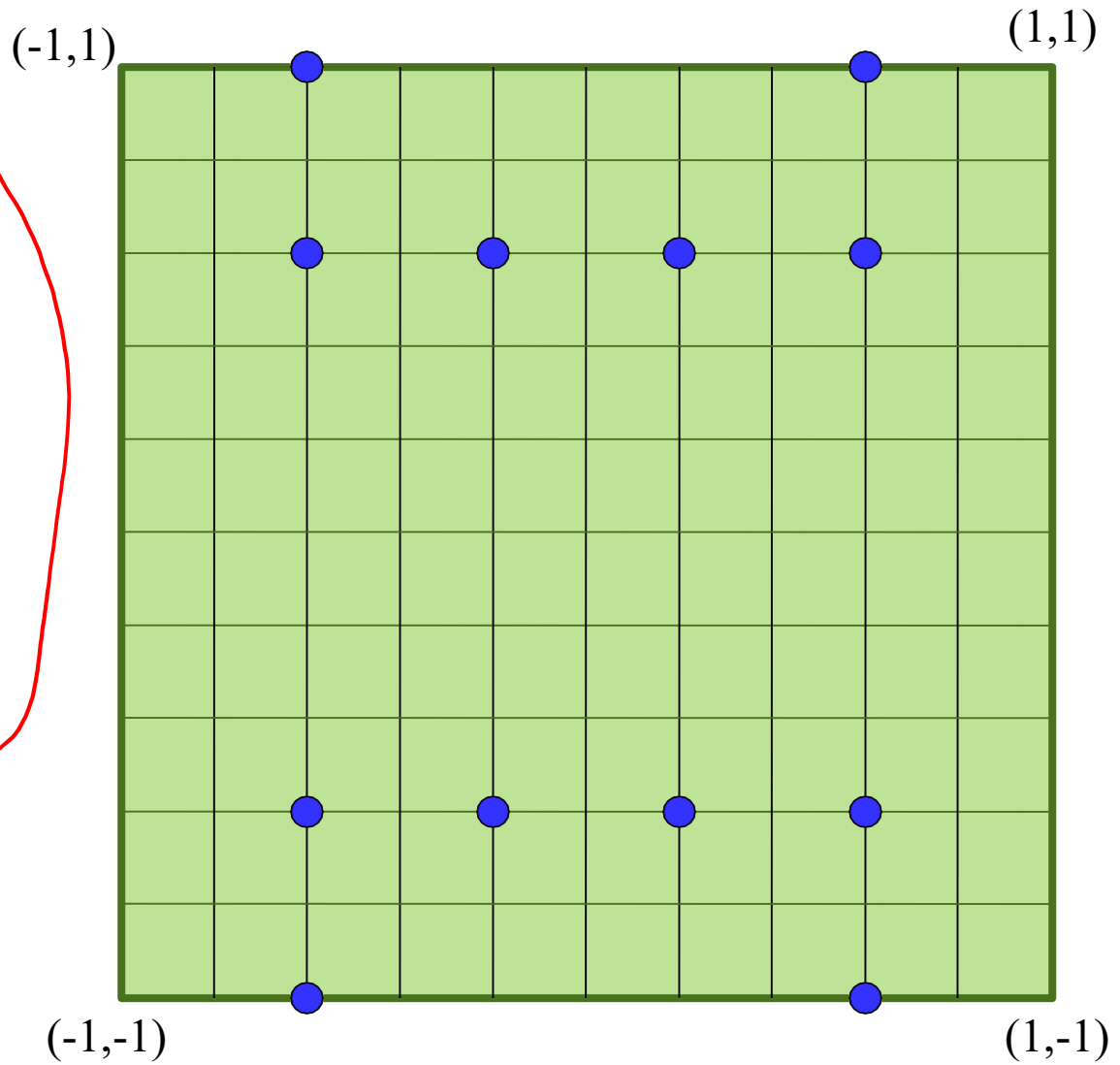
The default view is an orthographic projection essentially dropping the z coordinate

ILLINOIS

Points

```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];
```

```
gl.drawArrays(
  gl.POINTS,…)
```

