Ans. to Tut 5

Qn 1

Flight simulator or virtual Reality walkthrough

In both applications, there is no story board. The actual scenarios are generated by the player in real time.

Qn 2

In one second, $\frac{24}{6} = 4$ key frames are needed. For a two hour film,
$(4)(60)(60)(2)+1 = 28801$ key frames are needed.

For a monitor,

$(\frac{60}{6})(60)(60)(2)+1 = 72001$ key frames are required.

Qn 3

a) vertex 1 $\frac{(-40,40)+(-30,35)}{2} = (-35,37.5)$

vertex 2 $\frac{(40,-40)+(-10,-20)}{2} = (15,-30)$

vertex 3 $(x_3, y_3)_k = \frac{(-40,40)+(40,-40)}{2} = (0,0)$

Thus the vertex position in the mid way frame is

$\frac{(0,0)+(50,20)}{2} = (25,10)$

b) In-between frame 1

vertex 1 $(x_1, y_1)_k + \frac{1}{3}[(x_1, y_1)_{k+1} - (x_1, y_1)_k] = (-40,40) + \frac{1}{3}(10,-5) = (-36\frac{2}{3}, 38\frac{1}{3})$

vertex 2 $(23\frac{1}{3}, -33\frac{1}{3})$

vertex 3 $(\frac{50}{3}, \frac{20}{3})$

In-between frame 2

vertex 1 $(x_1, y_1)_k + \frac{2}{3}\left[(x_1, y_1)_{k+1} - (x_1, y_1)_k\right] = (-40,40) + \frac{2}{3}(10,-5) = (-33\frac{1}{3}, 36\frac{2}{3})$

vertex 2 $(6\frac{2}{3}, -26\frac{2}{3})$

vertex 3 $(33\frac{1}{3}, 13\frac{1}{3})$

Qn 4

$\Delta t = 1$

$tB_j = t_1 + \Delta t[1 - \cos(\frac{j\pi}{2(n+1)})] \qquad j = 1,\ldots,n$

$t_1 = 0 \qquad n = 5$

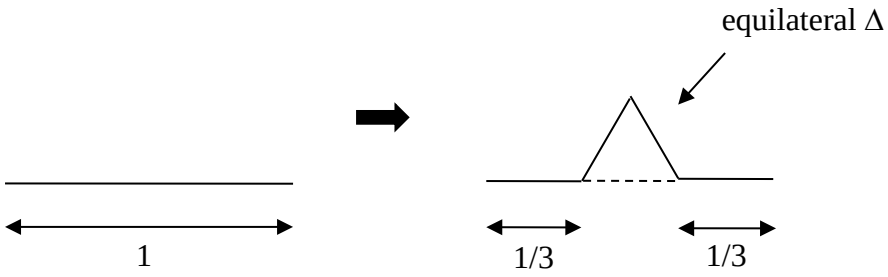
$tB_j = 1 - \cos(\frac{j\pi}{12}) \qquad j = 1,\ldots,5$

The vertex position (x, y) at in between frame j for vertex i is

$(x, y) = (x_i, y_i)_k + tB_j\left[(x_i, y_i)_{k+1} - (x_i, y_i)_k\right] \qquad i = 1,2,3$

Qn 5

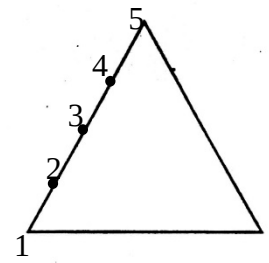
a)



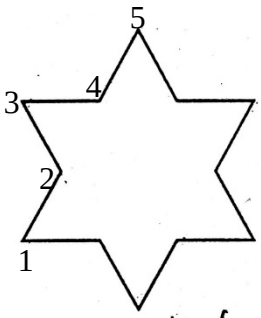
b) The method considers the shape as a poly-line, i.e. a sequence of lines. In the closed figure, the first point coincides with the last point. Therefore for the triangle, there are 4 points. Hence

$V_{\max} = 13 \quad V_{\min} = 4 \quad N_{ls} = 0 \quad N_p = 4$

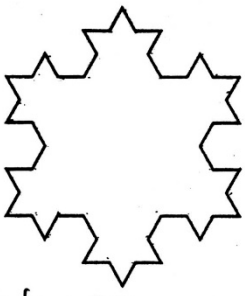
c) Insert 3 vertices, equally spaced, to each line segment, as illustrated.



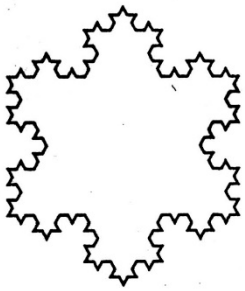
keyframe 1 (a)



(b) keyframe 2



keyframe 3 (c)



(d)