Final Project review template

Project Summary

Team DEF investigated uses of parallelization (multi-threading) of BFS and Label Propagation algorithms in identifying connected components of graphs. The team designed experiments to run BFS and LP on datasets of 1,3,6 connected components and 102k, 34k and 17k vertices respectively. Their hypothesis was that the algorithms would perform faster with a higher number of threads. The results showed the opposite: more threads caused larger runtimes irrespective of the number of connected components.

Comment on how well the team addressed the categories in the Evaluation Criteria Document

- **pedagogical value**
  - Section 2.1 was excellent
  - I would've appreciated some background into OpenMS (or OpenMP – there are two names given). What it is, how it is configured, technical challenges faced in interfacing with it.
- **technical quality**
  - I would've liked more description of the experimental design in Section 2.3. The sentence on the *n* and *m* relationship was a bit unclear to me.
  - The hypothesis were logical, as was the interpretation of the results seen from experimentation.
  - I would've liked to see results with respect to number of comparisons instead of run time, as there may be WSL / OS / implementation dependent factors that contribute to the behavior observed.
- **creativity**
  - I thought the pedagogical aspect of section 2, specifically the coloring of Figure 1 and 3, and the models in Figure 2 and 4, was a creative way to allow the reader to understand the domain.
  - I think the experimental results may have been able to be analyzed in a more creative manner (i.e. performance characterized by something other than run time, run time vs potential theoretical run time,).
- **quality of presentation**
  - The presentation could've summarized the results and introduced them in a more text-based manner. Diagrams and illustration were used effectively; however, I was left wanting some text-based contextual material for many of the slides, so I could associate the illustrated behavior with words.
- **quality of report**

- The report was well written, clearly organized, and coherent. The analysis was sound and the overall quality of the report was high. It clearly was well-planned and executed, adhering to professional expectations.

What did you like about the project?

list at least three things with a short paragraph about each

1) Diagrams
   I found Figure 4 and Figure 2 to be useful in understanding the model of Frontier-based BFS and LP.
2) Algorithm/Pseudocode
   The pseudocode was clear and well-commented, and its accompanying model gave great pedagogical context.

What could have been improved?

list at least two things with concrete suggestions in the form of a short paragraph or sublists

1) Data Analysis: The depth of the analysis could've been strengthened using techniques mentioned by Stallman from Program 1 and 2.
2) Experimental breadth: Experimenting on different types of m:n relationships (not just $V3^s$) – this was not mentioned on

Questions for the team or for Dr. Stallmann

1) What are graph types that the experiment was run on?
2) How does the graph structure effect performance?

Other comments

Great job! I found it an interesting and well executed paper – kudos.