C.S. FIELD SESSION
Advanced Software Engineering

Table Mountain Innovation, a Golden-based medical device consultancy, wants *your* help with an interesting web-based method to track blood test results.

Start here:

http://tablemountaininnovation.com
https://www.apple.com/ios/health/

There is currently no way to plot, graph, track, and evaluate blood test results over time. This is important for people with long term chronic or changing conditions that require blood testing.

We need a web-based graphing tool to parse and graph blood test result data. Users upload their test data, and the web tool will produce graphs & charts useful to the clinician and patient.

This is a python project!
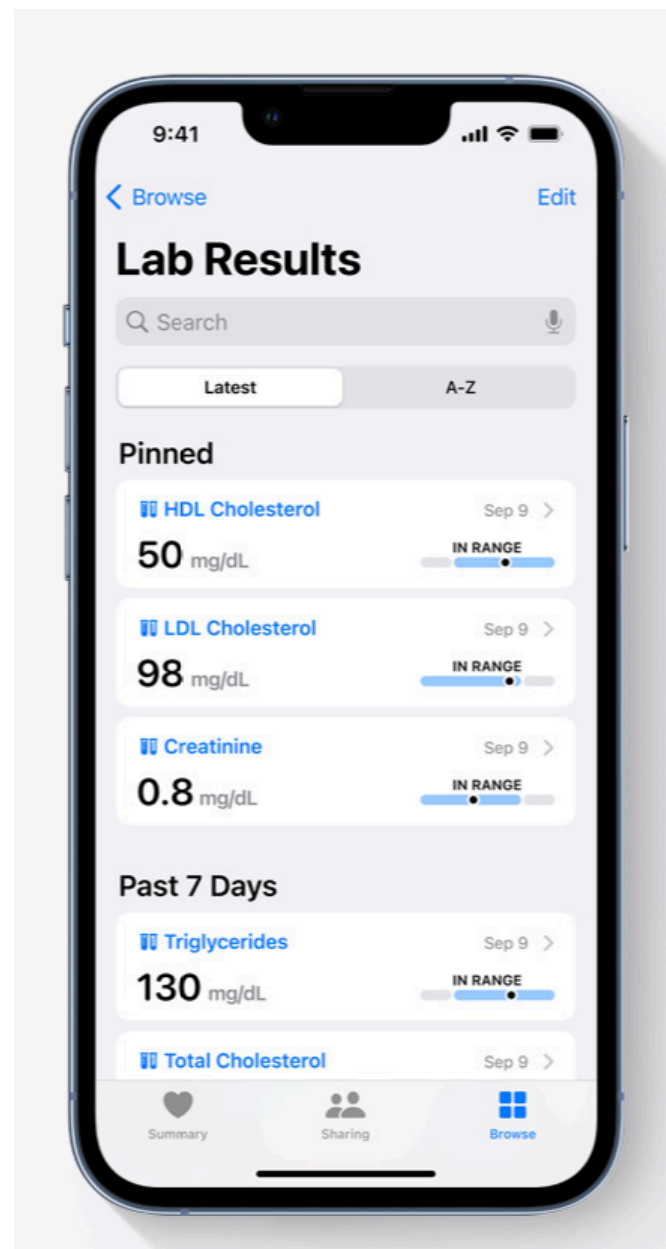
Blood test results re-imagined!

Apple currently ships all iPhones with the "Apple Health" app installed. Android does not have such an app.

The "Apple Health" app can ingest data directly from Quest or Labcorp (nationwide blood testing centers), but the app has terrible UI for long term viewing and correlation of this data.

The app WILL generate a VERY complicated JSON or XML file with a poor schema and deeply nested dictionaries of lists of strings.

We need to extract the data from the JSON file, and graph it in the web with beautiful and flexible UI, hover pop-ups, inclusion / exclusion of data sets, etc.

The web tool should be written in Python & Django with some open source graphing package.

Note that this code may become the basis for a commercial product!

========================

Tasks:

- Research Python, Django, and hosting services
- Research the blood test results data structures
- Understand parsing & filtering required to extract the data.
- Work with Chris on UI ideas.
- Code the web tool!
- **Stretch Goal** - Add user accounts, etc.

Sample File shown below... there are 100's!!!

Schedule:
Sprint 1: Intro, definitions, access to tools, pick a Project Manager
Sprint 2: Specific requirements, begin work
Sprint 3: Implementation, Check-in
Sprint 4: Implementation, Check-in, Course Correct
Sprint 5: Implementation, Check-in, Final Update
Sprint 6: Final Tweaks, Presentation

Technologies:
- Python & Django
- Some open source (or Python included) graphing libraries
- Web hosting
- An interest in physiologic data manipulation!
- Generate CSV files
- Exposure to FHIR and HL7 (good for medical software!)
- GITLAB Repository
- Agile Tool = Jira

Specifics:
- Mostly zoom, maybe 1-2 onsite meetings in North Golden (near Cannonball Brewery)
- Simple "work for hire" and NDA gives us ownership to your code. (See CPW)
- No required "work hours". We will have a single 1-hour meeting every week.
- Guidance from senior engineers
- Potential Internship after the project is over
- If we do meet onsite at our facility... No Dress Code! T-shirt and Flip-Flops are OK
- Team Size 3-6
- *p.s.   We're the Fun Team!*

Contact:
Chris Crowley - Founder
720-232-9000
Table Mountain Innovation Incorporated
1440 Brickyard Road #2
Golden CO 80403

```
resourceType:          "DiagnosticReport"
contained:
  0:
    id:                "1"
    category:
      coding:
        0:
          system:      "http://hl7.org/fhir/observation-category"
          code:        "laboratory"
    subject:
      reference:       "Patient/15614213"
    effectiveDateTime: "2021-04-01T15:02:00+00:00"
    resourceType:      "Observation"
    code:
      coding:
        0:
          system:      "http://labcorp.com/ers/testCodes"
          display:     "Sedimentation Rate-Westergren"
          code:        "005215"
        1:
          system:      "http://loinc.org"
          display:     "Sedimentation Rate-Westergren"
          code:        "4537-7"
    interpretation:
      coding:
        0:
          system:      "http://hl7.org/fhir/v2/0078"
          code:        "N"
    referenceRange:
      0:
        low:
          value:       0
          unit:        "mm/hr"
        high:
          value:       30
          unit:        "mm/hr"
        text:          "0-30 mm/hr"
    meta:
      profile:
        0:             "http://fhir.org/guides/argonaut/StructureDefinition/argo-observationresults"
    valueQuantity:
      value:           2
      system:          "http://lca.unitsofmeasure.org"
      unit:            "mm/hr"
    status:            "final"
    issued:            "2021-04-02T12:08:00.000+00:00"
```