DAILY ASSESSMENT FORMAT

Date:	20-07-2020	Name:	POOJA K S
Course:	Coursera	USN:	4AL17EC070
Topic:	Mathematics for Machine Learning: Linear Algebra	Semester & Section:	6th SEM and 'B'section
Github Repository:	pooja-shivanna		

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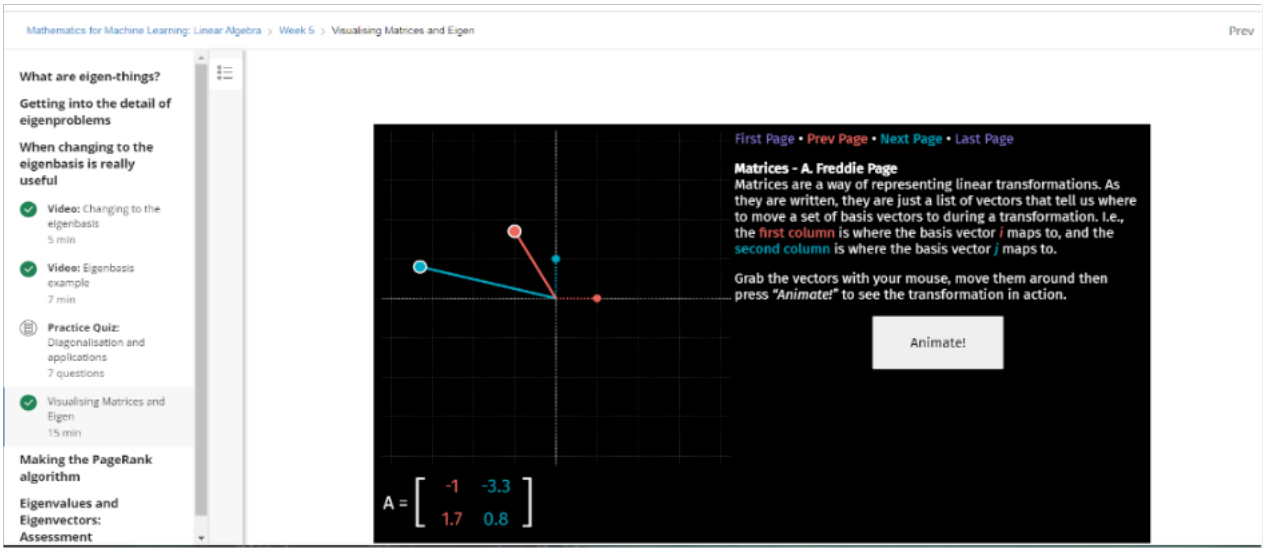
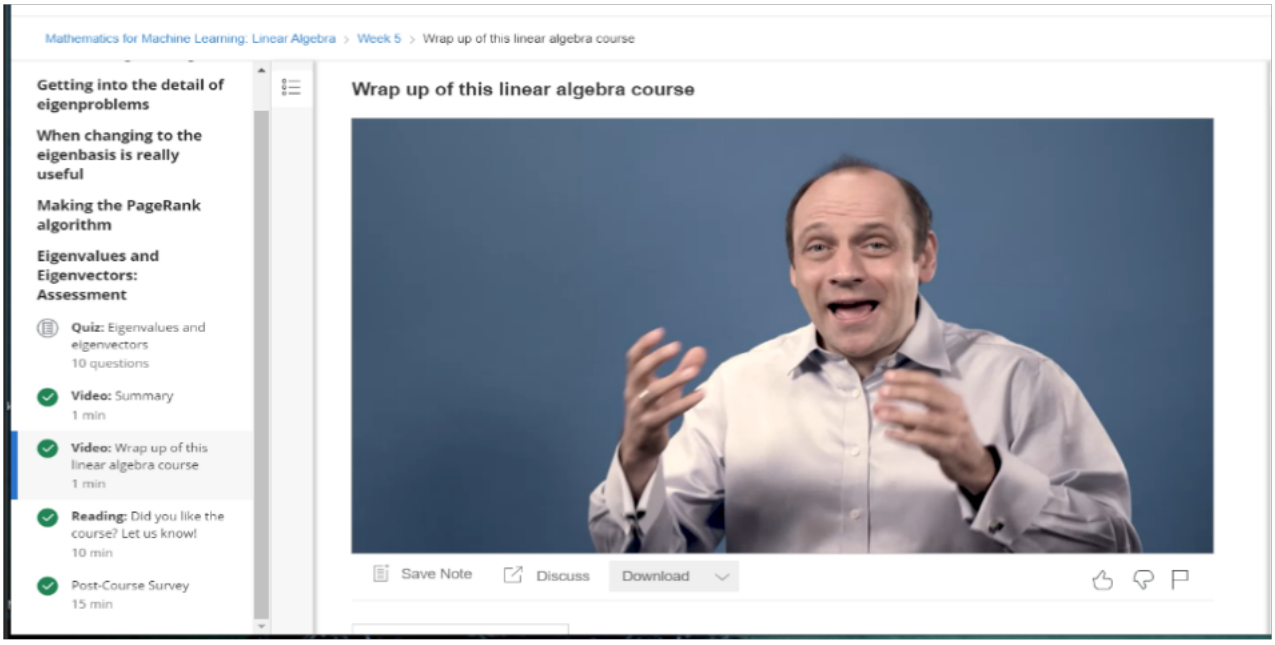
FORENOON SESSION DETAILS(9.00am to 1.00pm)





