

**CMPSC 580
Junior Seminar
Spring 2022**

**Assignment 5:
Feasibility: How *do-able* is my project?**

Objectives

To determine some of the parameters which are necessary to complete a technical project. To explore the available resources at hand (i.e., tools, skills, literature, data, and etc.) which will be applied to the completing of the project. To inquire whether a project can be completed in a given time frame (2-3 months) with the application of the available tools.



Figure 1: Is your idea feasible for the time and resources which are available to you?

Introduction

An project idea may look wonderful on paper but when the time comes to complete the work, the reality of the project may not seem so optimistic. In order to prevent a project from having a false-start where the project begins, but does not end, it is highly recommended that time be spend to explore the facets and details of the projects to determine possible pitfalls. For example, when embarking on a large project where many different resources are to come together for its completion, the researcher is advised to consider what these resources are and how much of them will be necessary for a successful conclusion to the project.

Resources and related questions come as shown below.

- **Hardware:** Do I have the correct equipment to run this project?
- **Skills:** Can I find a way to manipulate software /hardware? Can I write the necessary code? Can I install the necessary software and /or libraries that I will need? Can I connect these pieces as necessary for the project?
- **Tools:** What software, libraries, and similar do I need?
- **Data:** What data will I need? Where will I obtain my data? How much can I obtain? How much should I use?

- **Time:** How long should this project take? How long will each part of my project take to complete?
- **Results:** What do successful results look like?
- **Analysis:** How will I analyze the results? What approach to use in my analysis?
- **Other abilities and resources:** What else do I need for this project? Is there anything else that I may need to use or implement at some point to make this project successful?

To find direction in light of the above concerns, one may simply to *complete the project* and then report back on what was necessary for the task. In this case, we are not actually completing the project, but rather we are completing a *thought experiment* where the project is the deliverable of the experiment.

A Thought Experiment

Thought experiments are devices of the imagination which are employed for testing or exploration in various fields, such as, entertainment, education, conceptual analysis, exploration, hypothesizing, theory selection, theory implementation, and many others. Outlined at Wikipedia <https://en.wikipedia.org/>, a thought experiment is a hypothetical situation (i.e, experiment) in which a hypothesis, theory, or principle may have been laid-out for the purpose of thinking through its consequences (and allowing for types of basic testing). These experiments are not necessarily completed in the real world, but the knowledge can still be gathered from them when used in some analytical sense.

Discussed in Figure 2, a well-known thought experiment comes from a torturous experiment involving a cat by Schrödinger. In his work, Schrödinger outlines a hypothetical experiment to determine the health-state of a cat in a system, given various types of inputs and dangers including poison and radioactivity. To avoid committing severe animal cruelty in the name of his research, Schrödinger was able to gain some understanding by using only his imagination to manipulate the parameters of what would have proven to be a very dangerous experiment.

Design

In a thought experiment, the outcome may be unclear, however, the setup of the experiment is actually quite defined. For instance, the necessary elements of Schrödinger's work – the radioactive instruments, the poison, the cat, in addition to all the other elements, were clearly placed in the experiment with well-defined roles.

When designing a thought experiment for research, an investigator is invited to carefully consider all of the elements which would be necessary to gain knowledge from the results. During this time, the investigator is also given opportunities to realize (or discover) *what else* may be missing from the general experimental design. Missing entities may take the form of taking additional steps, adding more equipment, address faults in methodology, deeper analysis, or similar elements. In designing a thought experiment of the work, the investigator soon realizes some of the deeper aspects of the work to address for a project in *reality*.

