

**CSE 333/533 - Monsoon 2024**  
**Assignment 01: Bezier curves**  
**Due date: 23:59, 9 Sep. 2024**

Piecewise Bezier curves provide good local control and  $C^1/G^1$  continuity at joins. In the given code, a sequence of left mouse clicks on the application canvas are used to draw a piecewise linear curve connecting the points. Left mouse click ends adding of points and thereafter left mouse clicks can be used to select and move the control points. Study the code to understand it.

You need to change the given program to draw **interpolating piecewise quadratic** Bezier curves. You should

1. Describe your strategy to create the interpolating piecewise **quadratic** Bezier curve and to enforce  $G^1$  (**Geometric!**) continuity at joins. What sort of user control can you provide to flexibly design such curves?  
[Correctness: 10 marks, strategy: 5 marks]
2. Implement drawing of interpolating piecewise quadratic Bezier curve from points taken progressively (i.e, even while the user is adding control points).  
[Functionality: 30 marks, Code quality and documentation: 5 marks]

A brief documentation is required. In this document you will be expected to explain your design choices, describe the algorithms and data structures that you have used, and attach screenshots of your program output.

**Deliverables** (as a single zipped file **Assignment01\_<studentID>.zip**) containing:

- C/C++ code (make sure to upload full code and do not include any intermediate object files, delete any other temporary files).
- 2~3 page PDF Report written with **Latex/MS Word**. Use the acmlarge option (single column) (see sample-acmlarge.tex if writing with Latex). Include screenshots within the report itself (and DO NOT attach separately).

**Total marks for this assignment: 50 marks**

**Bonus question(s):**

*(bonus marks to a maximum of 10 will be awarded for the following features. This part is completely optional)*

3. Allow the tangents at control points to be interactively modified by the user and updated on the screen.  
[Functionality: 8 marks, Code quality and documentation: 2 marks]

**Note:** *Your code should be written by you and be easy to read. You are NOT permitted to use any code that is not written by you. (Any code provided by the instructor/TA can be used with proper credits within your program)*