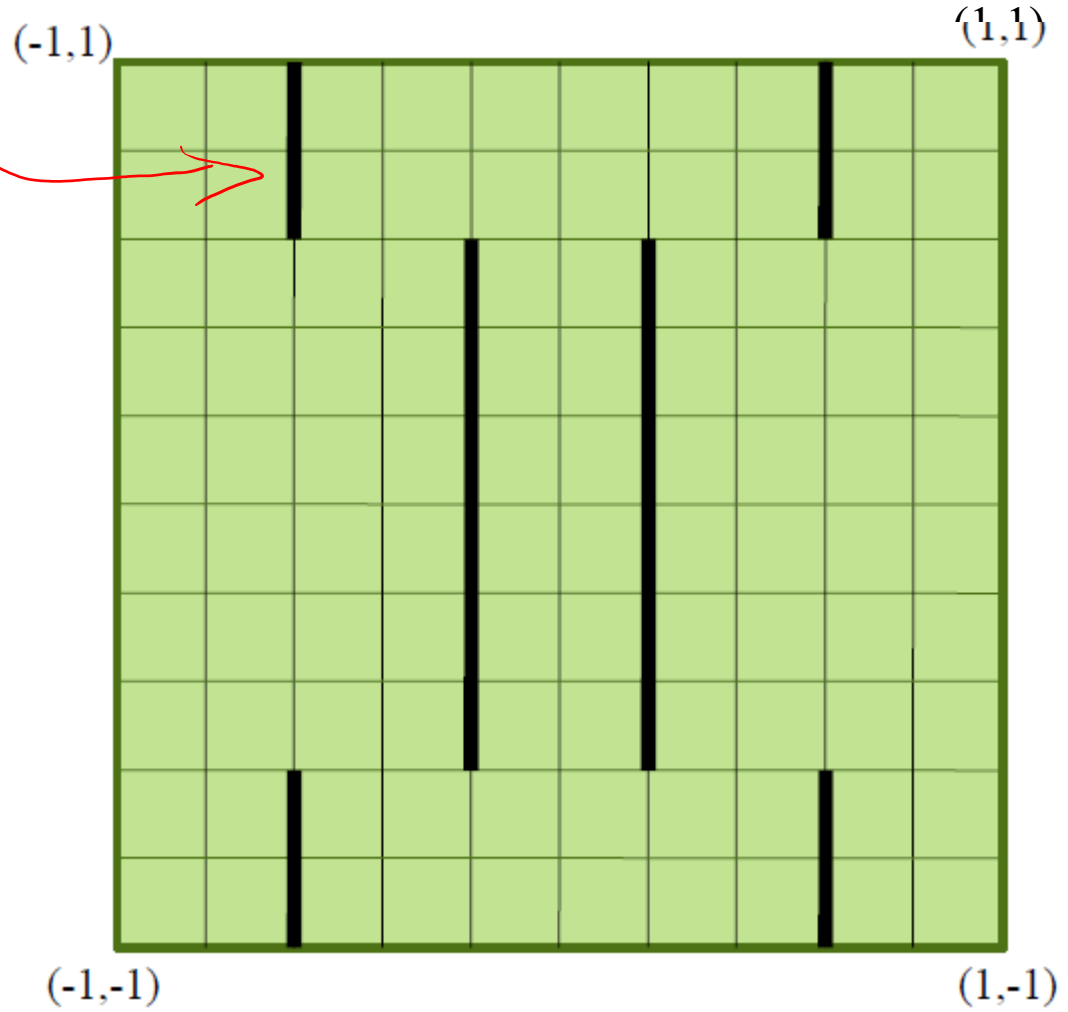


ILLINOIS

Lines

```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];
```

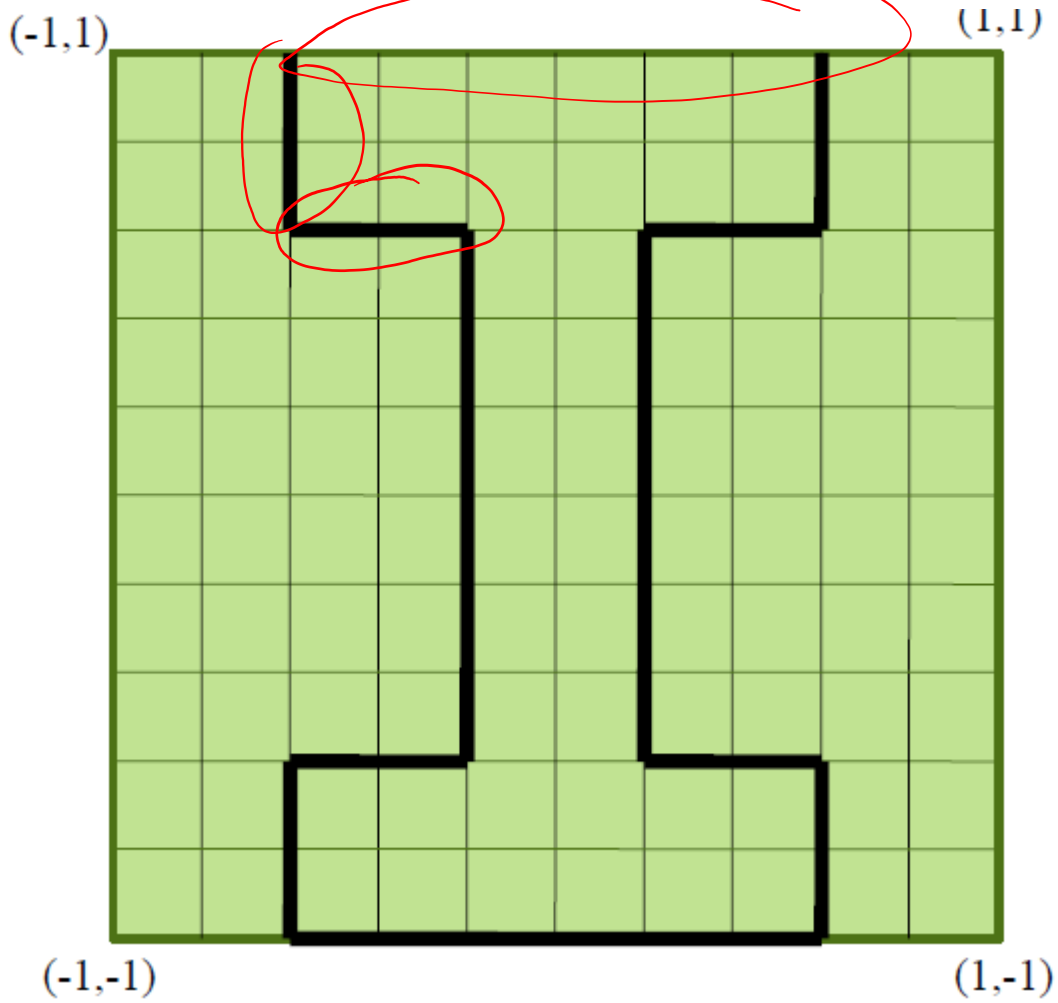
```
gl.drawArrays(