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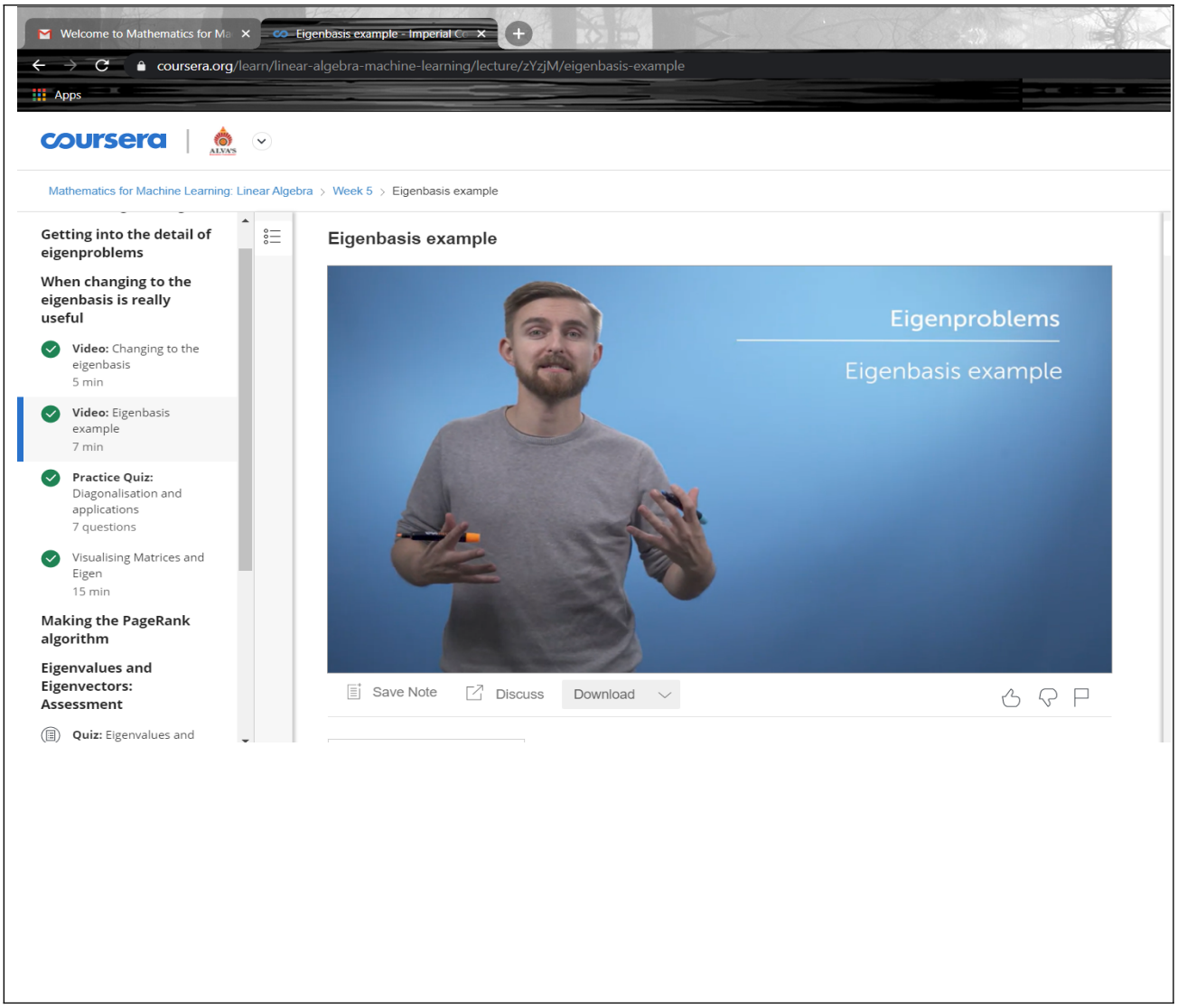

