Preparing For Insight Data Engineering

Insight Fellows Bridge the Gap series
November 4, 2020

INSIGHT

Who is this session intended to help

- Applicants who want an overview on the Insight Data Engineering Program, application process, and coding challenge

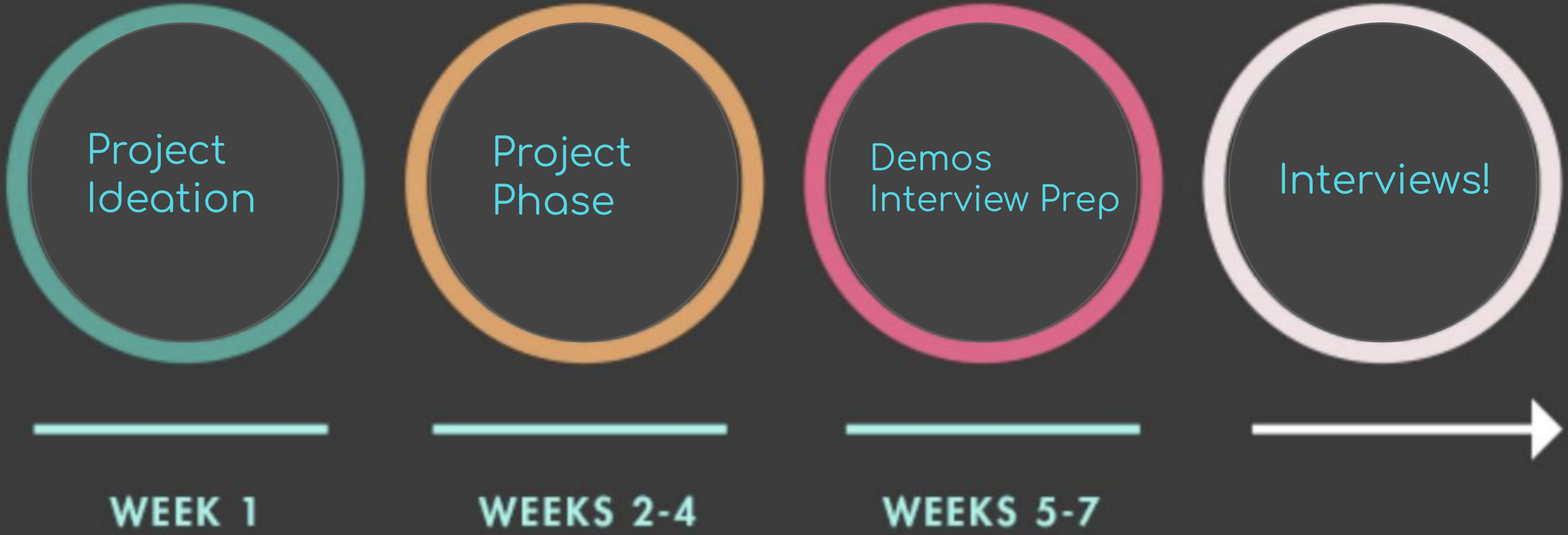
Who is this session not intended to help

- Applicants who want to learn how to code
- Applicants who want more information on how to do well on the data science, health data science, artificial intelligence, devops engineering, decentralized consensus fellowship process (Please check out the Bridge the Gap series for those programs)

What is Insight Data Engineering?

- Intensive 7 week full-time project-based training
- Need-based scholarships available
- No education requirement
- Build scalable, distributed data pipelines; (data warehouse, benchmarking, etc.)
- Self-directed collaborative learning, no classes
- Data Engineering program: one cohort, two time zones (ET, PT)
- Each program has separate admissions process

INSIGHT IN A NUTSHELL



Project Ideation

WEEK 1

Project Phase

WEEKS 2-4

Demos
Interview Prep

WEEKS 5-7

Interviews!

