

University of Central Florida
DEPARTMENT OF COMPUTER SCIENCE

COP 4520
Spring 2020

Professor Damian Dechev

January 21, 2020

RESEARCH PROJECT GUIDELINES

I. Schedule

a) Team Declaration

Topic Due Date: Wednesday, January 22nd, 2020

Declare your team (1 - 5 students). You will work with your team on all Project Assignments. Optionally, you can propose an alternative topic related to the course material. Dr. Dechev will consider your project proposal.

b) Project Assignments

Project Assignments 1 and 2 will provide you with specific steps that will help you get started with your COP 4520 Final Project.

c) Presentations

Date: one 20-25-minutes presentation per group, scheduled between February 24th, 2020 and April 20th, 2020.

d) Final Report

Due Date: Wednesday, April 15th, 2020 (this deadline can be extended only by a Temporary Incomplete authorized by the student's residential college dean).

Purpose: final course project paper and source code, please see Section II for detailed description and requirements.

II. Description and Requirements

The purpose of the project is to give you a chance to explore in some depth a topic that is related to the subject matter of this course. The project consists of two parts, an activity and a report. Your final report must present original work on a challenging problem.

1. The activity involves scholarly work—exploring a topic, reading relevant literature, writing software, and running experiments—and must include either a substantial amount of programming or a strong theoretical mathematical treaty of issues related to multicore programming.

Project Assignments 1 and 2 are meant to guide you in your project activity and provide you with specific guidelines.

In summary, in Project Assignment 1 you will develop a blocking version (using locks) of the data structure presented in your main Project Topic paper. In Project Assignment 2, you will re-implement the non-blocking design described in the main Project Topic paper. Your Final Report will include a summary of your implementations from both project assignments, performance experiments, and statements of correctness and progress along with a literature survey on the specific topic (the design of this particular type of concurrent data structure).

2. The final report is a short paper (6–10 pages) describing the results of the activity and should reflect the substantial amount of work that you put into the activity. The paper should make clear what is the problem, the state-of-the art in this research area, a discussion of related work, a detailed technical section discussing your implementation work, and performed experimental results.

Your Final Report will take the form of a survey paper, i.e. you will collect information about other alternative approaches, summarize and present this information and compare with your implementations. A good survey should have intrinsic added value, in the sense that the sum should be stronger than its parts. It should contain the authors own opinion, e.g., proving new structure, pointing out connections not noticed before, including a new context for old results, etc.

The report will be graded for writing quality as well as for technical content, so attention should be paid to organization, grammar, spelling, and scholarly style. All references used, both text and code, must be properly cited in the bibliography. You are required to use LaTeX (<http://en.wikipedia.org/wiki/LaTeX>) to prepare your report.

3. Submission instructions and source code: typically in the course of your research you will develop source code for your algorithms and experimental results. Please include with your mid-term and final reports the following:

- a) the source code of your algorithms along with a brief README file
- b) the source code of your testing programs and performance experiments along with a brief README file
- c) the source code of your paper (in a LaTeX format)
- d) confirmation of publication in ScienceOpen or ResearchGate based on the Publication Instructions

Submission:

All materials should be submitted online using Webcourses as a single zip archive.

Format:

All papers should follow either the ACM or the IEEE Manuscript Format.

A sample ACM template and further formatting instructions are available here:

<https://www.acm.org/publications/proceedings-template>

III. The Report

a) What Makes a Good Report?

I cannot really tell you how to write a paper in this brief handout, but the section title is intended to remind you that a project report is an essay of sorts, and the things you have learned in other courses about logical organization, writing style, use of proper grammar and spelling, and proper methods of citing other people's work all apply here. For more details, you might want to read the following book: *Writing for Computer Science* by Justin Zobel, Springer, 3rd edition, 2015.

Like an essay, the project report should have some ideas of your own to report. It should reach some conclusion, and it should give logical arguments and relevant data to support that conclusion. What I do not want in a paper is a simple paraphrasing of somebody else's work. Quoting other people's work as a way to make a point is perfectly acceptable, if properly attributed; simply copying their work, attributed or not, is not acceptable. I want to read about your ideas, your code, and your conclusions, not somebody else's. But of course you will rely on other people's work to support your arguments.

b) Required Format of the Report

Your paper should follow accepted guidelines for scholarly work in computer science. As already stated, all papers should follow the ACM or IEEE Manuscript Format. The paper should begin with title, author, and abstract. The body of the paper should be divided into logical sections appropriate to the structure of the material. Each section should have a numbered section heading. Numbered and

unnumbered subheadings should be used where appropriate. Figures and tables should have captions and should be referenced by number. Related work should be cited in the text, and full reference information should appear at the end in a bibliography. Any material copied verbatim should be enclosed in quotation marks as well as being properly cited. The bibliography should contain full citation information, including author, title, year, and publication data. If the publication is a conference proceedings, then the proceedings title, editor, organization or publisher, etc. should be included. If it is a book, then the publisher should be included. If it is a web page, then the URL and sponsoring organization should be mentioned.

c) Writing Tools

Most research papers in computer science are prepared using the LaTeX typesetting system. Because this is a computer science course, and because it is educational for you to learn to use the tools of the field, I am requesting that you too prepare your paper using LaTeX and that you prepare your references using the companion tool, BibTeX. Exceptions require the instructor's prior approval and will typically not be allowed.

Compared to papers produced on a typical word processor, the results from LaTeX are much more professional looking. LaTeX automatically numbers pages and sections, automatically produces a table of contents and list of figures (if desired) and generates page headers and cross-references. BibTeX takes information that you put into a bibliographic database and formats it according to commonly-accepted styles. You don't have to remember whether the article title or journal title should be italicized, or where commas and periods are needed—it does all that for you. But the big win comes when typesetting equations and other mathematical notation. LaTeX produces professional-quality typeset equations and formulas rather painlessly. Attempting to do the same in a word processor is clumsy at best, and the results are generally disappointing.

d) Hints

Start now! Locate your resources. Many but not all papers are available on the web. Make sure your project is doable in the amount of time available. Your proposal should identify the resources necessary to carry out your project.