

CSE248 Fall 2023 Exercise 3: Placement

Due Time : 11:50pm, Friday 11/16 2023 Submit to Gradescope

Gradescope: <https://gradescope.com/>

In this exercise, we investigate the placement of VLSI and PCB. The focus is on the formulation.

1. Identify/devise a softmax function with the following properties. Demonstrate/prove your claimed properties.
 - 1.1. The function is convex and numerically practical with a double floating point presentation.
 - 1.2. The function has the minimal worst error compared with published formulations.
 - 1.3. The function has the least average error compared with published formulations.

2. Formulate a VLSI mixed mode placement with the following properties. Demonstrate/prove your claimed properties.
 - 2.1. The formulation handles global and local placement density constraints.
 - 2.2. The formulation handles hundreds of huge-sized block cells as well as millions of tiny standard cells.
 - 2.3. The formulation handles timing constraints.

3. Formulate a PCB placement problem with the following properties. Demonstrate/prove your claimed properties.
 - 3.1. The formulation minimizes the net crossings.
 - 3.2. The formulation allows two-sided placement.
 - 3.3. The formulation handles capacitors for power noise decoupling and terminators for impedance matching.