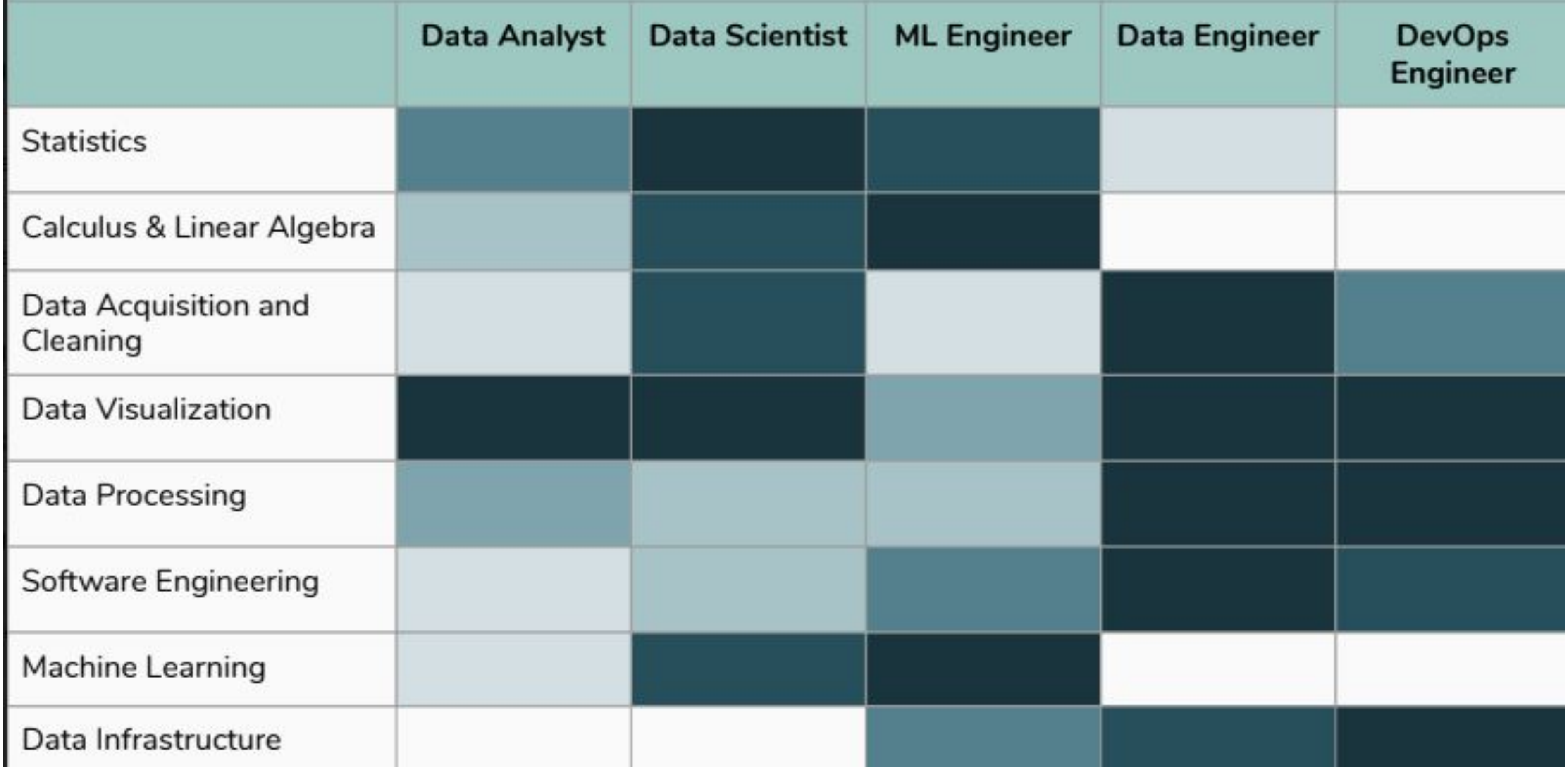
Admissions process

1. Apply at https://apply.insightdatascience.com
2. Coding challenge with a week to complete
3. One or more 15-30 minute remote interviews
4. Decision

What do Data Engineers do?

- Develop, construct, test and maintain architectures for big data
- Align architecture with business requirements
- Data acquisition
- Data cleaning and processing
- Identify ways to improve data reliability, efficiency and quality
- Use large data sets to address business issues
- Prepare data for predictive and prescriptive modeling
- Use data to discover tasks that can be automated

Summary: Specialization of skills



So you want to be a data engineer...

Data engineering is software engineering with a speciality in data

To be a good data engineer, you also must demonstrate that you can be a **good software engineer**

- You know how to code
- You can solve problems using code
- You can contribute production-quality code

What does the Insight DE coding challenge test for?

- Can read a problem statement, understand it and solve using code
- Knowledge of basic data structures
- Able to write clean, modular code using software best practices
    - Readable, modular
    - Tested
- Knowledge of Linux and basic command-line
- Familiarity of version control tools (i.e., git)
- Communication -- able to explain how you solve a problem

Can read coding challenge, understand & code it

- We spend a lot of time preparing and writing the problem statement presented in the coding challenge we send

- If you have questions that prevents you from completing the coding challenge (e.g., suspected error or contradiction in challenge description or input and output data) email cc@insightdataengineering.com
  - But first, re-read the Readme
  - Don’t email questions for the sake of contacting us -- we receive hundreds of emails and try to respond to each and every one