  gl.LINES,…)
```



Line Strip

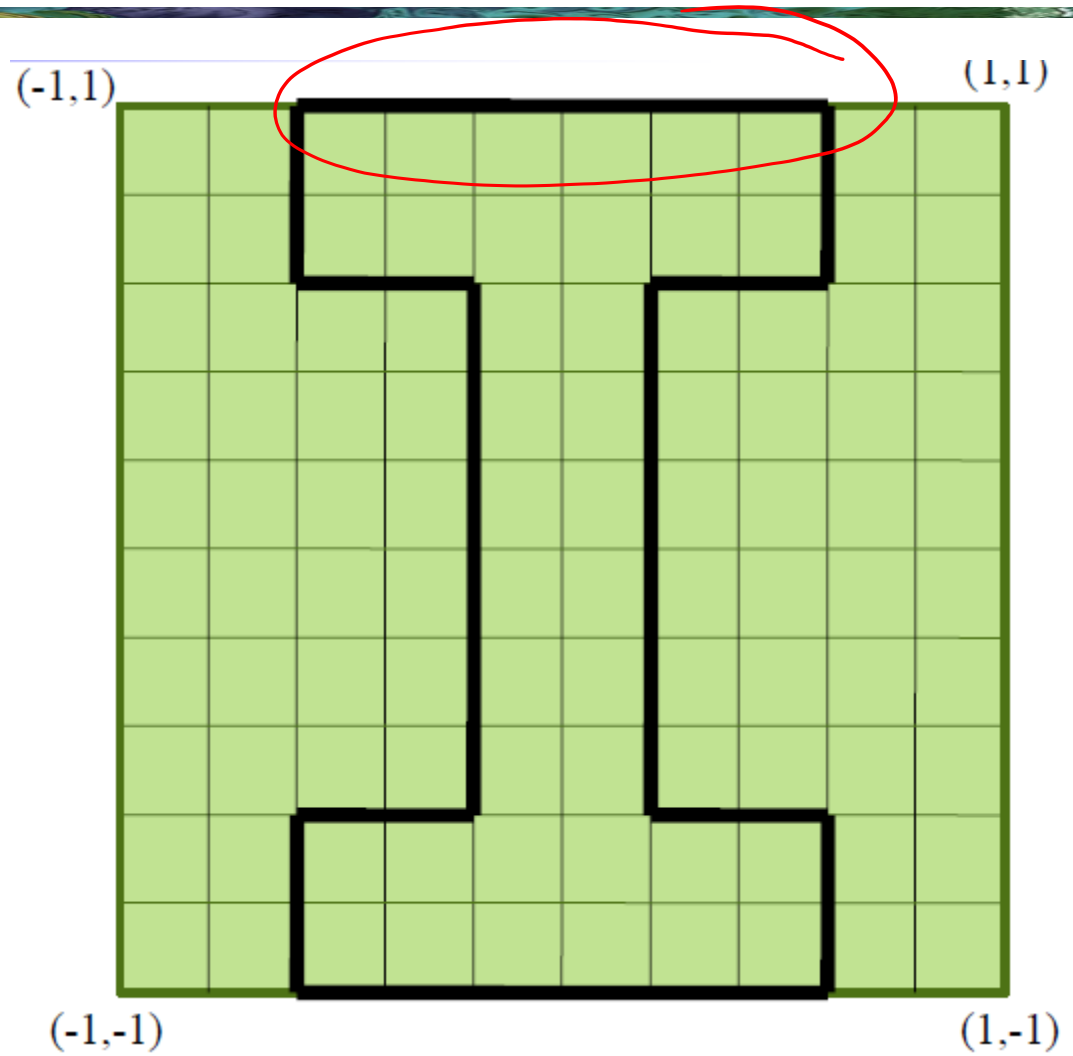
```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];
```

```
gl.drawArrays(
  gl.LINE_STRIP,…)
```



