Font Rasterization

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Breif history of fonts

Brief history of fonts

1 pixel = 8 bits

1 Letter = 32·32 Pixels

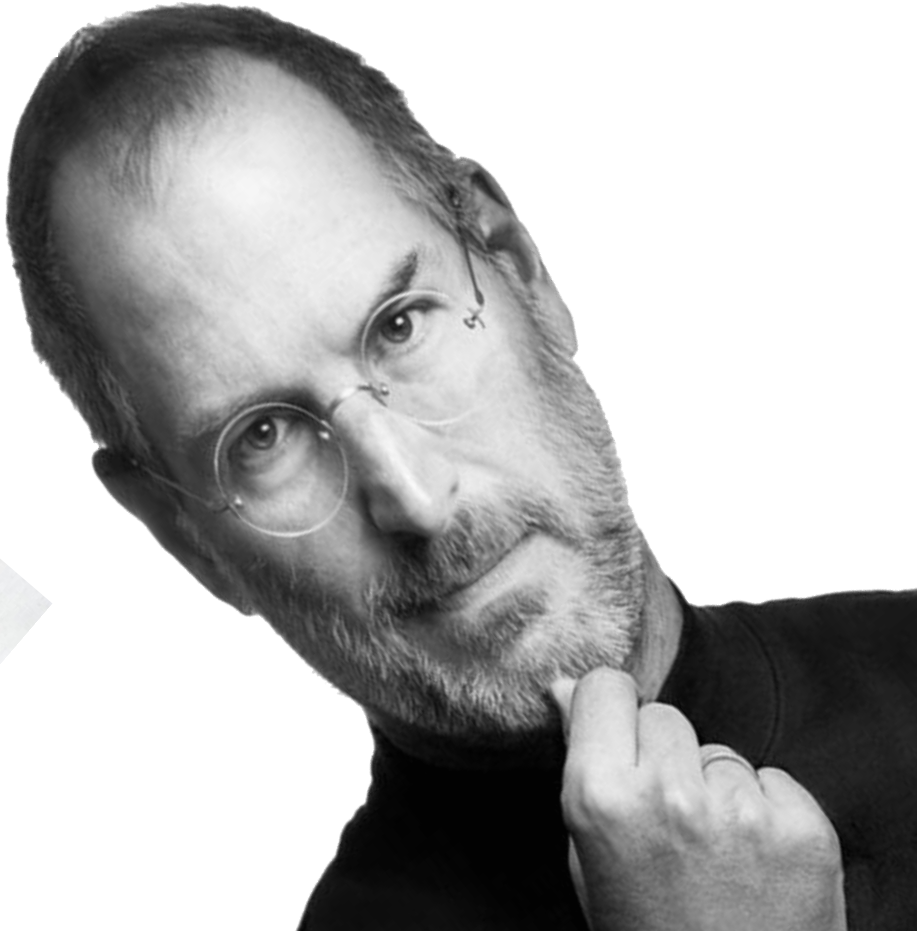
English Alphabet = 26 Letters · 2

=26 ·32 ·32 ·8 bits ≈ 425,000 bits

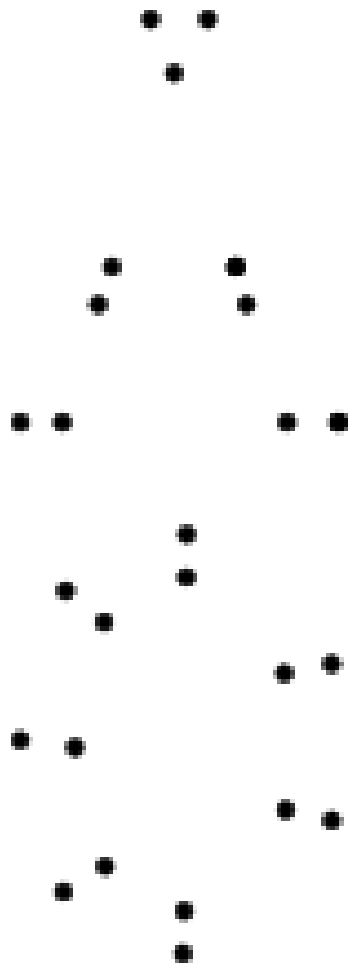
= 53 Kb

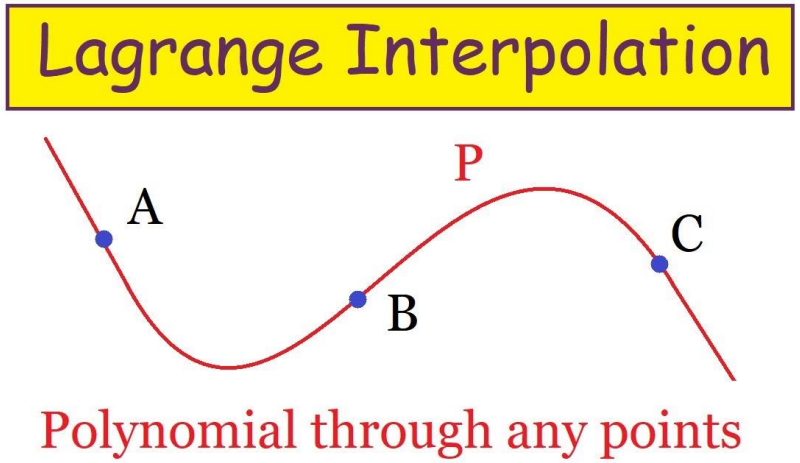
TrueType font format

1) Any curve can be represent using An equation