Clean, modular code & software best practices

- Write clean and modular code that other people beside you can read
  - consistent style
  - meaningful names for variables functions
  - If the code can be reused, create a module
  - Judiciously comment your code -- take an entire line to comment

```
int count = 0 #keeps count
```
🚫

```
# keep count of products
int count = 0
```
🙂

- Provide exception handling and tests to ensure your code works as expected
- Luckily, many clean-code resources available online
  - Python: https://docs.python-guide.org/writing/style/
  - Java: https://docs.python-guide.org/writing/style/
  - Scala: https://twitter.github.io/effectivescala/
  - C++:https://github.com/lefticus/cppbestpractices/blob/master/03-Style.md

Knowledge of Linux, basic command-line

- Data engineers must be comfortable navigating Unix and shell scripting commands
  - DE program is not for you if you want to work exclusively in Jupyter notebooks or IDEs

- For the challenge, you need to know only the basics.

  Eg: **`cd`**, **`chmod +x filename.sh`**

- Luckily, many resources available online
  - https://www.howtogeek.com/412055/37-important-linux-commands-you-should-know/
  - https://www.guru99.com/must-know-linux-commands.html
  - https://www.geeksforgeeks.org/introduction-linux-shell-shell-scripting/

Familiarity of version control i.e., git

- Git is the most popular open-source version control software
- Version control allows you to track changes over time and is essential for team collaboration
- Documentation available: https://git-scm.com/docs

Communicate how you solved it

- Data engineers need to communicate with other engineers, data scientists, business users and others
- Documenting the code that you wrote is essential for others to understand what you did

How the Insight coding challenge is organized

- Applicants typically receive challenge via Github link
- Challenge consists of problem statement via Readme
- In the past, applicants asked to read input file(s), do some processing and write results to output file(s)
- Applicants expected to provide Github link to their codebase
- For best results, code in Python, Java, Scala or C++
  - Do not use R, Matlab, C#
  - Do not submit Jupyter notebook

General Insight coding challenge directory structure*

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
        |-- tests
                |-- test_1
                        |-- input
                        |-- output
```

*** Subject to change in the future**

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
        |-- tests
                |-- test_1
                        |-- input
                        |-- output
```

While the coding challenge Readme contains instructions on what we are asking you to program, when you submit your solution, you should rewrite the Readme to clearly describe your approach to solving the challenge

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
      |-- tests
            |-- test_1
                  |-- input
                  |-- output
```

This subdirectory is where the code you write should reside

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
      |-- tests
            |-- test_1
                  |-- input
                  |-- output
```

This subdirectory is where your code should expect to read any input files

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
      |-- tests
            |-- test_1
                  |-- input
                  |-- output
```

This subdirectory is where your code should expect to write any output files

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
      |-- tests
            |-- test_1
                  |-- input
                  |-- output
```

You must modify this script to run/invoke your code, and compile it if necessary (e.g., Java, C++)

Coding challenge directory structure

```
|-- Readme.md
|-- run.sh
|-- src
|-- input
|-- output
|-- insight_testsuite
          |-- tests
                   |-- test_1
                            |-- input
                            |-- output
                   |-- write_your_own_test
                            |-- input
                            |-- output
```

This subdirectory is where tests can be found and added to. Insight usually provides test_1

But you can add a new directory with your own test cases

How to add your own tests and test your code

Create a new subdirectory under **tests** with additional input and output subdirectories. In this case it’s named **write_your_own_test** but rename it to a more appropriate name for your test

```
|-- insight_testsuite
        |-- run_tests.sh
        |-- tests
                |-- test_1
                        |-- input
                        |-- output
                |-- write_your_own_test
                        |-- input
                        |-- output
```

How to add your own tests and test your code

In the **input** directory, create a file (of if the challenge calls for it, multiple files) with the data that you want to use as input to test your code

```
|-- insight_testsuite
        |-- run_tests.sh
        |-- tests
                |-- test_1
                        |-- input
                        |-- output
                |-- write_your_own_test
                        |-- input
                        |-- output
```

How to add your own tests and test your code

In the **output** directory, create a file (of if the challenge calls for it, multiple files) with the data you would expect your code to output if it were correct/pass your test

```
|-- insight_testsuite
        |-- run_tests.sh
        |-- tests
                |-- test_1
                        |-- input
                        |-- output
                |-- write_your_own_test
                        |-- input
                        |-- output
```

Common questions / issues

- Follow instructions on how to submit code
- Do not check-in Jupyter notebooks with your code
- Use only built-in or standard libraries
  - Do not use pandas or add-on libraries that need to be downloaded and installed locally (e.g., in Python, if you need to ‘pip install’ it first then it’s non-standard)
- `run.sh` has been modified to execute your program (e.g., make sure the command to run your code is not commented out)
- Test your code before submission using the link provided

Questions?