Introduction
This demo is a simple implementation of creating any-degree B-spline curve in GPU via geometry instancing.

B-Spline
B-Spline is a special kind of piecewise polynomial defined by several control points and knots used to construct curve and surface. The degree of the polynomial is determined by the number of control points and knots. It is widely used in Computer-Aided Design due to its ease and accuracy of evaluation and its capacity to approximate complex shapes. B-Spline can be evaluated via De Boor’s algorithm.

Geometry Instancing
Using geometry instancing, thousands of line strips are created at the same position and each has a unique Instance ID. The vertices’ position is evaluated in the vertex shader according to the Instance ID and control points and knots sent to the GPU.

Example
The figure below shows one example of B-Spline curve with degree 3. It is defined by 5 control points (red color) and 9 knots.

Control points: (-6, 0), (-3, 3), (0, 0), (3, 3), (6, 0)
Knots: 0, 0, 0, 0, 1, 2, 2, 2, 2