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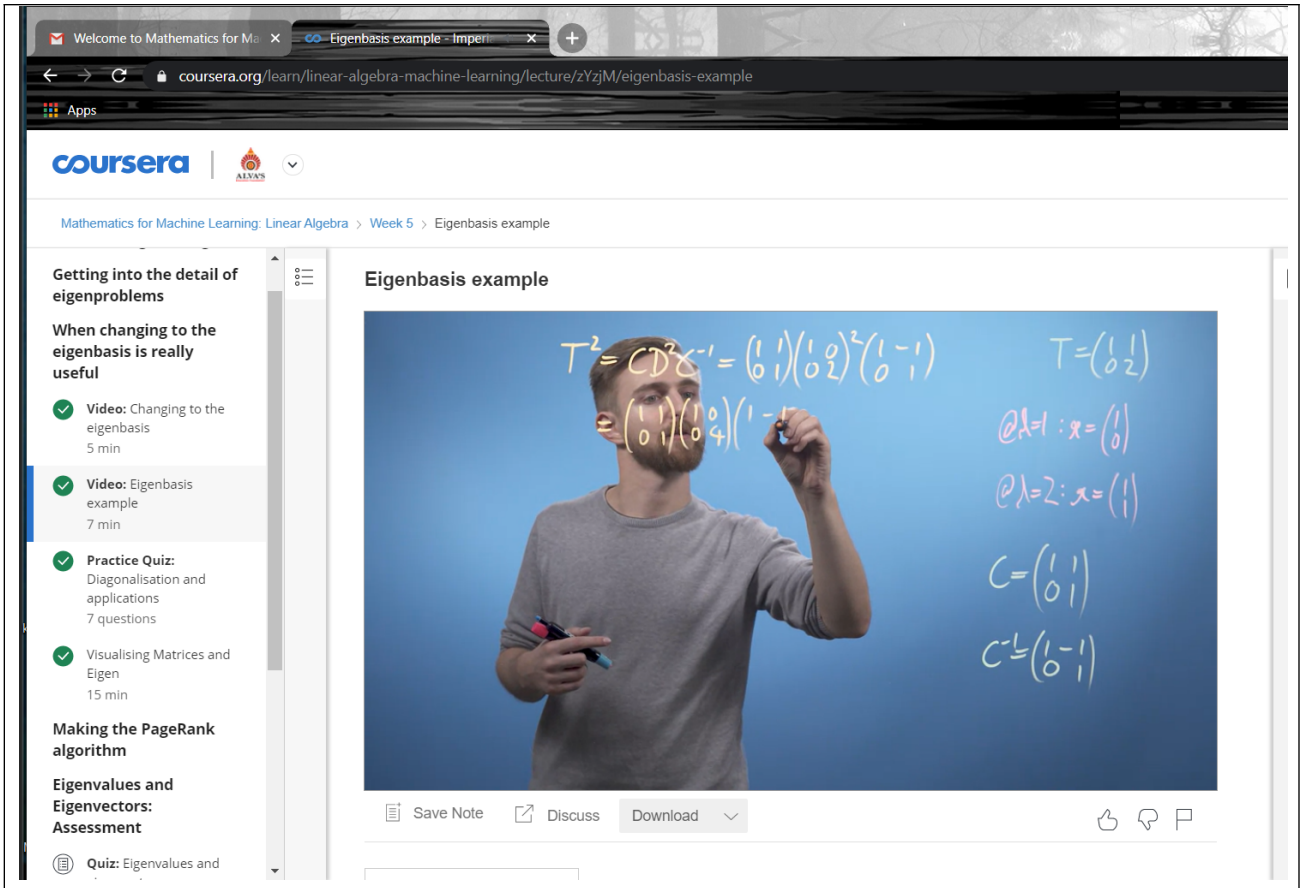

