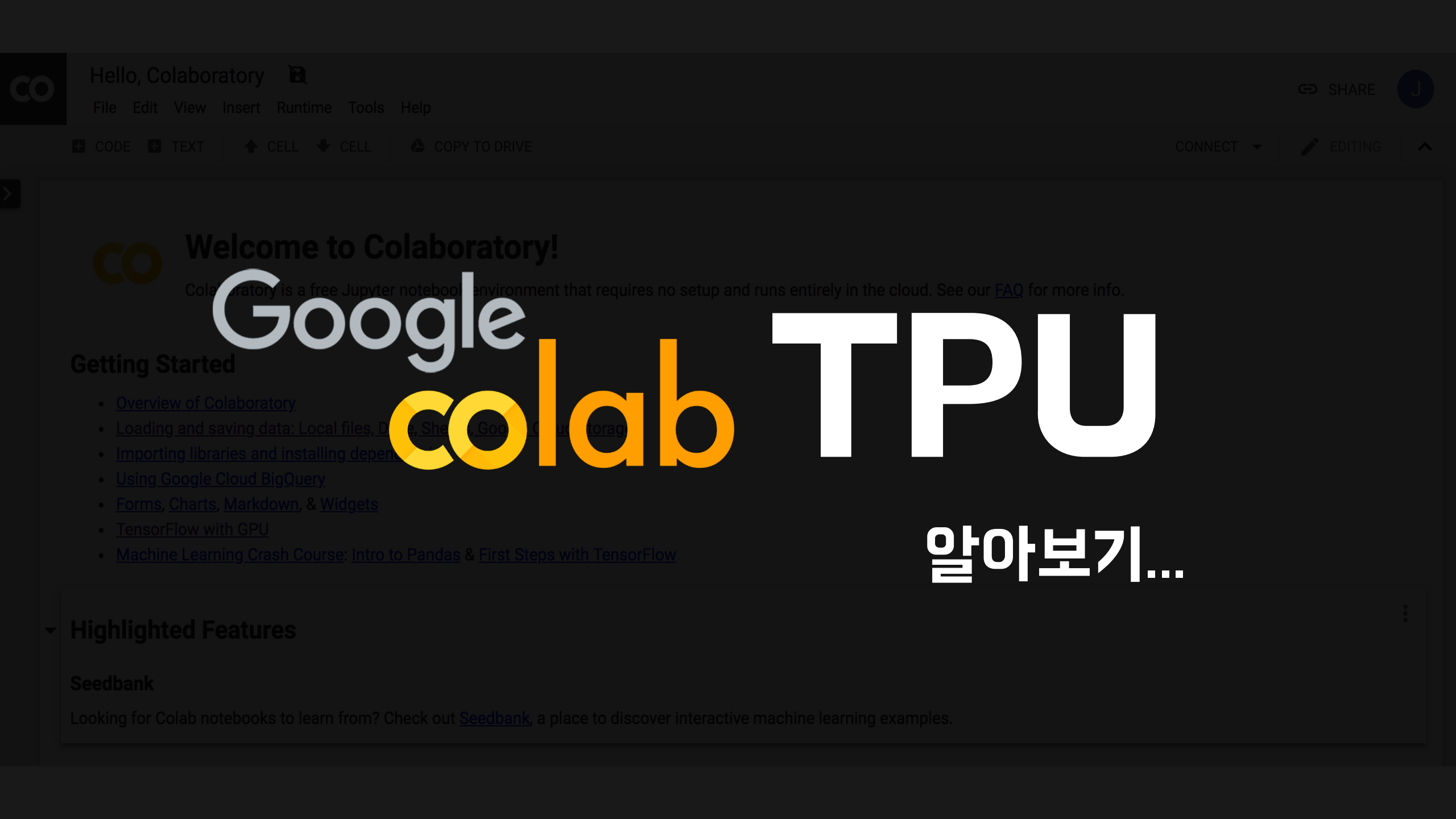
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발표자 소개

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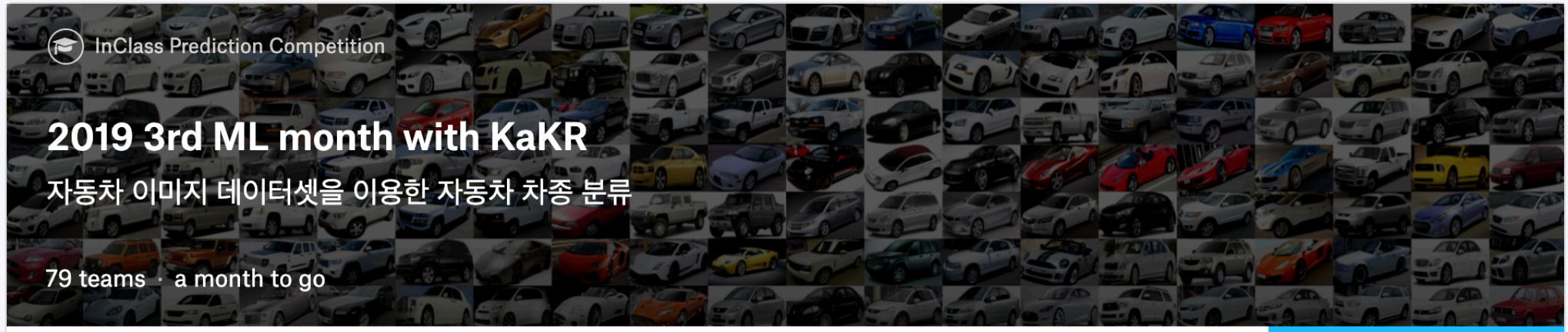
현 캐글코리아 운영진
KaKR 3rd Competition 준비 & 운영

