

# Software Pertaining to Underground Environments

Project Ideas for CS 440, Spring 2026

**Due:** Saturday January 24th, at 11:59 p.m. via Gradescope.

This semester CS 440 Software Engineering groups will be designing large complex software systems, from initial project conception through detailed system and object design. ( The actual implementation and testing of these project designs will be conducted later, by different groups of software engineers. ) Your initial task is to brainstorm potential project ideas, subject to the constraints given below.

The general theme for the Spring 2026 semester is “Software Pertaining to Underground Environments”, which is a very broad area with many possibilities. A few more clarifications and specifications:

- Your ideas should be new and original, not a repeat of something that has already been done, though you may combine old ideas in new and original ways. **This will be a criteria in evaluating your submission.**
- The scope of the project should be **LARGE**, requiring a team of professionals years to accomplish.
- Your application may be a game such as dungeon/cave exploration, or a more serious application such as geothermal analysis, oil/mineral exploration, seismic analysis and prediction, etc.
- A few ideas to think about and explore:
  - Who would benefit from this project, and what would the benefits be?
  - What commercial enterprises rely on underground resources? E.g. oil exploration, mining, freshwater supplies, geothermal energy ?
  - Software for scientific research involving underground data, ( e.g. core samples or data collected from subterranean sensors ), possibly in remote locations.
  - Software for environmental protection issues, such as predicting the movement of contaminants in underground streams and through porous media.
  - Early detection and warning of earthquakes, tsunamis, or volcanic eruptions.
  - If you choose to develop a game, how can you make it new and unique, and not just another D&D variant?
- Your project must do some meaningful work, and must be more than a web site. ( It may use an HTML interface for access, but the real meat of the project would be behind the interface, and should involve some serious computations or other work beyond looking up and presenting data. )
- The underground component needs to be significant and important. Not just an existing game or app transformed into an underground environment.
- If you have access to someone who can play the role of a knowledgeable client, it will make life easier.

Your task is to brainstorm possible ideas for projects, and to write up your ideas in a one- to two-page written report. ( 12 pt font, single spaced,  $\leq 1$ ” margins, similar to this page. ) It is up to you to organize and communicate your ideas effectively, and to decide whether to use your page(s) to develop a lot of ideas briefly or a few ideas more thoroughly. You may want to incorporate sketches, diagrams, or mockups if they help you to more effectively communicate your thoughts and ideas. Your writeup should also give some consideration as to who would use the application and their objectives in doing so. Include reference information if relevant.

Note that this is an individual assignment, not group work. Submissions will be evaluated based on original creativity, the scope of the project, usefulness/value of the proposed product, and effective communications. There will be time to share your ideas with team mates later when groups are formed.