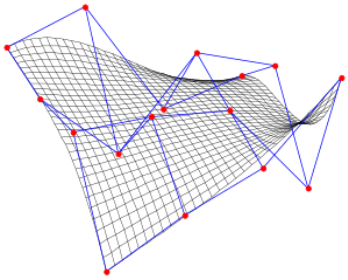
Assignment 3:

In this assignment, you are asked to use **de Casteljau algorithm** to draw a Bézier patch as a network (see figure below).



Given .txt file will provide you with the control points of a Bézier patch **p**(u,v). There will be listed m+1 rows and n+1 columns of control points in the format as follows.

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##(as m+1 ctrl pnt # in u-direction) ##(as n+1 ctrl pnt # in v-direction)

x-of-$P_{0,0}$ y-of-$P_{0,0}$ z-of-$P_{0,0}$ … … x-of-$P_{0,n}$ y-of-$P_{0,n}$ z-of-$P_{0,n}$

x-of-$P_{1,0}$ y-of-$P_{1,0}$ z-of-$P_{1,0}$ … … x-of-$P_{1,n}$ y-of-$P_{1,n}$ z-of-$P_{1,n}$

:

:

x-of-$P_{m,0}$ y-of-$P_{m,0}$ z-of-$P_{m,0}$ … … x-of-$P_{m,n}$ y-of-$P_{m,n}$ z-of-$P_{m,n}$

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(**Hint:** A parametric surface patch can be considered as a union of (infinite number) of curves. There are many ways to form these unions of curves; the simplest one may be the so-called isoparametric curves. Given a parametric surface f(u,v), if u is fixed to a value, say 0.1, and let v vary, this generates a curve on the surface whose u coordinate is a constant. This is the isoparametric curve in the v direction with u = 0.1. Similarly, fixing v to a value and letting u vary, we obtain an isoparametric curve whose v direction is a constant. Therefore, let u be fixed at 0, 0.1, 0.1, ..., 0.9 and 1, we shall have 11 isoparametric curves f(0,v), f(0.1,v), f(0.2,v), ..., f(0.9,v) and f(1,v). These curves sweep out the surface if we let u change from 0 to 1 continuously. Similarly, the isoparametric curves generated by varying v cover the surface. You need to display these iso-paramteric curves as the network of the patch.)

You are allowed to use C++, MATLAB, C, Python and so on to finish your assignment.