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CS300 in Fall 2018 Homework #5

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Problem 4 (4+3+3P):

Consider the following geometric primitives in the Euclidean plane:

i) construct the line L:=**`Line`**(P,Q) through two given or previously constructed points P,Q

ii) construct the point P:=**`Intersect`**(L,L') at the intersection of two given or previously constructed lines L,L'.

iii) draw the circle C=**`Circ`**(P,Q) around a given or previously constructed point P through a given or previously constructed point Q.

iv) draw the point Q:=**`Intersect`**(C,C') at the intersection of two given or previously constructed circles C,C'.

v) draw the point R:=**`Intersect`**(C,L) at the intersection of a given or previously constructed circle C and line L.

vi) draw some point Q:=**`NewPoint`**(L,P) on a given or previously constructed line L distinct from given or previously constructed point P.

a) These primitives are not well-specified. Why not: Draw one counter-example for each (i) to (iv); then extend/enhance each of the above specifications (i)—(iv) to make it well-specified!

b) Describe a finite sequence of the above primitives (=algorithm) to construct, given a line L and a point P, the line L' perpendicular to L through P. Are there different cases to consider?

c) Describe an algorithm to construct, given two non-parallel lines L and L', their angle bisector L''. Provide figures of intermediate stages. What about the angle *trisector*?