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CMPEN 431 Project Report

The framework and its components provide a design space exploration by defining configurable parameters, validation functions, and tracking structures.

The design point chosen by the Design Space Exploration process would be the configuration that resulted in the best performance like execution time.

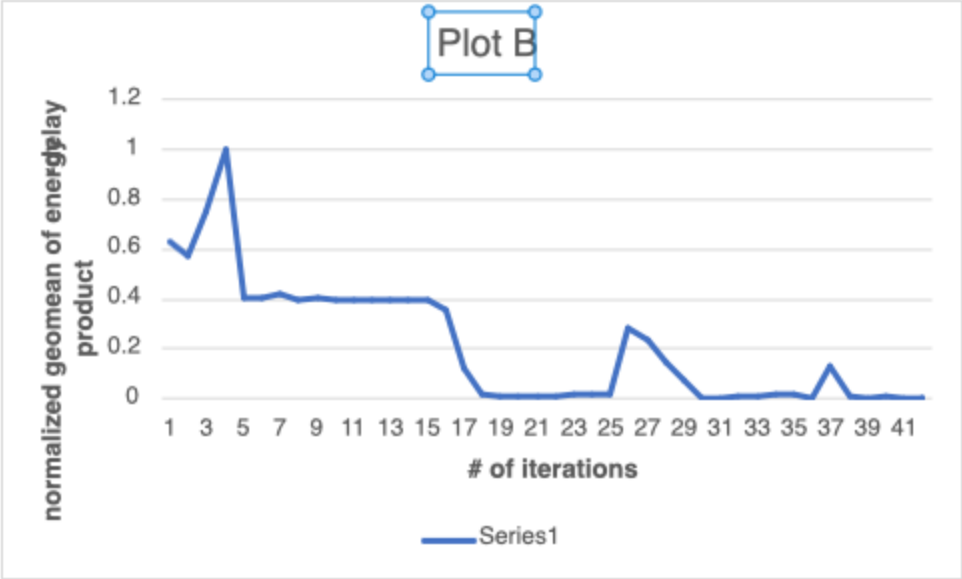
Parameter	Performance	EDP
width	Value=1 Why:	Value= 0 Why:
Scheduling	Value=128, 16 Why:	Value= 1 Why:
dl1sets	Value=`-bpred 2lev -bpred:2lev 1 1024 8 0` Why:	Value= 2 Why:
ras	Value=8 Why:	Value= 3 Why:
width	Value=1 Why:	Value= 0 Why:
scheduling	Value=6 Why:	Value= 6 Why:
l1block	Value=0 Why:	Value=0 Why:
dl1sets	Value=0 Why:	Value=2 Why:
dl1assoc	Value=3 Why:	Value=2 Why:
il1sets	Value=2 Why:	Value=2 Why:
il1assoc	Value=2	Value=0

	Why:	Why:
ul2sets	Value=0 Why:	Value=0 Why:
ul2block	Value=4 Why:	Value=4 Why:
ul2assoc	Value=3 Why:	Value=3 Why:
replacepolicy	Value=3 Why:	Value=3 Why:

Plots

Plot A - normalized geomean execution time (y axis) for each considered design point vs. number of designs considered (x axis)

Plot B - Line plot of normalized geomean of energy-delay product (y axis) vs number of designs considered



Plot C - Bar chart showing normalized per-benchmark execution time and geomean normalized execution time for the best performing design

Plot D - Bar chart showing per-benchmark normalized energy-delay product and geomean normalized energy delay product for the most energy-efficient design found

Two new insights That we gained were the trade offs between exploration and exploitation in a DSE and the impact of dimensional dependents on DSE. I realized that effective DSE requires a Strategy to cover a large part of the space quickly. The impact dimensional dependents have on DSE for one example is execution time. It seemed that optimizing each dimension independently would lead to the best results, but these parameters would change with each other as others changed, meaning that the optimal setting for one dimension depends on the values of others.