Line Loop

```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];
```

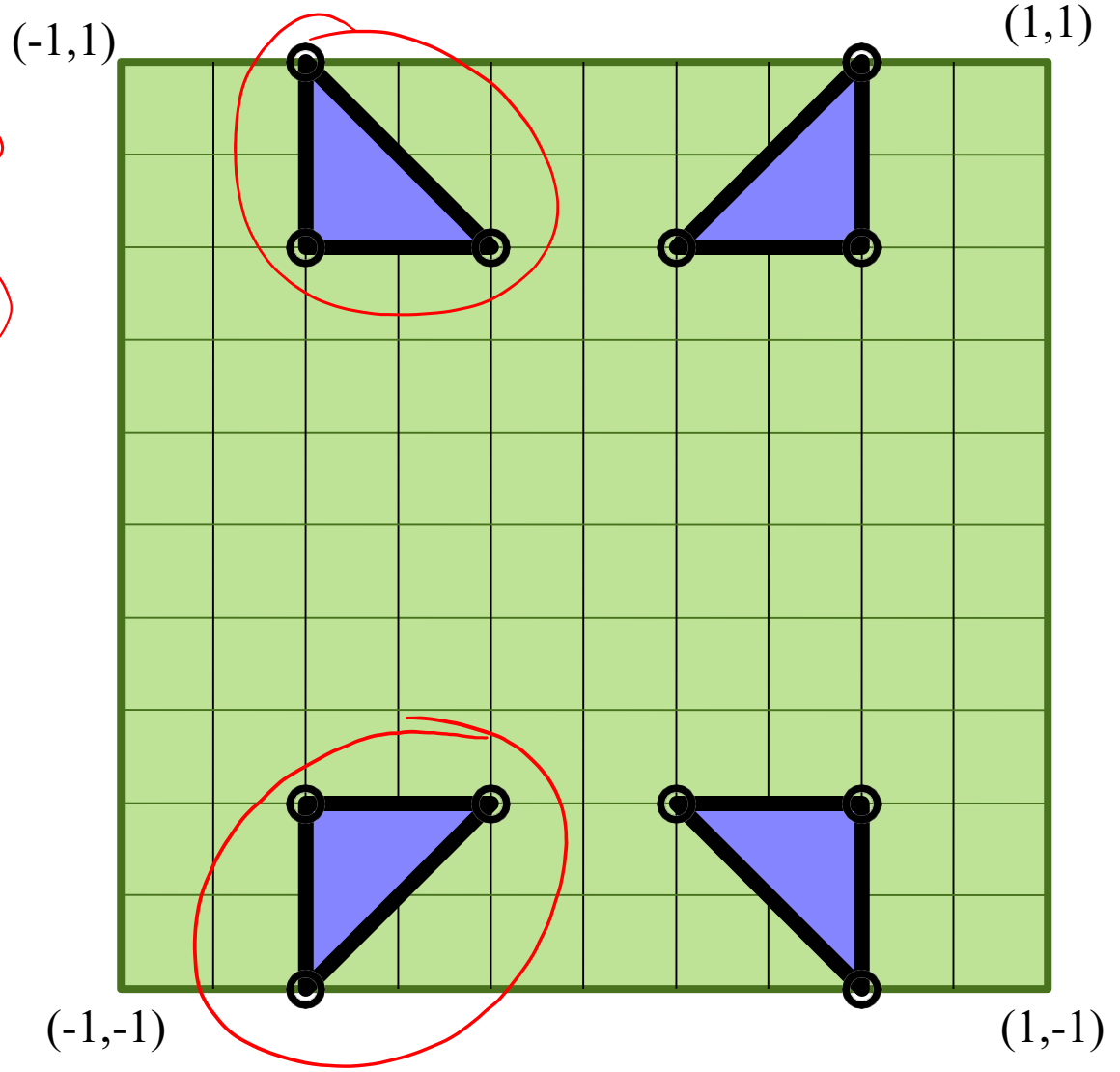



```
gl.drawArrays(
  gl.LINE_LOOP,…)
```

Triangles

```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];
```

```
gl.drawArrays(
  gl.TRIANGLES,…)
```

