

## Assignment 5

### 1. Implement the recursive deCasteljau algorithm

Base case: If we only have one point left, we have found the point on the Bezier curve at  $t$ , we return that point

Recursive algorithm: With multiple control points we interpolate the new points between consecutive pairs  $i$  and  $i + 1$  using the parameter  $t$

We use the formula:  $\text{Vec2f } p1 = (1 - t) * \text{control\_points}[i] + t * \text{control\_points}[i + 1]$   
where  $p1$  is the interpolated point.

After adding all new points to a vector, we recursively call our algorithm on the new set of points until we reach the base case and find the point on the curve for parameter  $t$

### 2. Draw the Bezier Curve in red using the control points

For every point  $t$  we call our *deCasteljau algorithm* in the range 0 - 1  
We create a loop starting at  $t=0$  and increment each time by our step value: 0.001

Each loop we find the point on the curve using *deCasteljau* and then convert that point into screen space to get the pixel coordinates.

At the calculated pixel coordinate we give the RGB value (1, 0, 0) for red and draw the pixel to the image.

After all pixels have been calculated and drawn we have the complete Bezier curve.