Senior project outline
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Abstract

Introduction
• What are the questions we are trying to answer?
  - Graph structure of memory depends
  - Program divisibility
• Why do we care about asking them?
  - Data centric model with fast memory
    o I-ram project
  - Grid computing at the microarchitectual level
• sections in the paper

Memory dependencies graph
  - what are they, how do they arise.
    o Via mem, or register
  - when are they trivial?
    o Standard waw rar war
    o Potentially other things like excess register overflow

  - the graph structure
    o weighted directed graph
    o size of nodes
    o vertices indexed by unique id
  - building the graph
    o simulation
    o dictionary
    o potential renaming
    o block vs instruction vs procedure level

Base Graph data
  - Programs tested
  - General structure of graphs
    o Distribution of connectivity
    o Maximal nodes
    o Weights and look back weights
    o Many fringe nodes

Partitioning the graph
  - clarify the problem
    o assignment of set label to each vertex
    o define communication cost
    o goal to minimizes communication cost while keeping the sets balanced
  - Complexity of the problem in the perfect case
- Developing an approximation
  - Factors that weigh in on set choice
    - Connectivity of this vertex to other sets
    - Connections into this vertex
    - Global Size of each set
- present base alg
  - loop over vertices updating them via heuristic
  - evaluate progress via metric
  - prone to local minima
- improvements
  - randomized update like NN
  - re-randomization and simulated annealing
  - Partial gradient decent
- give convergence data

Partitioning Data
- give data collection parameters
- give data on total com-costs
- on metric
- show set distributions
- show code vs data distributions

Data duplication in the graph
- we can preprocess the graph splitting nodes, to improve partitioning
- show example of situation
- show improved com-costs

Data Analysis
- feasibility of segmentation
- what would the memory speed need to be to make such a division reasonable?
- Give data on set context switch data

Questions unanswered
- Parameter tuning
- Run time prediction ability
- compiler driven optimizations

Conclusion
References