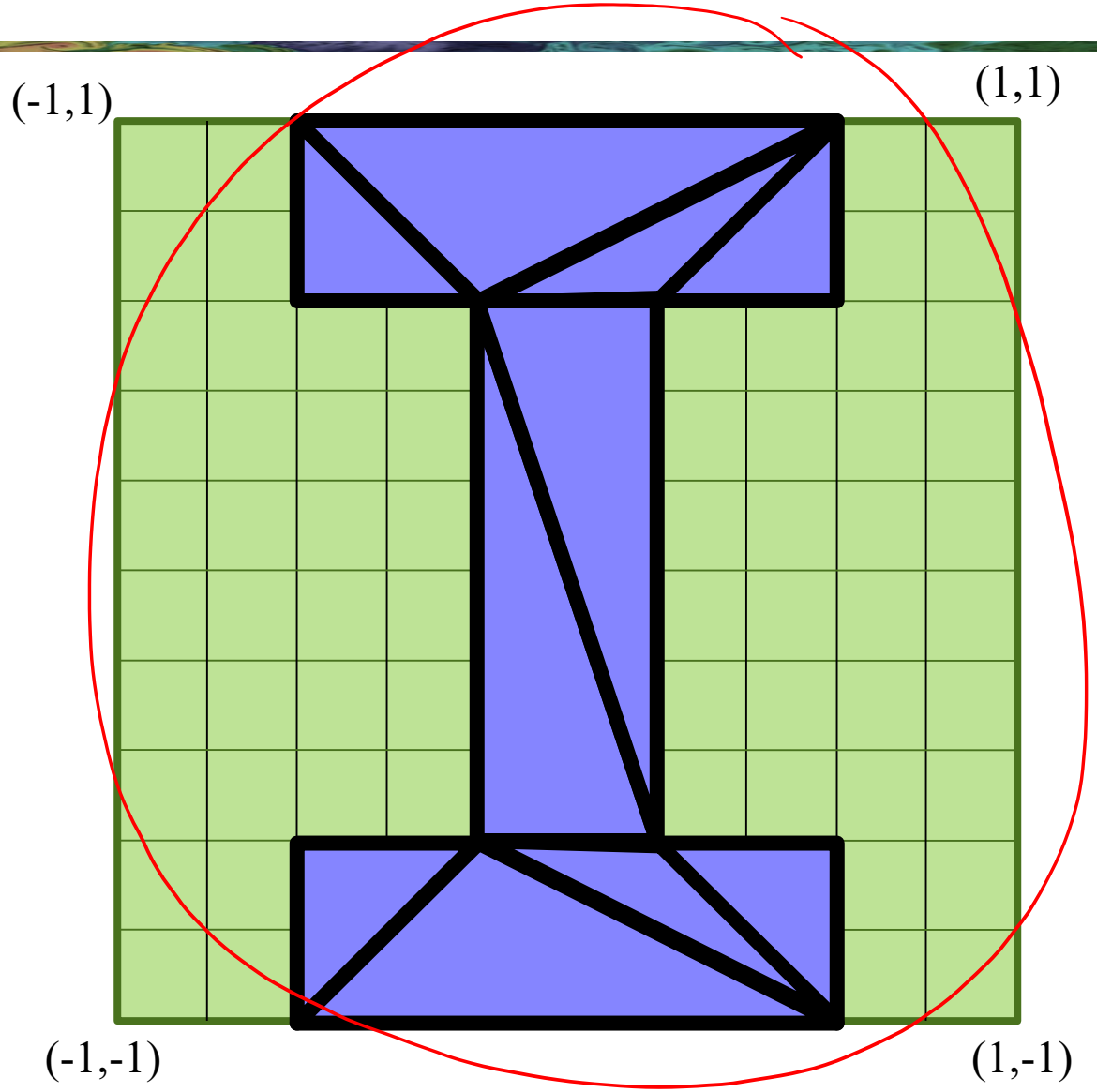


ILLINOIS

Triangles

```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0,
        …];
```

```
gl.drawArrays(
  gl.TRIANGLES,…)
```



