

CSE 599F1, Winter 2017
Soft Constraints Assignment
Due: Wed Feb 1, 10:00pm

This assignment involves finding the solutions to some simple sets of hard and soft constraints, using the definitions in the “Constraint Hierarchies” paper that we read.

15 points total (5 points per question).

1. Consider the following constraints on real numbers x , y , and z .

required $x + y + z = 10$
strong $x = 6$
weak $y = 0$
weak $z = 0$

- (a) What are all the locally-predicate-better solutions?
- (b) What are all the weighted-sum-metric-better solutions?
- (c) What are all the least-squares-metric-better solutions?

2. Now consider the following constraints on real numbers a , b , and c . (Note that c has a read-only annotation in the first constraint.)

required $a + b = c$?
required $c = d$
strong $a = 5$
medium $b = 5$
weak $d = 20$

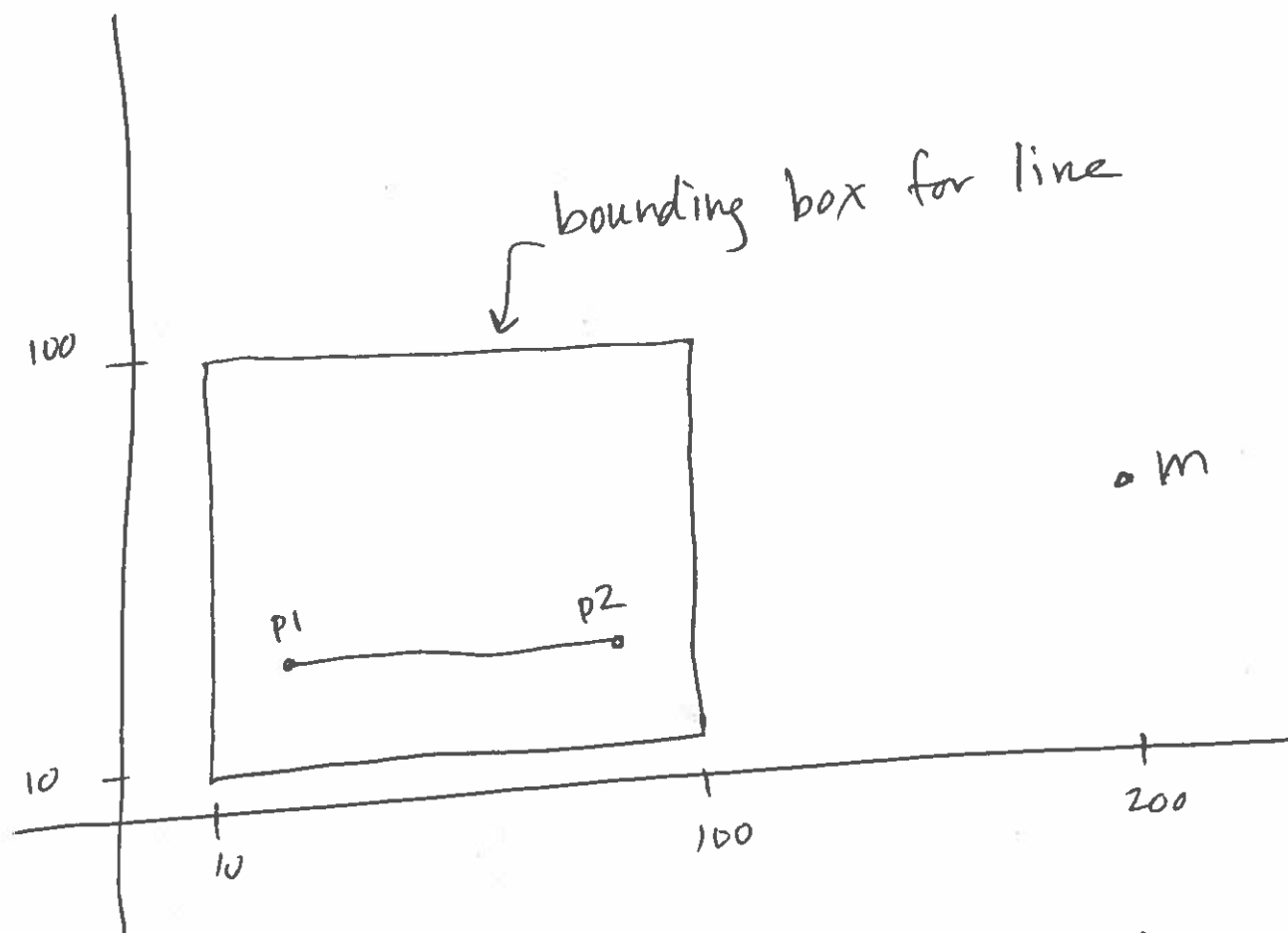
- (a) What are all the locally-predicate-better solutions?
- (b) What are all the weighted-sum-metric-better solutions?
- (c) What are all the least-squares-metric-better solutions?

3. Suppose that we have a line that is constrained to be horizontal and to be contained within a box whose left is at 10, right at 100, top at 100, and bottom at 10. All of these constraints are required. The first endpoint $p1$ has x and y values $p1.x$ and $p1.y$ respectively, and the second endpoint $p2$ has x and y values $p2.x$ and $p2.y$ respectively.

Initially $p1.x=20$, $p1.y=35$, $p2.x=80$, and $p2.y=35$. Suppose the user is trying to move $p2$ to the point $x=200$, $y=50$ using the mouse. This constraint is strong (not required). There are also weak stay constraints on the endpoints of the line. (Also see the attached sketch.)

- (a) Write down the set of constraints.
- (b) What are all the weighted-sum-metric-better solutions? (There might be just one, or might be several.)

Turnin: Please turn in your solution using the 599 dropbox.



trying to move $p2$ to
mouse position m

$$\begin{aligned} p1 &= (20, 35) \\ p2 &= (80, 35) \\ m &= (200, 50) \end{aligned}$$