Final Project: Object-Oriented Systems Research

CSCE 496: Performance Analysis of O-O Systems

Due Date: May 4, 2004

1 Problem Statement

I have identified a few papers that you can use as a starting point for your research. They are available in the repository. If you do not find the papers interesting, you can propose your own research topics. The only requirement is that your proposed plan must include the SSCLI as the research platform. Listed below are a few possible topics that you can consider. Notice, this is a group project with no more than three members per group.

- 1. object profiling—you can use existing profiling tools in conjunction with your own to profile basic objects' behaviors that include lifespan, call sites, sharing of objects by multiple threads, etc. For starter, there is a paper in the repository title "Error-Free Garbage Collection".
- 2. dynamic memory management research—the topic can include building a mechanism to improve the efficiency of memory management. For example, pretenuring is an optimization technique that has proved to be effective in reducing copying time in generational garbage collection. Students can perform experiments to identify objects that are longlived. A mechanism can then be constructed to allow such objects to be created directly in the mature region. Thread local heaps is another possible research topic. It is used to speed up garbage collection performance in multithreaded applications.
- 3. building benchmark applications—currently, we have a pressing need for micro and real-world benchmark programs that utilize multiple

threads of execution and remote object invocation. Microbenchmark programs are the ones created to profile a specific function. For example, you can create a program that spawned a user's specified number of threads that may or may not perform any useful work. Real-world benchmark programs are the ones that utilize some specified functions to perform work in real-world workload. For example, real-world benchmark could be a business logic tier in a multitier client/server application.

Instead of having regularly scheduled lectures during the week of April 5, I will meet with each group for about 30 minutes to discuss your proposed research plan. You can sign up for a meeting time in front of my office. For the first meeting, I need to have a one-page proposal of what you want to work on. We will then have two more lectures on April 12 and 14. The midterm exam will be on April 16. After the midterm, we will no longer have lectures. Instead, each group will have a weekly meeting with me for 30 minutes during class time. You can use the rest of lecture time for your own group meeting. You will give a 30-minute presentation (20 minutes talk and 10 minutes Q & A) as well as the final report on Tuesday May 4th between 1:00 - 3:00 pm.

2 Miscellaneous

You report may contain up to 6 pages in ACM SIG Proceedings Templates. More information is available at: http://www.acm.org/sigs/pubs/ proceed/template.html.