CS3451. Fall 08. Homework 2. Due Feb 6 in class. NAME: ___________________ Grade:______ / 10.

Individual test. Do not look at other students' work. Please type and write legibly. Bring to class. All 2D.

/2 1) Write the code for EE(pt A, pt B, pt P, pt Q) {…}, which returns *true* when edge(A,B) and edge(P,Q) intersect. If your code uses other functions (except for dot() and other trivial point and vector operators), please provide the code for them as well. (You should test your code in Processing before including it here.)

/3 2) Write the code for EC(pt A, pt B, pt C, float r) {…}, which, if edge(A,B) does not intersect circle(C,r) returns –1, and otherwise returns the value of the parameter t of the point X=A+tAB which is the first intersection where the ray from A to B hits the circle. If your code uses other functions (except for dot() and other trivial point and vector operators), please provide the code for them as well. (You should test your code in Processing.)

/2 3) Consider a control polygon P. Explain the 4-point subdivision technique. Assume that consecutive vertices at one subdivision levels are named A, B, C, D…. Explain how you obtain the new vertices B_1 and B_2 corresponding to B and the edge BC, using the linear interpolation function s(P,t,Q). Point out the advantages and limitations of this scheme.

/2 4) Consider a control polygon P. Explain the cubic B-spline subdivision technique. Assume that consecutive vertices at one subdivision levels are named A, B, C, D…. Explain how you obtain the new vertices B_1 and B_2 corresponding to B and the edge BC, using the linear interpolation function s(P,t,Q). Point out the advantages and limitations of this scheme.

/1 5) Suggest a good approximation of the velocity (tangent vector) V at point B in a sequence …A,B,C…. of a polyloop :