Linear algebra is a sub-field of **mathematics** concerned with vectors, matrices, and **linear** transforms. It is a key foundation to the field of **machine learning**, from notations used to describe the operation of algorithms to the implementation of algorithms in code

Although linear algebra is integral to the field of machine learning, the tight relationship is often left unexplained or explained using abstract concepts such as vector spaces or specific matrix operations.

In this post, you will discover 10 common examples of machine learning that you may be familiar with that use, require and are really best understood using linear algebra.

After reading this post, you will know:

The use of linear algebra structures when working with data, such as tabular datasets

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and images.

Linear algebra concepts when working with data preparation, such as one hot encoding and dimensionality reduction.

The ingrained use of linear algebra notation and methods in sub-fields such as deep learning, natural language processing, and recommender systems.

The math includes at least **calculus**, statistics, probability theory. and **linear algebra**. Numerical analysis and something like topology will help if you want to create your own algorithms or tackle deep learning.

Linear algebra is absolutely key to understanding the calculus and statistics you **need** in **machine learning**. ... Deeper Intuition: If you can understand **machine learning** methods at the level of vectors and matrices you will improve your intuition for how and when they work

Definition of **linear algebra**. : a branch of mathematics that is concerned with mathematical structures closed under the operations of addition and scalar multiplication and that includes the theory of systems of **linear** equations, matrices, determinants, vector spaces, and **linear** transformations.

Linear algebra plays a major role in **Artificial Intelligence** and machine Learning. In various machine learning algorithms like supervised learning and unsupervised learning, to calculate inputs and to train the machines with the characteristics and expected outputs.

Main point of the Matrix

The **Matrix** trilogy suggests that everyone has the individual responsibility to make the choice between the real world and an artificial world. Though Neo is the exemplar of free will, fate plays a large role in his adventure. Neo relies on the Oracle, and everything she says comes true in some way.

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Application of Matrices

Almost every branch of physics, including classical mechanics, optics, electromagnetism, quantum mechanics, and quantum electrodynamics, **matrices** are used to study physical phenomena, such as the motion of rigid bodies.

Matrices have also come to have important applications in computer graphics, where they have been used to represent rotations and other transformations of images. is a 2 × 3 **matrix**. A **matrix** with n rows and n columns is called a square **matrix** of order n

Matrices are classified according to the number of rows and columns, and the specific elements therein. (i) Row **Matrix**: A **matrix** which has exactly one row is called a row **matrix**. The above two **matrices** are row **matrices** because each has only one row.

