

I. Company background

Hazen Research is an R&D mineral processing company specializing in refining precious metal and rare earth extractions and preparing flowsheets for process scale-up to minimize risk through pilot plants. Hazen has a wide range of laboratory equipment to use to analyze mineral composition, and ways of grinding it down further.

II. Description of Work to be Done

As a result, we need a better way of managing and tracking samples for various projects. We need a database that can be accessed both offline and/or hosted locally, with an emphasis on security. User computers run windows, but servers can run Linux or Windows.

The goal is for users to be able to upload various data types and information depending on the type of test selected, such as XRDs, Particle Size Analysis, Titrations. Data should be able to be filtered based on type of test and/or project number.

- **Flexible Type Entry.** New machines and technology enter the field regularly, and we create new methods all the time. Being able to create and potentially remove different field labels for tests is important.
- **Project Number Filtering.** All samples are attached to a 5-digit project ID.
- **Sample Progress Tracker.** Metadata for sample progress through the system should update automatically between Received – In Progress – Complete. It would be nice if there was a % associated with “in-progress”.
- **Multiple Data Types.** Every test has different data associated with it. Pictures/images, PDF reports, and raw numerical data with varying amounts of entries.
- **Export to .csv for Excel.** Post-processing of data is done in other programs.
- **Original Sample Connection.** One sample can produce multiple tests. The original data point needs to be linked so that subsamples can inherit the metadata.
- **Multiple User Types.** There will be a superuser, manager, and technician level, all with different levels of editing permission.
- **Date Logging.** Time the test was run (user entered), time data entered, and time last modified.
- **Frontend Development.** A user-friendly GUI that is not just terminal based.

III. Stretch Goals

- **Locally Hosted Website.** Will not connect to the greater web, but can be accessible from the same network. Point of data entry, with removal only possible by certain levels of user.

IV. Desired Skills for Students

Not everyone is computer literate at Hazen. The best solution is one that is usable by someone who is comfortable with minimal Excel use and emails.

- SQL/Database Languages,
- GUI development,
- Network integration,
- Communication/User experience techniques

V. Team Size

Between 2-4 people.

Internships: If available, they would be very hands-on in the physical lab; it would not be a computer science internship. Students would gain experience on how there's a lot of things that could benefit from automation in the mining industry.

VI. Location

Work can be completed from anywhere, and I am open to remote check-in meetings or coming to the Mines campus. Hazen Research is off Indiana street, ~10 minutes away from Mines.

VII. Intellectual Property Rights

No NDA is required, as dummy data will be provided. We will jointly hold the Intellectual Property Rights to the database.