Spring 2017
CAP 4730 Computer Graphics
Homework #2 Due March 29th 11:59pm

Parametric Curves and Subdivision Surfaces

a. Give three reasons why cubic polynomials are preferred to higher order polynomials for generating piecewise polynomial curves.

b. Describe two differences between *Bezier* and *BSpline* curves.

c. Given the polynomial $p(u) = a_0 + a_1 u + a_2 u^2 = \mathbf{u}^T \mathbf{a} = \begin{bmatrix} 1 & u & u^2 \end{bmatrix} \begin{bmatrix} a_0 & a_1 & a_2 \end{bmatrix}^T$ and control points $p = \begin{bmatrix} p_0 & p_1 & p_2 \end{bmatrix}^T$

   i. Derive a matrix $\mathbf{M}$ such that the coefficients $\mathbf{a} = \mathbf{M}^{-1}\mathbf{p}$ make $p(u)$ interpolate all control points where $u \in [0,1]$.

   ii. Describe a subdivision algorithm for rendering this curve.