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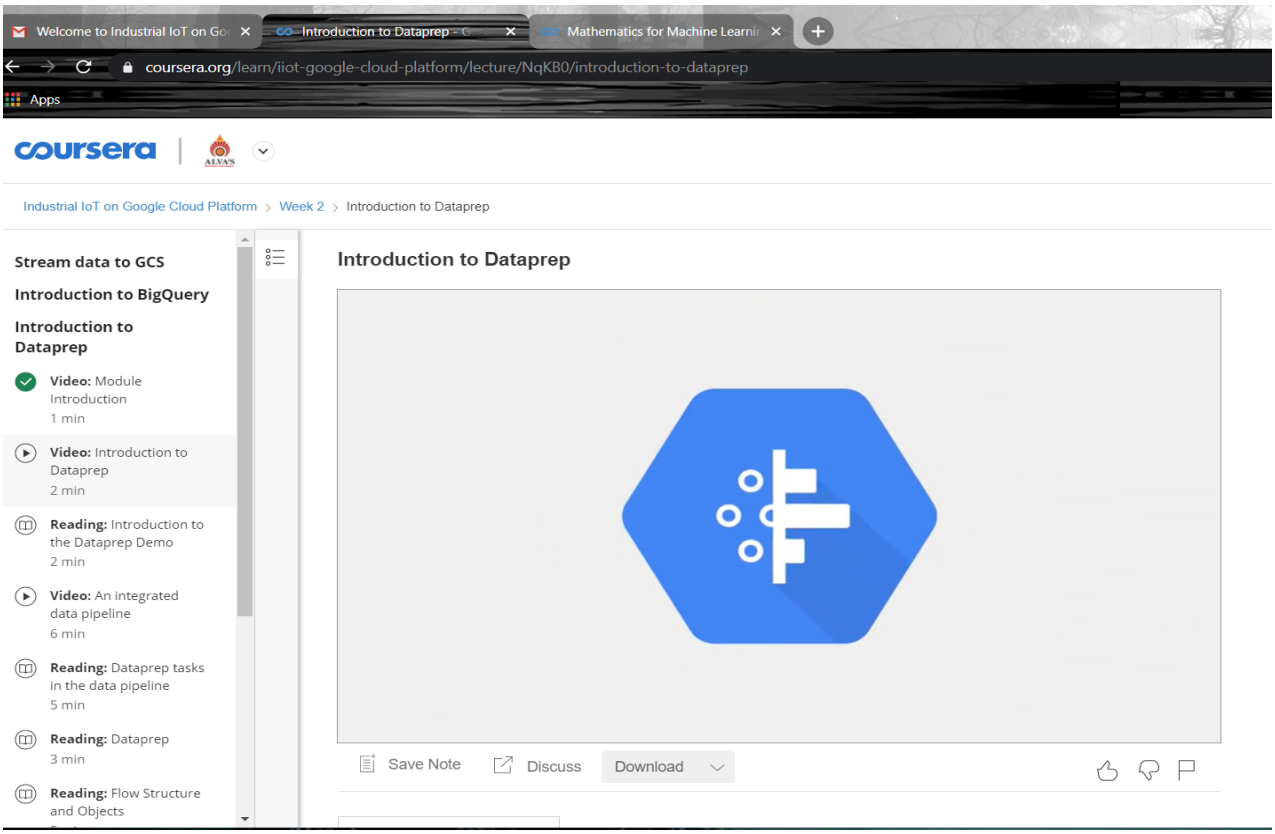

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Apps

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Industrial IoT on Google Cloud Platform > Week 2 > Introduction to Dataprep

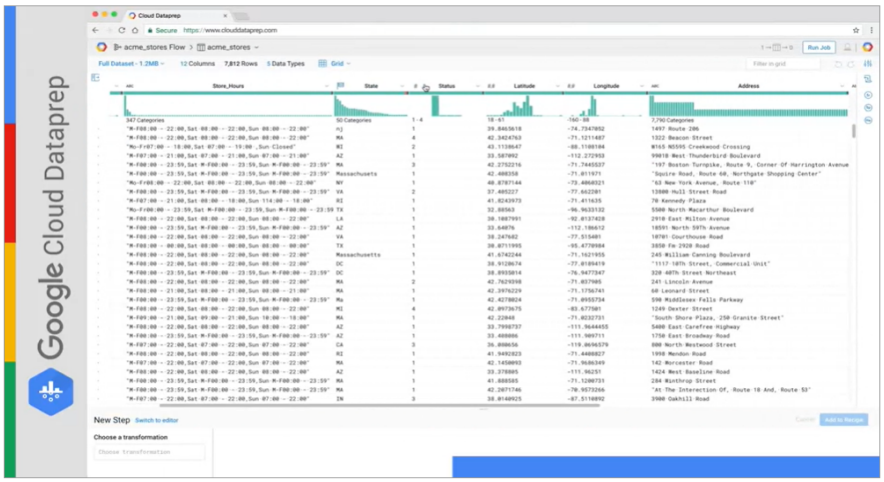
Stream data to GCS

Introduction to BigQuery

Introduction to Dataprep

- **Video:** Module Introduction — 1 min
- **Video:** Introduction to Dataprep — 2 min
- **Reading:** Introduction to the Dataprep Demo — 2 min
- **Video:** An integrated data pipeline — 6 min
- **Reading:** Dataprep tasks in the data pipeline — 5 min
- **Reading:** Dataprep — 3 min
- **Reading:** Flow Structure and Objects