2) Letters are just a series of curves



Drawing Letters





Connecting Dots + Bezier Curves = Epic

What are Bezier Curves?

Linear Bézier curves

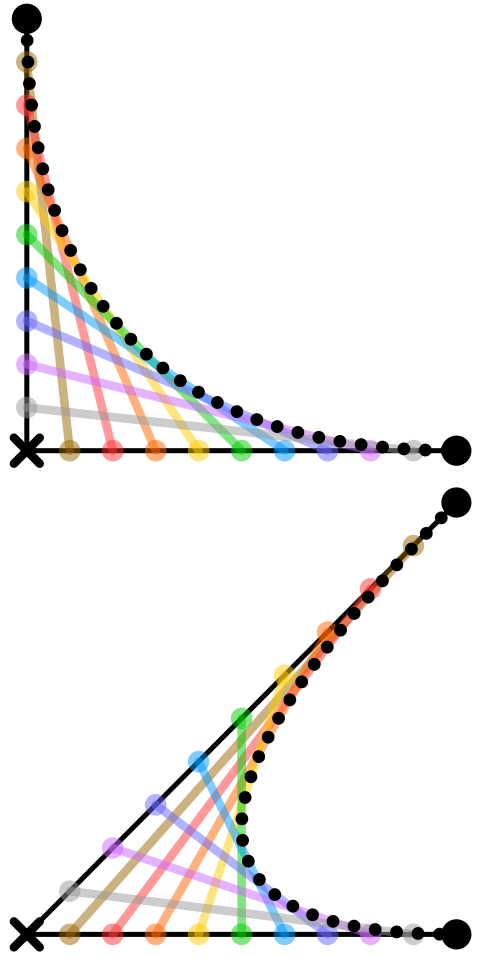
$$\mathbf{B}(t) = \mathbf{P}_0 + t(\mathbf{P}_1 - \mathbf{P}_0) = (1-t)\mathbf{P}_0 + t\mathbf{P}_1,\ 0 \le t \le 1$$

Quadratic Bézier curves

$$\mathbf{B}(t) = (1-t)^2\mathbf{P}_0 + 2(1-t)t\mathbf{P}_1 + t^2\mathbf{P}_2,\ 0 \le t \le 1.$$