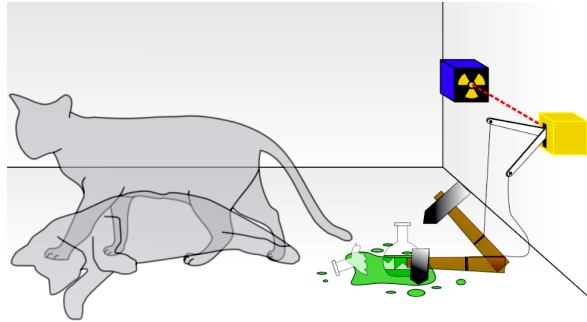


Figure 2: Schrödinger's cat: a cat, a flask of poison, and a radioactive source are placed in a sealed box. If an internal monitor (e.g. Geiger counter) detects radioactivity (i.e. a single atom decaying), the flask is shattered, releasing the poison, which kills the cat. The Copenhagen interpretation of quantum mechanics implies that, after a while, the cat is simultaneously alive and dead. Yet, when one looks in the box, one sees the cat either alive or dead, not both alive and dead. This poses the question of when exactly quantum superposition ends and reality resolves into one possibility or the other. Source: Wikipedia, https://en.wikipedia.org/wiki/Schr%C3%B6dinger%27s_cat.

Feasibility Study

Once all the pieces and steps of the work have been assembled in one's imagination for a thought experiment, their roles are (by this point) arguably more clearly defined. In addition, the details of timing – when each element is to be applied – are likely better understood. If the investigator feels that all the elements can be obtained and that the timing is convenient, then planning a real experiment may begin as it is thought to be **feasible**, meaning that it can be terminated successfully. Project feasibility is the determination of the *do-ability* of a project. It must be said here that feasible projects may still fail but that the likeliness of success is higher when the project is entirely feasible.

Clone Your Assignment Repository

Today's assignment repository can be found at the below link to a GitHub Classroom repository. Here you will work on your assignment and then you must push your work to the GitHub cloud where the instructor will be able to view your work for grading. Often, there will be files in your assignment repositories which you are to edit before you submit them by using the below commands for git. **Please note that the instructor cannot view your submission and cannot grade your work unless you push your work to the GitHub cloud!**

https://classroom.github.com/a/SidU_rIO

To use this link, please follow the steps below.

- Click on the link and accept the assignment
- Once the importing task has completed, click on the created assignment link which will take you to your newly created GitHub repository for this lab,

- Clone this repository (bearing your name) and work locally
- As you are working on your lab, you are to commit and push regularly. The commands are the following.
 - `git add -A`
 - `git commit -m 'Your notes about commit here'`
 - `git push`

Part 1, This Class: What To Do

By this time, you have already determined the idea of your research project, as well as the necessities that you will need to obtain for the completion of the work. You have also identified the knowledge gap between your research questions and your general field. At this stage, you are to be thinking about the scope and feasibility of your project so as to be able to complete the work during a particular amount of available time.

For this part, you are to design a thought experiment of the work and then answer some leading questions about how the steps are taken to complete the work. You will introduce and describe the individual elements and resources which are a part of your work. For this work, imagine that you are actually doing the work and that you are simply recording the details as they are completed. Please follow the deliverable in your work repository for leading questions for this part.

Part 2, Next Class: What To Do

During next class, you will interview a colleague from class where you will ask searching questions about the project to be able to uncover areas where problems may exist. For instance, you will ask questions concerning the structure of the project to be able to determine where there are potential pitfalls. When your interview has come to an end, your colleague will interview you in a similar way. Your thoughts and conclusions are to be included in your GitHub repository and also placed in the **Issue Tracker** of your colleague's GitHub account to enable them to access your ideas.

Summary of deliverables

- **For THIS class:** Complete questions in `writing/report.md`.
- **Web notebook:** Please provide a cohesive blog post for feasibility on your website (min 200 words) to summarize your answers for the leading questions.
- **For NEXT class:** Interview your colleague by following the leading questions in `writing/interview.md`. Please add these questions to your own GitHub working-repository and also share them with your colleague's by using their Issue Tracker.

Help?

Please let the instructor know of any questions that you may have. Please use email or make office-hour appointment slots if you would like to discuss an issue.