Project Report Guideline

Your class project will contribute 25% toward your final grade. The goal of your project report is to explain your project sufficiently so that the reader can understand what the problem is and how you have solved it. The reader should be able to understand your methods without reading code.

There are five main parts in your write up:

- Problem description,
- Important existing solution(s),
- Description of your solution,
- Results,
- Analysis and Conclusion.

The problem description should introduce the problem, and point out the essential parts of your problem with respect to its computational aspects. Existing approaches to the problem should be outlined in order to put the proposed solution into perspective. The description of your algorithm (if any) should be in prose and in pseudocode. In addition to explaining your approach, the prose should help clarify why you made important choices. The pseudocode should be at a high enough level to be easily and quickly read, yet it should illustrate the important points of the algorithm. Excessive details will be counterproductive, and will indicate that you have not thought enough about what the important issues are. The results should be brief, and, if appropriate, should compare with some known results. The analysis and conclusion should be a retrospective on your approach toward solving the problem, especially what you would do differently if you were to do it again. For example, was the machine chosen appropriate? Were there parts of your algorithm that seemed like a good idea when you started, but turned out to be not working well? Were there ideas that you tried and dropped? Your project report must be self-contained, including a short abstract and a list of references. If you don't know the format of technical papers, read any journal articles in IEEE Trans. on Computers or IEEE Trans. on Parallel and Distributed Systems. Keep in mind that you have to give credits to all papers you referenced in your report. Your project report must be type-written using any of your favorite word processing or typesetting package. In general, your paper is expected to have 12 to 18 double-spaced pages, without counting the program code. Here is the breakdown about how will your term paper be graded.

- Technical content: 25%
- Clearly stated background and motivation: 10%
- Paper organization and quality of presentation: 15%
- Your own efforts (contribution, criticism, comparison, etc.): 40%
- Satisfactory English: 10%
Suggested Topics

You can choose any topic related to parallel and distributed processing; including topics related to system, application, algorithm, performance evaluation, and network and distributed parallel computing. Here is a list of topics that I have in mind at this moment:

- Study the parallel solution for certain application, algorithm, or system software
- Implementation, performance evaluation, and analysis of algorithms for some computation/application
- Experimental performance measurement for a comparative study of algorithms for some computation/application
- Detailed study on the cost of one or more collective communication algorithms: this can either be analytical (for some context not covered in the text, e.g. remove single-port assumption) or experimental
- Survey of available public domain parallel software for some chosen computation/application, and experimental comparison
- Study and analyze some parallel machines, architectures, and network structures

The next question you may have is *where can I find out references?* The papers in technical journals are usually two or three years old due to the long reviewing process. But the quality of journal articles is usually better than conference articles or technical reports. However, you have to pay attention on one thing: *Don't be easily convinced by conclusions or comments made by the author(s).* Published papers do not guarantee that their arguments are correct. You have to make your own assessment.

Suggested Sources of References

In addition to the textbook, here I list some journals and conference proceedings which have useful articles to this course. You can find most of these references in the library. Note that you don't have to trace back all old issues. Except a few classical papers, only those issues published in the last six years may still be useful.

References

- *ACM Trans. on Computer Systems.* This is a very prestigious journal published by ACM. Papers in this journal are very practical and reflect the state-of-the-art computer technology.
- *Communications of ACM.* This is a flag magazine published monthly by ACM. There are some nice articles.
- *Computing Surveys.* This is a survey magazine published quarterly by ACM. It is the place you can find all kinds of interesting topics.
- *IEEE Computer.* This is the most popular magazine published by IEEE Computer Society (every IEEE CS member receives a copy). Papers in this journal are very readable and cover all new advances in computers.
IEEE Trans. on Computers. This is the most prestigious journal published by IEEE Computer Society. It has both theoretical and practical papers.

IEEE Trans. on Parallel and Distributed Systems. This is a prestigious journal in the area of parallel processing. It has both theoretical and practical papers and is published by IEEE Computer Society. You can find many articles related to this course.

IEEE Trans. on Software Engineering. This journal mainly covers software and language related articles. Some database and performance papers can be found there.

IEEE Concurrency. Similar to IEEE Computer. It is a relatively new journal aimed to the increasingly important field of parallel and distributed processing.

IEEE Journal on Selected Area in Communications.

Journal of Parallel and Distributed Computing. Similar to IEEE Trans. on Parallel and Distributed Systems. It is a very good journal.

Parallel Computing. This is a good journal in the areas of computational sciences. It covers a wide range of issues, from software tools to numerical algorithms.

SIAM Journal of Scientific Computing. This is the most prestigious journal in the area of large scale numerical computing.

IEEE Supercomputing Conf. The largest Conf. in the field of supercomputing and parallel processing. It emphasizes application and practical issues.

ACM International Conf. on Supercomputing. A prestigious supercomputing conference which is more on the research side.

International Parallel Processing Symposium. This is a conference which covers all the respects of parallel processing.

International Conf. on Parallel Processing. Similar to International Parallel Processing Symposium.


International Conf. on Distributed Computing Systems.

Parallel and distributed processing has been a very hot research area in the past twenty years. You may find many other conferences in this area, such as Scalable High Performance Computing Conf. and Frontier. Some magazines, such as Journal of Supercomputer Applications, Journal of High Speed Computing, and Journal of Concurrency: Practice and Experience also have many good articles addressing issues of parallel and distributed systems. However, many of the articles do not provide much detailed technical description. Talk with me if you have difficulty in searching for references.

Final Comments

You have to submit a two-page project proposal (extended abstract) including a short description of your topic and a list of references to me by Feb. 20, 2007. Your project report is due on Monday May 7, 2007. In class presentation is required and will be scheduled later for the last week of the semester.