

CSCI653 Assignment 1—Make Your GitHub Project Repository

Due: 11:59 pm, September 2 (Fri), 2022

In this course, you will pick an application of high-performance computing and simulations (HPCS) to a challenging scientific or engineering problem and seek an innovative solution to the problem of your choice, *i.e.*, do “your” science with HPCS. As was articulated by George Whitesides, the best way to keep your effort focused (and not open-ended) is to prepare an outline of a scientific paper as you start a project and keep filling the running document as the project progresses [reference 1; see also 2].

As a specific running document, in this course, you will use a GitHub repository [3, 4]. In addition to being the standard platform for collaborative software development, version control and dissemination, GitHub is commonly used as a “digital business card” in which you present your projects and accomplishments. The final report of this course (due Wednesday, December 14) will be a professionally formatted and populated GitHub repository, and the objective of this first assignment is to create an outline of the repository, which you will keep expanding and modifying over the course of the class. Do not worry even if you do not exactly know yet what will be the topic of your final project. Your outline will be a live document, which will evolve during the semester.

You are encouraged to choose an HPCS application from your own research project, or use the following resources to find an existing application (*i.e.*, do market research):

1. Student projects for the CS267 (Application of Parallel Computers) course by Professor James Demmel at UC Berkeley (reference [5] has links to previous projects).
2. Technical papers at the IEEE/ACM Supercomputing conference [6].

Now that we are in the midst of “compute Cambrian explosion” [7], you may think about what you can do not only with emerging exaflop/s supercomputers but also with post-exaflop/s artificial intelligent (AI) and quantum computers.

Assignment

Create your GitHub account at [3] and prepare a project outline following the GitHub guide [8]. You can also learn about the markdown language to format your repository using the markdown cheat sheet [9]. Your outline should include the following contents:

- a. Problem description.
- b. Simulation methods and algorithms, numerical methods, and parallel and distributed computing (or data visualization and analysis) techniques to be used.
- c. Expected results.

Submit the uniform resource locator (URL) of your repository to Blackboard.

References

1. G. M. Whiteside, “Writing a paper,” *Adv. Mater.* **16**, 1375 (2004);
<https://aiichironakano.github.io/cs653/Whitesides-WritingPaper-AdvMater04.pdf>

2. J. J. McDonnell, “The 1-hour workday,” *Science* **353**, 718 (2016);
<https://aiichironakano.github.io/cs653/McDonnell-OneHourWorkday-Science16.pdf>
3. <https://github.com/>
4. <http://swcarpentry.github.io/git-novice/>
5. <https://sites.google.com/lbl.gov/cs267-spr2022/projects>
6. <https://sc22.supercomputing.org>
7. S. Matuoka, “Cambrian explosion of computing and big data in the post-Moore era,”
HPDC’18, 105 (2018); <https://doi.org/10.1145/3208040.3225055>
8. <https://guides.github.com/activities/hello-world/>
9. <https://github.com/adam-p/mark-down-here/wiki>