Introduction to Dataprep



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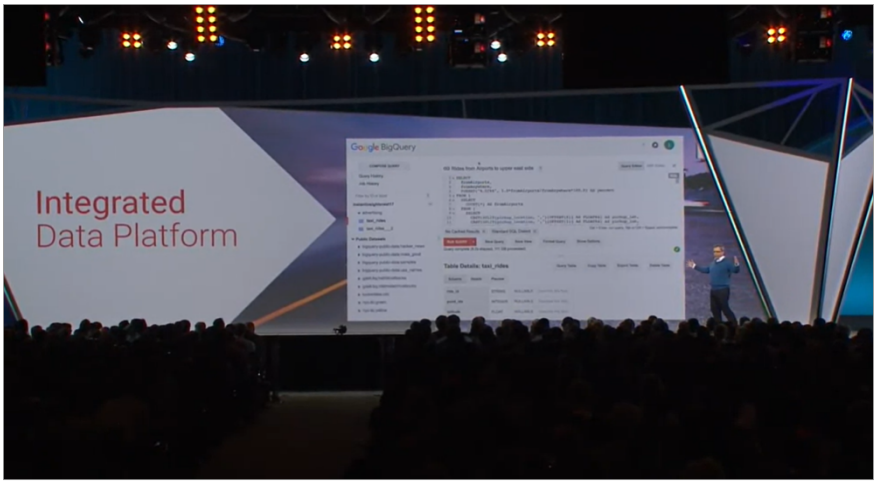
An integrated data pipeline



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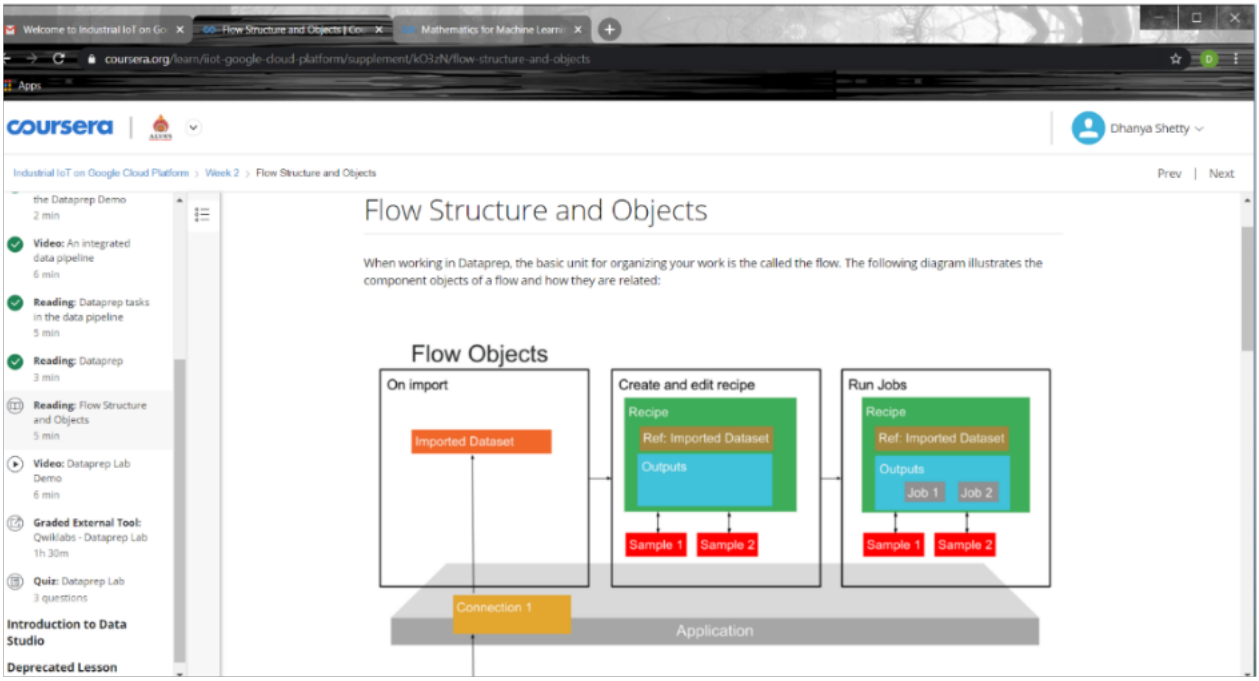

