EE382V: VLSI Physical Design Automation

Spring 2015 (Prof. David Pan)

Homework #3: due March 9, 2015

1. Wirelength estimation: consider the following two nets n_1: *b-d-e-f*, n_2: *a-b-c-d-e*. Cell *a, b, c, d, e,* and *f* are placed at (3,0), (2,8), (1,5), (4,5), (11,7), and (3,9), respectively.

a) Compute the estimated wirelength using half-perimeter, complete graph, source-sink connection, and minimum spanning tree method. Assume that the 1st cell is the source. The distance is the Manhattan-distance.
b) Compute the estimated wirelength using squared wirelength and linear wirelength in the Gordian package. Assume that pins are located at the center of the module, and nets are represented via "star-model".

2. Gordian algorithm: consider the following sub-region information for Gordian placement performed at level 3. Assume that the area of cell *a* through *q* is (3,2,4,5,4,3,6,4,2,1,4,2,3,1,6,3,4).

region 0: center at (2,8), contains cell *a* and *b*
region 1: center at (4,9), contains cell *c*, *d*, and *e*
region 2: center at (7,10), contains cell *f* and *g*
region 3: center at (9,8), contains cell *h* and *i*
region 4: center at (1,2), contains cell *j*, *k* , and *l*
region 5: center at (4,4), contains cell *m* and *n*
region 6: center at (6,3), contains cell *o*
region 7: center at (8,3), contains cell *p* and *q*

a) Set up the "center of gravity" constraints for *x* dimension and identify the entries in all matrices and vectors involved.
b) Repeat part a) for *y* dimension.