1. Let two line segments be represented by the following parametric equations:

\[ P(t) = (1 - t)P_0 + tP_1, \quad t \in [0, 1], \]
\[ Q(s) = (1 - s)Q_0 + sQ_1, \quad s \in [0, 1], \]

for points \( P_0, P_1, Q_0, Q_1 \).

a) Write out pseudo-code to detect if these line segments intersect, and if so, determine their intersection set. Make sure to specifically discuss any assumptions and to explicitly handle any special cases. Is your algorithm restricted to any particular dimension? (3pts)

b) What is the implication of using floating point arithmetic versus what a purely theoretical answer to 1a? You may wish to actually implement your algorithm and experiment to answer this question, but I DO NOT wish you to submit any such code. Merely answering this question fully will result in full credit. (2 pts)

2. Design and describe (pseudo-code is fine or any other fully expressive presentation) a method for the following: Given two non-co-planar polygons, test whether one is fully on one side of the other. A complete answer here would include a careful definition of the terminology “…fully on one side of the other.” (5 pts)

These questions were adapted from similar ones in the Angel textbook, 2nd Edition.

For either question, you are permitted to consult outside sources to complete your work, but you must fully cite any such external sources.

Due, Monday, 4/14/03, by noon, by hardcopy submission to my faculty mail box in UTEB 456. If you have any difficulty finding this, please consult with the departmental secretaries in the CSE office. Your submission should be word-processed of any convenient software of your choosing that allows for professional quality submission.