Google Cloud Platform (**GCP**), offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning. Registration requires a credit card or bank account details.

Google Cloud Platform provides infrastructure as a service, platform as a service, and server less computing environments.

In April 2008, Google announced App Engine, a platform for developing and hosting web applications in Google-managed data centres, which was the first cloud computing service from the company. The service became generally available in November 2011. Since the announcement of the App Engine, Google added multiple cloud services to the platform.

Google Cloud Platform is a part of **Google Cloud**, which includes the Google Cloud Platform public cloud infrastructure, as well as **G Suite**, enterprise versions of Android and Chrome OS, and application programming interfaces (APIs) for machine learning and enterprise mapping services.

Storage & Databases

- Cloud Storage - Object storage with integrated edge caching to store unstructured data.
- Cloud SQL - Database as a Service based on MySQL and PostgreSQL.
- Cloud Big table - Managed NoSQL database service.

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- Cloud Spanner - Horizontally scalable, strongly consistent, relational database service.
- Cloud Datastore - NoSQL database for web and mobile applications.
- Persistent Disk - Block storage for Compute Engine virtual machines.
- Cloud Memory Store - Managed in-memory data store based on Radis.
- Local SSD: High-performance, transient, local block storage.
- File store: High-performance file storage for Google Cloud users.

Networking

- VPC - Virtual Private Cloud for managing the software defined network of cloud resources.
- Cloud Load Balancing - Software-defined, managed service for load balancing the traffic.
- Cloud Armour - Web application firewall to protect workloads from DDoS attacks.
- Cloud CDN - Content Delivery Network based on Google's globally distributed edge points of presence.
- Cloud Interconnect - Service to connect a data centre with Google Cloud Platform
- Cloud DNS - Managed, authoritative DNS service running on the same infrastructure as Google.
- Network Service Tiers - Option to choose Premium vs Standard network tier for higher -performing network.

Big Data

- Big Query - Scalable, managed enterprise data warehouse for analytics.
- Cloud Dataflow - Managed service based on Apache Beam for stream and batch data processing.
- Cloud Dataproc - Big data platform for running Apache Hadoop and Apache Spark jobs.

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- Cloud Composer - Managed workflow orchestration service built on Apache Airflow.
- Cloud Data lab - Tool for data exploration, analysis, visualization and machine learning. This is a fully managed Jupiter Notebook service.
- Cloud Data prep - Data service based on Trifecta to visually explore, clean, and prepare data for analysis.
- Cloud Pub/Sub - Scalable event ingestion service based on message queues.
- Cloud Data Studio - Business intelligence tool to visualize data through dashboards and reports.

Cloud AI

- Cloud AutoML - Service to train and deploy custom machine, learning models. As of September 2018, the service is in Beta.
- Cloud TPU - Accelerators used by Google to train machine learning models.
- Cloud Machine Learning Engine - Managed service for training and building machine learning models based on mainstream frameworks.
- Cloud Job Discovery - Service based on Google's search and machine learning capabilities for the recruiting ecosystem.
- Dialog flow Enterprise - Development environment based on Google's machine learning for building conversational interfaces.
- Cloud Natural Language - Text analysis service based on Google Deep Learning models.
- Cloud Speech-to-Text - Speech to text conversion service based on machine learning.
- Cloud Text-to-Speech - Text to speech conversion service based on machine learning.
- Cloud Translation API - Service to dynamically translate between thousands of available language pairs
- Cloud Vision API - Image analysis service based on machine learning
- Cloud Video Intelligence - Video analysis service based on machine learning

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