CS3451-Fall 2014, P03 REPORT

The title: CS3451 Fall 2014, Project 3 SPIRAL ANIMATION

Show an animation from the green rectangle spiraling to the red rectangle. Both rectangles can be rotated, scaled and moved.

The rotation of the rectangles is calculated by finding the angle of the vector of the centroid and the mouse, and the vector of the centroid and the point.

The scaling is done by the calculating the distance between the mouse and the centroid.

The movement is also done by calculating the position of the mouse.

The animation is done using the following formula found in 05NA.pdf 4.11:

$\alpha = A_0B_0$^ A_1B_1 is the angle between vector A_0B_0 and A_1B_1

m is the distance ratio $d(A_1,B_1) / d(A_0,B_0)$

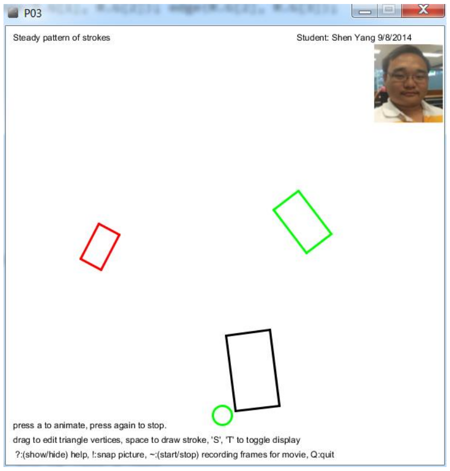
the **fixed point F** may be computed as the solution of a linear system:

set $c=\cos(\alpha)$ and $s=\sin(\alpha)$, $I=<c,s>$, $J=I^\circ$, and $L=\{I,J\}$

Then, solve $L(FA_0)=FA_1$.

```
c = cos(α); s = sin(α);
D = sq(c*m-1)+sq(s*m);
x = c*m*x0 – x1 - s*m*y0;
y = c*m*y0 – y1 + s*m*x0;
F.x = (x*(c*m-1) + y*s*m) / D;
F.y = (y*(c*m-1) - x*s*m) / D;
```

```
vec V1 = V(A0, B0);
vec V2 = V(A1, B1);
float m = n(V1)/n(V2);
float alpha = angle(V1, V2);
float c = cos(alpha);
float s = sin(alpha);
float D = sq(c*m-1)+sq(s*m);
float x = c*m*P.G[i].x-Q.G[i].x-s*m*P.G[i].y;
float y = c*m*P.G[i].y-Q.G[i].y+s*m*P.G[i].x;
pt F = new pt(((x*(c*m-1)+y*s*m)/D), (y*(c*m-1)-x*s*m)/D);
float mt = (float)(Math.pow(m, time));
vec w = W(mt,(V(F, initial[i])));
pt p = new pt(w.x, w.y);
pt rotated = p.rotate(time*alpha, p);
pt Fadd = F.add(rotated);
P.G[i] = new pt(Fadd.x, Fadd.y);
time+=1/300000f;
```



Steady pattern of strokes

Student: Shen Yang 9/8/2014

press a to animate, press again to stop.

drag to edit triangle vertices, space to draw stroke, 'S', 'T' to toggle display

?:(show/hide) help, !:snap picture, ~:(start/stop) recording frames for movie, Q:quit

Figure 1 Animation in motion