Todo list

SPICE related
- Perform SPICE simulation for Vdd-programmable routing switch at nominal setting (min ED, Vdd=0.9v, vt=0.3v) DONE
- Vary Vth and simulate dynamic energy per switch at high Vdd and low Vdd. It could be done manually or using script
- Vary Vth, Leff, Tox and simulate leakage power at high Vdd and low vdd.
- Vary Vth and Leff to simulate buffer dealy at high vdd and low vdd.
- Based on the models, perform curve fitting for dynamic energy per switch, leakage power and delay (nlreg could be used)

Derivation on robust linear programming
- The rough derivation has been finished. DONE
- Need to write it down formally

Coding on robust linear programming
- Enhance the original linear programming formulation to handle the mix of different length wire segments
- Modify the original linear programming formulation such that it will generate dynamic and leakage power reduction given by formula
- Check out how to use the convex programming solver MOSEK
- Programming based on derivation

Some preliminary experimental set up
- Fit SPICE simulation results with nominal values into architecture file and power library file
- Run single Vdd simulation to get switching probability for each interconnect switch
- Run LP based assignment algorithm w/o process variation to get dynamic power and leakage power reduction given by formula. These numbers will be needed for robust linear programming formulation
- Run LP based assignment algorithm w/ worst case delay. It will be used as deterministic case for comparison purpose

Develop Monte Carlo power simulator
- Leakage power
  * Input: Number of high-Vdd/low-Vdd switches, leakage power model w/ process variation
  * Randomly generate Vth/Leff/Tox considering global and local variation, calculate total interconnect leakage
  * Output: leakage distribution
- Dynamic power
  * Input: Physical Netlist (PN file) annotated with Vdd-level, capacitance and delay;
  * Input: Switching Annotated Netlist (SW file)
  * Input: dynamic power model w/ process variation
  * Randomly generate Vth considering global and local variation, calculate dynamic power of each interconnect switch and then the interconnect dynamic power
  * Output: dynamic power distribution