Computational Mathematics "In the Wild"

Math 384

This assignment asks you to go on a computational safari to find course concepts "in the wild." You will connect course content to research papers in an area of their interest and share their findings with the class.[1]

Your task is to create two Computational Mathematics "In the Wild" slides to be submitted to a shared slide deck. These are due by May 14, the last day of class.

Choose one of the following options:

(A) Read a research paper in an area of your interest. Summarize the main ideas presented in the paper. Highlight three or more course concepts that appear in the paper, and connect these concepts to the main result of the paper.

(B) Select a course concept that interests you. Read three or more papers that highlight that concept in their work. Connect the course concept to the main result of each paper. Compare and/or contrast the appearance of this concept in different contexts.

(C) Suggest a different approach, with instructor permission.

Procedure:

1. Before selecting your paper(s), verify that no more than two other students are using that paper. After committing to a paper, you may "dibs" it by leaving a note in the shared slide deck.
2. Read your paper(s) carefully. Identify the main points and connections to course content.
3. Create your slide. All text and visuals should be legible when the slide is viewed in full screen on a typical laptop. It is suggested that you save your slide on your machine in case the shared slide deck crashes or someone accidentally deletes your slide.
4. Do not plagiarize material from any source, including course lectures, worksheets, textbook, other students' slides, or content generated by artificial intelligence. Material may be used with proper citation.
5. Claim authorship of your own slide by including your name, and optionally, a short autobiography. If privacy is a concern, please contact the instructor.
6. Do not modify others' contributions (even fixing typos). Treat other slide contributors with respect.

Evaluation

To earn a score of *Meets Expectations*, make sure to do the following:

- Demonstrate substantial understanding of the paper(s).
- Succinctly communicate the main relevant results to an audience who has not read the paper(s).
- Connect the paper(s) to course content according to the assignment expectations above.

[1] Thanks to Prof. Sara Clifton for the "in the wild" concept.

- Use appropriate terminology and visualization.
- Make the slide visually appealing (could be a poster hung in a classroom!) and free from typos and formatting errors. Mathematical notation should be typeset professionally.
- Cite all sources (at a minimum, where available, include authors, title, and year).

To earn a score of *Excellent*, meet the expectations above and do one or more of the following:

- Reproduce and extend the work in the paper(s).
- Connect the work in a nontrivial and unexpected way to another application or field.
- Explain the context and/or history of the work.
- Write or draw a creative piece based on the work.
- Come up with your own creative project inspired by the work, with approval from the professor.

Such an extension may require more than one slide or a different medium entirely. If so, provide a link to the additional material (ensure permissions allow the class and instructor to view).

Resources and Technical Details: The assignment is compiled in a common Google slides document available here (only to people in this course). An example slide (earning a score of *Meets Expectations*) is provided for reference. If you are unfamiliar with Google slides, please attend office hours for assistance creating your contribution well in advance of the deadline.

There are many journals that publish computational mathematics articles; an incomplete list appears below. Online access to most of these is provided by the St. Olaf Library. Research consultations are also available through the St. Olaf library.

- *The American Mathematical Monthly*: journal homepage, library access
- *Applied Mathematics and Computation*: journal homepage, library access
- *The College Mathematics Journal*: journal homepage, library access
- *Computational Methods in Applied Mathematics*: journal homepage, library access
- *Computational Optimization and Applications*: journal homepage, library access
- *Computers & Mathematics with Applications*: journal homepage, library access
- *Experimental Mathematics*: journal homepage
- *Foundations of Computational Mathematics*: journal homepage, library access
- *Journal of Applied and Computational Topology*: journal homepage
- *Journal of Computational and Applied Mathematics*: journal homepage, library access
- *Mathematics of Computation*: journal homepage, library access
- *Mathematics Magazine*: journal homepage, library access
- *SIAM Journal on Optimization*: journal homepage, library access
- *SIAM Journal on Scientific Computing*: journal homepage, library access