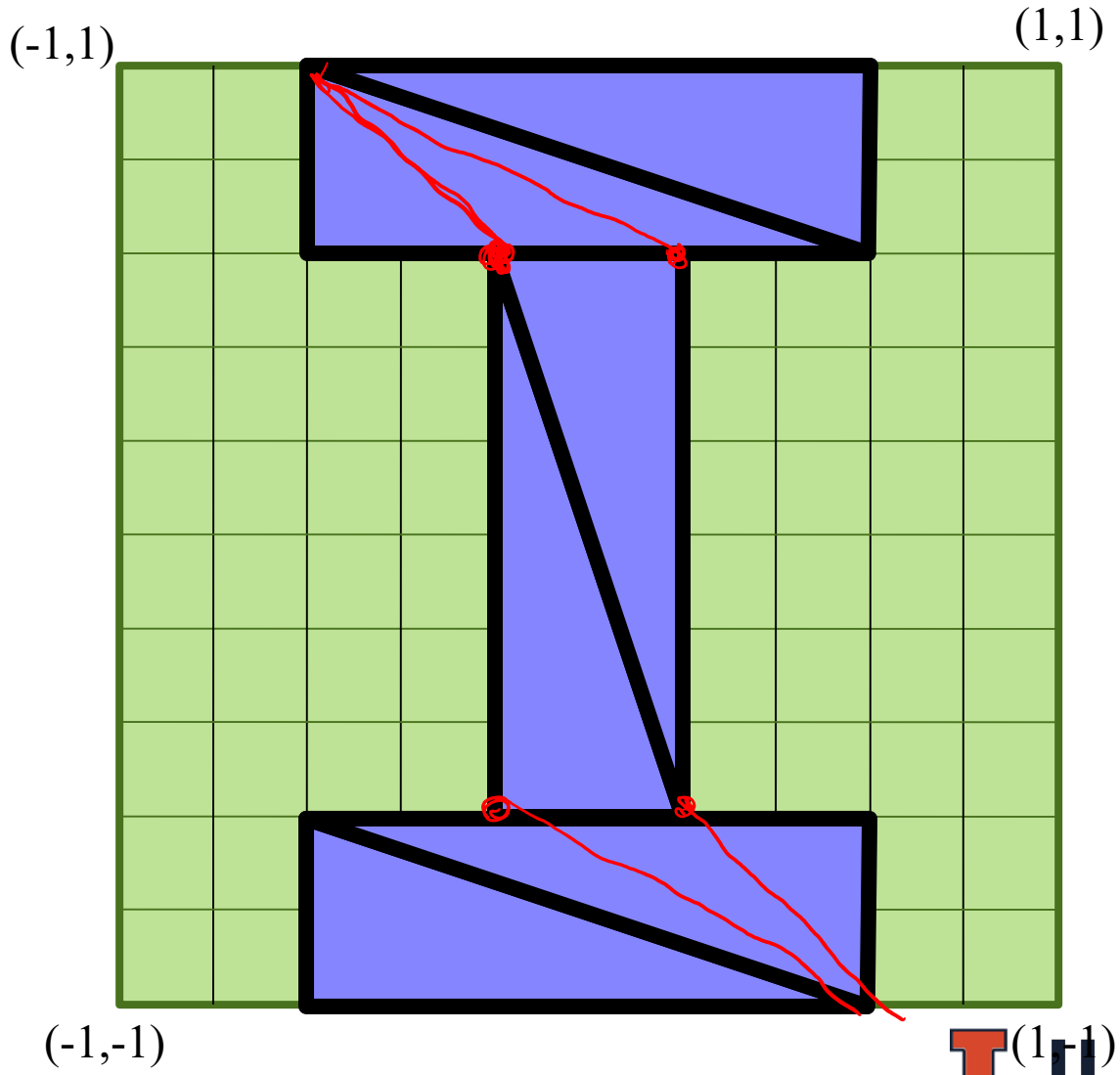
ILLINOIS

No T Vertices!

