EXAM 1: Computer Graphics Animation and Visualization - CS577

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Your NAME:

Do all FIVE questions. If you have any questions, please raise your hand and I will get to you. If you need more space to write the answer then use the back of the page.
Question 1 (a): (10 points) (P-Curves) Explain P-Curve, how can they be used for animation.
Question 1 (b): (10 points) (Slow in-Slow out) Describe a method to simulate slow in-slow out effect for animation.
Question 2: (20 points) (Laser Scans, Scanned Data versus Desired Topology and Laplacian Filter) What are the main problems when laser based range data is used for facial animation. How are these problems handled?

How is the laplacian filter (pp. 82 is given with the test) helpful in interactively fitting the laser scan data to the desired topology. Explain your answer.
Figure 1: Marching Cube in 2D.

Question 3: (20 points) (Marching Cubes) Briefly explain the marching cube technique. What is the biggest advantage of this technique?

In the Figure 1, a surface $S$ is shown inside a 2D rectangle denoted by the minimum point $(a,b)$ and the maximum point $(c,d)$. Divide this rectangle into a 5X5 grid. Use the marching cube method in 2Dimensions, and generate the approximate surface which a 2D marching-cube algorithm would generate for $S$. Explain your answer.

Would a better surface be generated when the resolution is increased to 10X10? Explain your answer.
Question 4: (20 points) (Volume Rendering by Drebin, Carpenter, Hanrahan) Describe the volume rendering method. Explain the histogram method used for CT classification. Why is it useful? Also explain a method for finding normals from the given volume data.
Question 5: (20 points) (A deformable lattice of skin) Explain the concept of deformable lattice of skin as described in pp. 245-246 provided with this test. Discuss the suitability of this model in simulating the skin.