

# Comparing System Configurations

4-8-2011

# Opening Discussion

- Minute Essay comments
  - Possibility of “Scientific Simulation” and the role of Discrete Event Simulation.
  - Even that is a really broad field.

# More Than Two Systems

- You have to boost the confidence level for each interval when you have many.
  - For  $c$  comparisons use  $1-\alpha/c$ .
- Use a standard
  - This leads to  $k-1$  comparisons.
- All pairwise
  - If you want to do all pairs, then there are  $k(k-1)/2$  comparisons. This will often lead to very wide intervals.

# Last Approach

- Comparison with best
  - Do comparisons with the simulation that has the best mean.
  - This will tell you if there really is a statistical difference.

# Ranking and Selection

- Take a few samples to start with and use that as an estimate of how many more samples you need to take.
- Only worry about differences of sufficient size.
- The book has a lot of math describing different approaches to ranking.
- An alternative is to find a subset that includes the best.

# Supercomputing

- Many of the world's most demanding applications are simulations.
- For this reason, supercomputers are often the tool of choice for large-scale simulation.
- The nature of supercomputers has changed over time.
  - Original supercomputers were vector (SIMD) machines.
  - By 2000 most had moved to clusters.
  - Currently seeing switch to GPU acceleration.

# Example Simulations

- Whole cell simulation
- Black hole mergers
- Atmospheric GCM
- ...

# Related Technologies

- Grids
  - Extensive, loosely bound networks of computers that work together.
  - Often have slow connections.
  - Machine types can be very heterogeneous.
- Clouds
  - Infrastructure for computing that scales on demand.
  - Used more currently for web serving and business applications.



# Current News

- <http://www.hpcwire.com/>
  - This is a site you could check out to see what is happening in HPC.
- <http://www.top500.org/>
  - The Top500 list keeps track of the fastest computers in the world.

# Minute Essay

- Any questions?
- No class on Monday or Wednesday of next week.