Triangle edges should

NEVER

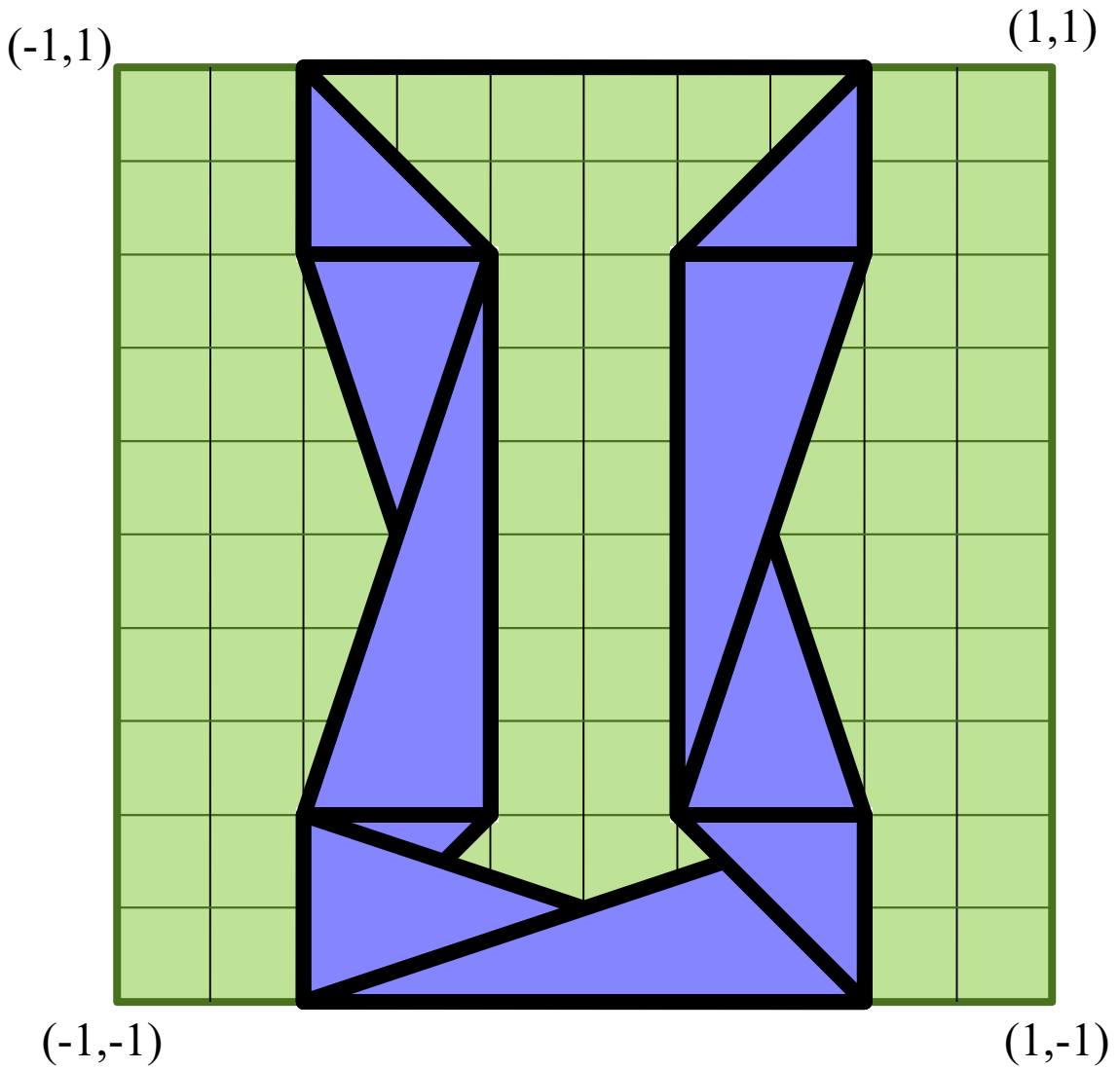
pass through a neighboring vertex



ILLINOIS

Triangle Strip

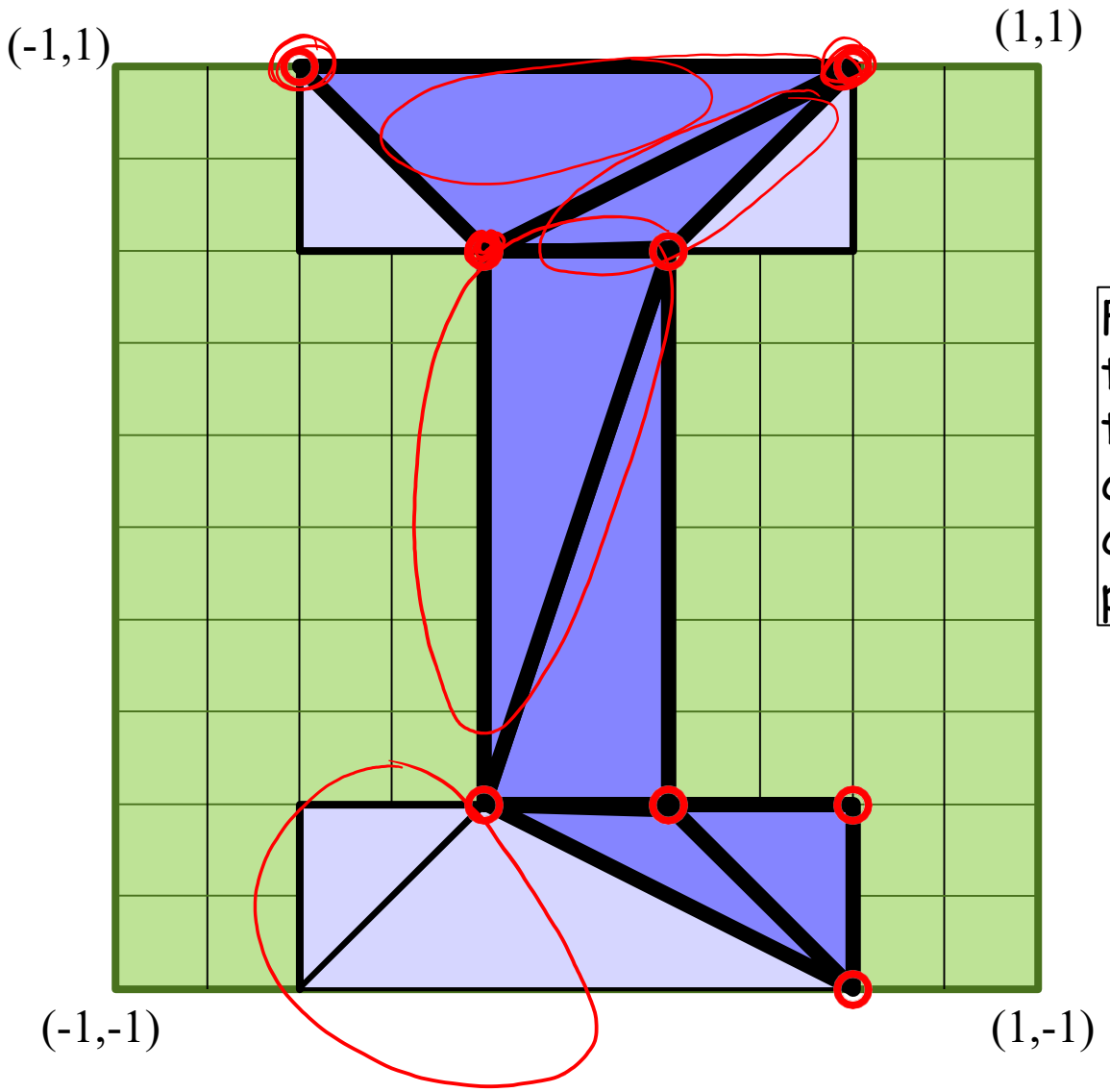
```
[-0.6,  1.0, 0.0,
 -0.6,  0.6, 0.0,
 -0.2,  0.6, 0.0,
 -0.2, -0.6, 0.0,
 -0.6, -0.6, 0.0,
 -0.6, -1.0, 0.0,
  0.6, -1.0, 0.0,
  0.6, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.2, -0.6, 0.0,
  0.6,  0.6, 0.0,
  0.6,  1.0, 0.0];

gl.drawArrays(
  gl.TRIANGLE_STRIP,…)
```



