

PROJECT DETAILS

Course project is a way for us to celebrate the completion of the course. This is a team project where you work closely with your team members to deliver an interesting project. The primary aim of this project is to apply the knowledge and skills you've acquired throughout the course to address a real-world problem that holds personal significance to each team member. We expect it to be a substantial project on which you devote significant effort. It's difficult to quantify "significant effort", we try to clarify this further in this guideline. We are not looking for a perfect project, instead we are interested to see how far you can go by identifying some challenges and come up with effective strategies and algorithms to handle them. You may include some of your failed attempts in the report, what you learned from them, and how you improved your work to get into your final submission. In general, we do not anticipate that the grades for each group member will be different. However, we reserve the right to assign different grades to each group member based on peer assessments (see below).

PEER ASSESSMENT

It is important to provide positive feedback to people who truly worked hard for the good of the team and to also make suggestions to those you perceived not to be working as effectively on team tasks. We ask you to provide an honest assessment of the contributions of the members of your team, including yourself. The feedback you provide should reflect your honest and fair judgment of each team member's:

- **Preparation:** were they prepared during team meetings?
- **Contribution:** did they contribute productively to the team discussion and work?
- **Respect for others' ideas:** did they encourage others to contribute their ideas?
- **Flexibility:** were they flexible when disagreements occurred?

Your teammate's assessment of your contributions and the accuracy of your self-assessment will be considered as part of your overall project score. There will be a

PROJECT MILESTONES & TIMELINE

We will end this course with a Final Project, where you will put together the techniques, skills, and insights you have learned in this course to answer a question that is important to you.

The individual preferences were carefully considered for everyone who submitted the form. Everyone should be able to see their group information on Canvas (people Tab).

For your Final Project, you will pose a question that is of interest to you, and answer it to the best of your ability by applying one or more topics/modules covered in this Algorithms course.

The Final Project is incredibly open-ended, and all I ask for (and insist upon) is that the question you choose is of interest to each of you. I will share some sample project topics on Piazza to give you an idea.

There are a few milestones for your final project. Below is a summary of important dates. It is critical to note that **no extensions will be given** for any of the project due dates for any reason.

PROJECT TIMELINE:

- M1: Project Proposal due March 19 (Week 11, Wed)
- M2: Project Presentation due Apr 09 (Week 14, Wed)
- M3: Final Report & code due Apr 18 (Week 15, Fri)

Note: Other than Quiz #4, you will have no other assignments or deliverables so your team can focus on the project for 4 + 1 (proposal) weeks.

Your Final Project will be marked out of **50**, and will be worth 25% of your final course grade.

- **Milestone 1: Project Proposal** – out of 4 (2%)
- **Milestone 2: Project Presentation** – out of 6 (3%)
- **Milestone 3: Project Final Report** – out of 40 (20%)

I. Project Proposal:

As your first milestone, you will submit a **Final Project Proposal** (1-2 pages (no longer than two pages), somewhere between 500 - 1000 words) which must contain each of the following:

- **Context and Personal Relevance:**
Provide a contextual introduction to your chosen topic and articulate why this subject is personally significant to each member of your team. Allocate one concise paragraph to describe the personal relevance for each team member.
- **Scope of the Project:**
Clearly define the scope of your project. Given the limited time frame of this final project, specify what you intend to investigate and equally important, what you will not explore within this project.
- **Plans of Actions:**
Present an overview of what you have accomplished thus far. Furthermore, outline your plans moving forward, especially in the next 4 weeks. Be sure to include specific details regarding the tasks and milestones you aim to achieve.
- **Your Data:**
What data will you be working on? You may want to use Google dataset search engine to find interesting datasets: <https://datasetsearch.research.google.com/>

Note: I encourage you to select a problem that holds personal significance to you. Additionally, engaging with real-world data [optional] and the opportunity to design and experiment with multiple algorithms can greatly enhance your learning experience.

Deliverables:

- Each team needs to submit a PDF file containing your **Final Project Proposal** (one submission per TEAM)

II. Project Presentation:

After you're done with your seminar your only concerns will be the Final Project, and you will have quite some time to work on your Final Project as there will be no more assignments.

For your **Final Project Presentations** you should be going over the key aspects of your project. Make sure you have opening, intro, project overview, and next steps. Your presentation is expected to be around **7 minutes** long.

Your Final Project Presentation will be evaluated on your organization, content flow, technical depth, your progress, clear communication, effective use of visual aids (e.g. Graphics, Demo, etc.), and time management.

The **main components of your presentation** will be: 1. Project Introduction (Your Goal), 2. Progress made so far and 3. plan for the final week (9 days actually).

Deliverables:

- Each team should submit a **PDF** version of your **Final Project Presentation** (*one submission per TEAM*)

III. Project Report:

I do recognize that the nature of your projects might be very different from each other and the criteria will be adjusted to better value your efforts in the final project. The following criteria is to give you a broad idea what we are looking for:

- **Introduction (5 marks):**
Provide context: Start by introducing the broader topic or issue that your project is addressing. What is the background information that sets the stage for your study? Clearly-defined question: State the specific research question that your project aims to answer. Rationale: Explain why this question is significant or relevant. What problem or gap in knowledge does it address? Personal Importance: Include a couple of paragraphs where each group member shares their personal connection or interest in the topic. Why is it important to you individually and as a group?
NOTE: it is allowed to partially use the content of your Final Project Proposal to form your Introduction!
- **Methodology (12 marks):**
Describe the research methods, algorithms and techniques used in your project. This should include details on data collection, data analysis, and any tools or software used. Did you design a new algorithm or customize an existing one? Explain how you selected your sample or data sources. Discuss any ethical considerations or limitations in your methodology.
- **Experiments/Simulations, Results & Analysis (12 marks):**
 - Present your findings and analysis of the data or information collected.
 - Use graphs, charts, and tables to visually support your analysis.
 - Explain the significance of your findings in relation to your research question.

- Ensure your analysis is clear and well-structured, and that it directly addresses the question you posed in the introduction.
- **Conclusion & Future Work (7 marks):**
 - Discuss the weaknesses and limitations of your project. This could include any limitations in your data, methodology, or the scope of your study.
 - Suggest avenues for future research, such as topics or questions that could be explored based on the insights gained from your project.
 - Finally, conclude with a paragraph (one separate paragraph per group member) describing what you learned from this project, and whether this report will be of any value to you – either for a future Northeastern course, or for some other project or endeavour you wish to pursue upon your graduation from Northeastern.
- **Code Implementation (4 marks):**
 - Ensure your codebase is well-structured, documented, and follows good software engineering practices (modularity, efficiency, readability). Use clear function names, comments, and docstrings. If applicable, include a README with setup instructions and a requirements.txt file for dependencies.

Note: I will not give you a “page limit” because depending on the nature of the project some reports will naturally be longer than others. Instead we will give you a “range” your report length must be **between 5000 words (10 pages) and 7000 words (15 pages)**. If you stay within this range, and address each of the points listed above, you will do well on this Final Project Report.

Deliverables:

- **Each team** should submit a PDF file containing your **Final Project Report** (*one submission per TEAM*)
- **Each member** should submit a **Peer Assessment** on their team members (*one submission per MEMBER*)
- **Each team** submit any code you’ve written as part of the project or any demo you’ve created. A jupyter or a GitHub page (make sure it’s public) notebook link would be the preferred submission method. (*one submission per TEAM*)

Good Luck!