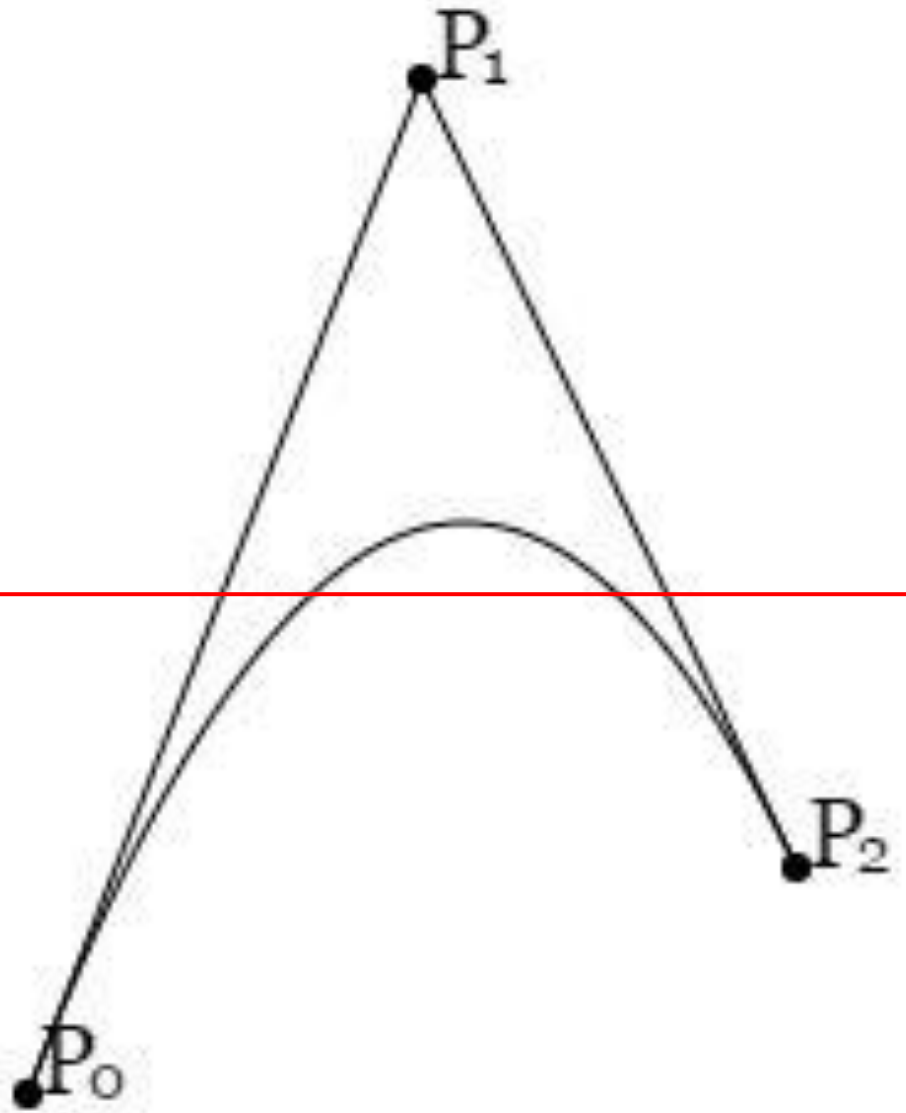
Cubic Bézier curves

$$\mathbf{B}(t) = (1-t)^3\mathbf{P}_0 + 3(1-t)^2t\mathbf{P}_1 + 3(1-t)t^2\mathbf{P}_2 + t^3\mathbf{P}_3,\ 0 \le t \le 1.$$



Filling in The Letter

Finding the roots



$$\mathbf{B}(t) = (1-t)^2\mathbf{P}_0 + 2(1-t)t\mathbf{P}_1 + t^2\mathbf{P}_2,\ 0 \le t \le 1.$$

Edge Cases

- Hitting a point
- Hitting a horizontal line
- Curve is on the line