Triangle Strip

```
[-0.6,  1.0,
  0.6,  1.0,
 -0.2,  0.6,
  0.2,  0.6,
 -0.2, -0.6,
  0.2, -0.6,
  0.6, -1.0,
  0.6, -0.6];
[…];
```

```
gl.drawArrays(
  gl.TRIANGLE_STRIP,…)
```

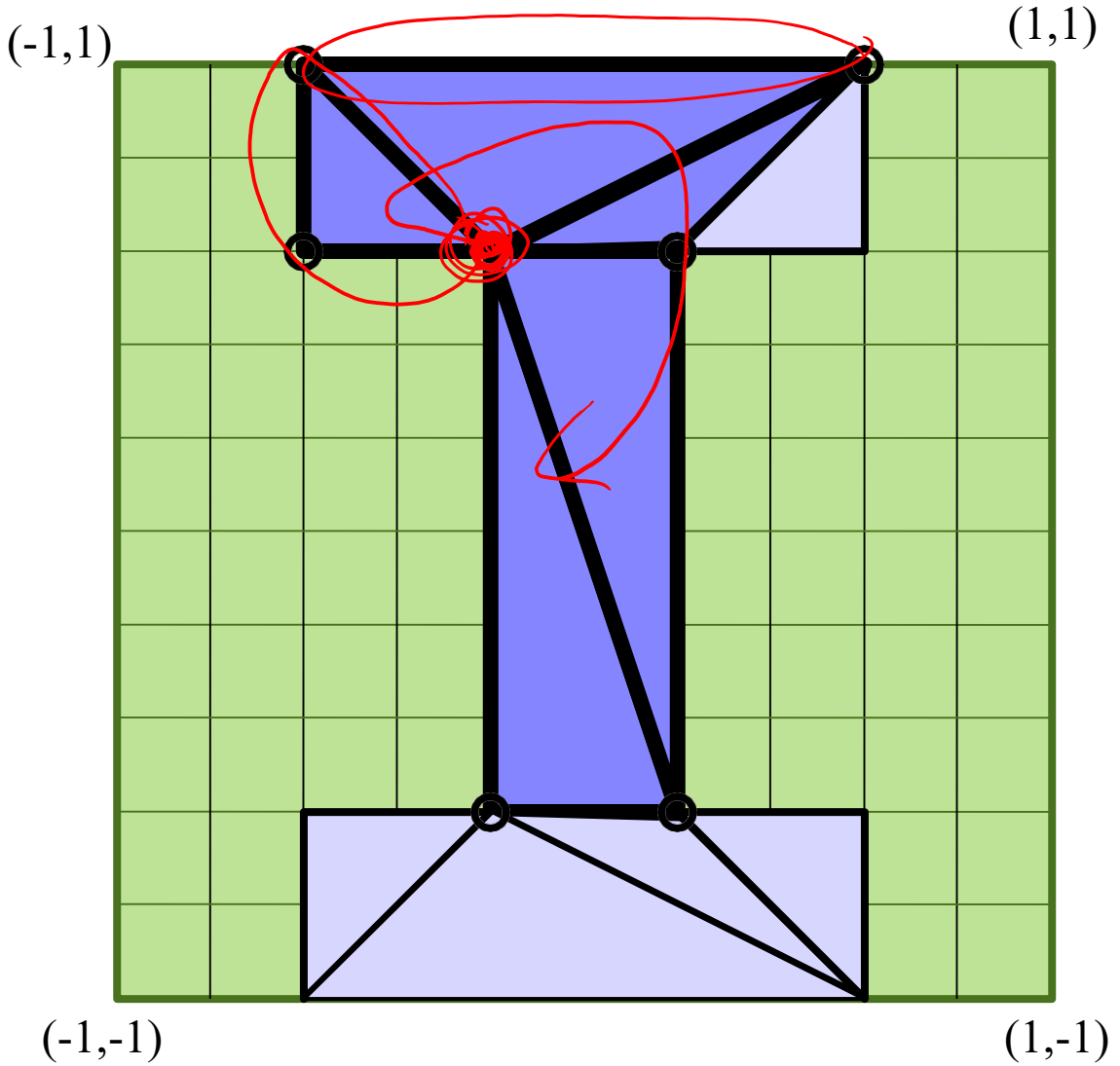


First two vertices prime the pump,
then every new vertex creates a triangle connecting it to the previous two vertices

Triangle Fan

```
[-0.2,  0.6,
 -0.6,  0.6,
 -0.6,  1.0,
  0.6,  1.0,
  0.2,  0.6,
  0.2, -0.6,
 -0.2, -0.6];
[…]; […]; […];
```

```
gl.drawArrays(
  gl.TRIANGLE_FAN,…)
```



First two vertices prime the pump,
then every new vertex creates a triangle connecting it to the previous vertex and the first vertex