

# MATH 441

*Discrete Optimization Problems*

*Learning Portfolio Outline 2023W2*

---

A [learning portfolio](#) is a collection of artifacts that demonstrates your skills and your ability to learn. Much like a photographer's portfolio demonstrates the quality and style of their work, a learning portfolio tells the story of your learning and demonstrates the quality and style of your mathematical work. Each student will work independently to create their own learning portfolio, communicate frequently with instructors to get feedback and submit their portfolio at the end of the semester. Be creative and take ownership of your learning!

## Artifacts

An artifact in your learning portfolio is *any* work that demonstrates *your learning*. There are many different kinds of learning artifacts. For example:

- Answer to a question posed during lecture (or elsewhere)
- Review of a learning resource such as a video, note, paper, podcast, blogpost, etc.
- Summary of a research paper published in a peer-reviewed scientific journal
- Formulation of an original optimization problem (with a solution if possible)
- Computation implemented with Python/MATLAB/Julia
- Explanation of a proof of an important theorem
- Conceptual explanation of an algorithm
- Solution to an interesting exercise found in another textbook (or elsewhere)
- Data visualization
- Interview with someone who works or does research in mathematical optimization
- ... *anything that demonstrates your learning* ...

The following steps outline a strategy for creating artifacts for your portfolio:

- **Read** the suggested readings each week
- **Identify** what you don't know and formulate new questions
- **Engage** in discussions during lectures, ask questions and generate new questions
- **Search** online resources to find answers and generate new questions
- **Discuss** with peers and write down your own thoughts and solutions
- **Document** your progress by writing down your ideas, questions, answers, resources, etc.
- **Focus** on a specific question, concept, example, etc.
- **Create** an artifact that demonstrates your understanding of your focus
- **Get feedback** by submitting work to *Learning Portfolio Feedback* assignments on Canvas

The strategy above may create a whole mess of ideas and so the last three steps are very important: *focus, create and get feedback*.

## Formats

How you present your artifacts is entirely up to you and your learning portfolio may include a combination of several different formats. For example, your learning portfolio could include:

- [LaTeX document](#)
- [Jupyter notebook](#)
- [GitHub repository](#)
- Webpage
- Video
- Podcast
- [Zine](#)
- [Flashcards](#)
- ... *Be creative!* ...

## Feedback

There are several *Learning Portfolio Feedback* assignments on Canvas throughout the semester. Submit your work regularly to receive feedback. We will also have portfolio feedback sessions in class for students to share their work with each other.

## Guidelines

The content and format of your portfolio is entirely up to you but the final version of your portfolio should satisfy the following guidelines:

- At least 7 artifacts in total
- Each artifact should be at least 1 page of written work (or equivalent if in another format)
- Each artifact should focus on a specific question or concept
- No more than 2 artifacts directly related to your group project
- Each artifact must be directly related to our discussions in class
- Each artifact must demonstrate *your learning* and should *not* be a copy of an existing resource
- Portfolio must include a cover letter (equivalent to 1 written page)
- Any references must be properly (see UBC Library's [How to Cite Guide](#))

## Self Evaluation

As you create your artifacts, you should be constantly evaluating your own work. Here are some criteria to consider:

### Presentation

- Precise mathematical notation
- Computer code clearly written and properly formatted
- Correct spelling and grammar throughout
- Headings, links and text properly formatted
- Figures presented clearly with title, captions, labels, legend, etc.
- All references properly cited (see UBC Library's [How to Cite Guide](#))

## Clarity

- Excellent writing with clear explanations
- Includes appropriate level of detail for audience (MATH 441 students)
- Precise mathematical statements throughout
- Well-organized and easy to follow

## Creativity

- Demonstrates mathematical maturity far beyond basic definitions
- Well-constructed mathematical arguments throughout
- Makes nontrivial connections between disparate concepts
- Restates familiar mathematical concepts in a novel way
- Presents complex mathematical information in a simple way

## Cover Letter

Your learning portfolio should include a cover letter which introduces the reader to your work. Write the cover letter at the end of the course after you have created your artifacts. The cover letter describes your work but more importantly it is a reflection on your learning. To get started writing your cover letter, reflect on the following questions:

- What is the most important thing that you learned in this course?
- What was your process for creating artifacts?
- Which artifact are you most proud of?
- What did you find most challenging about creating your portfolio? What was most enjoyable?
- What guidance would you give to students who are getting started with their own portfolio?

## Final Grade Proposal

Final grades are proposed by students and discussed with instructors in one-on-one interviews at the end of the semester. Include your proposal in your cover letter. Instructors reserve the right to accept or modify final grades.