특징 : 업무 및 취미 캐글



Overview Data Kernels Discussion Leaderboard Rules Team Host My Submissions **Submit Predictions**

Overview Edit

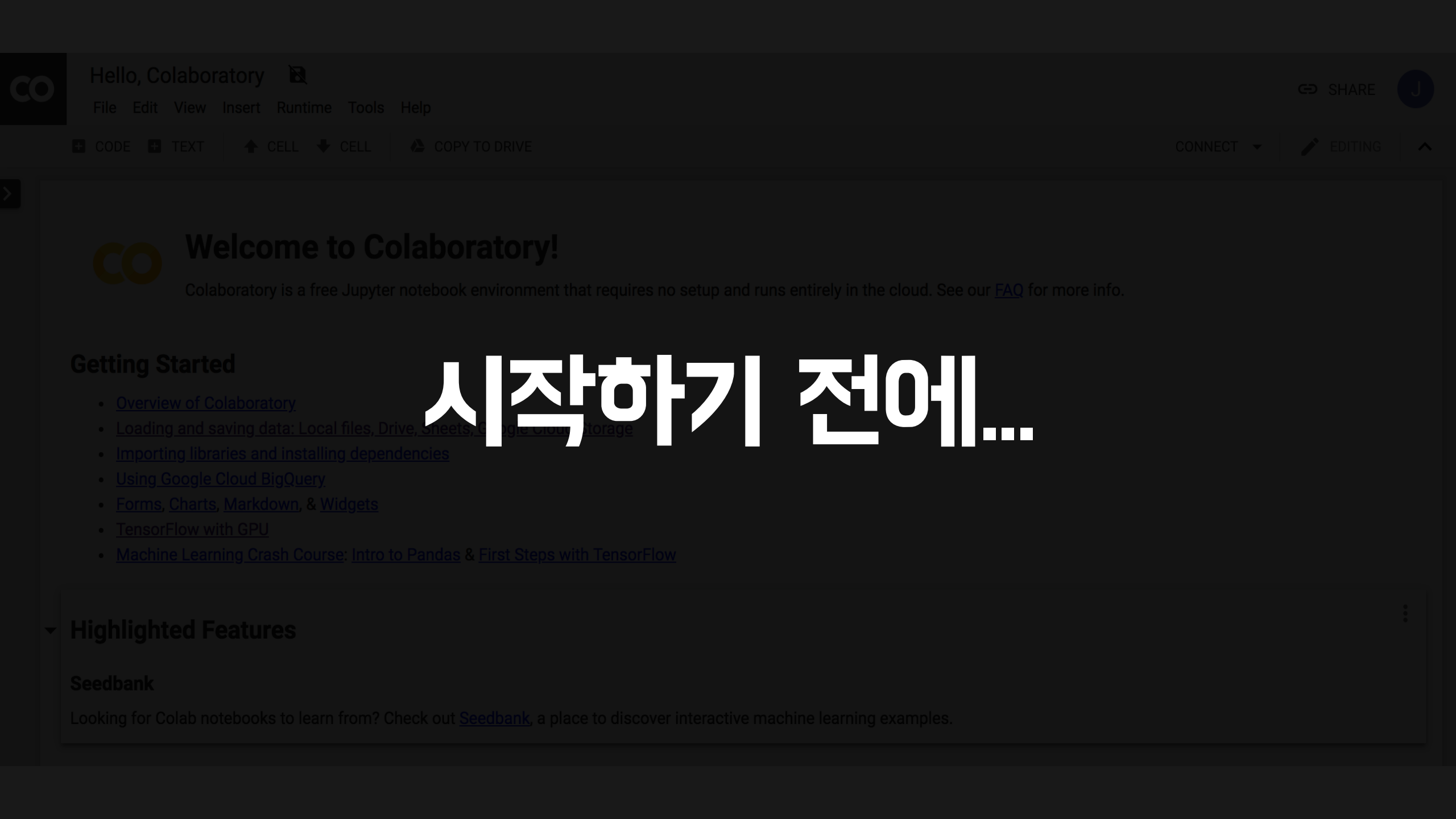
Description

Evaluation

Timeline

How to classify car classes ?

https://www.kaggle.com/c/2019-3rd-ml-month-with-kakr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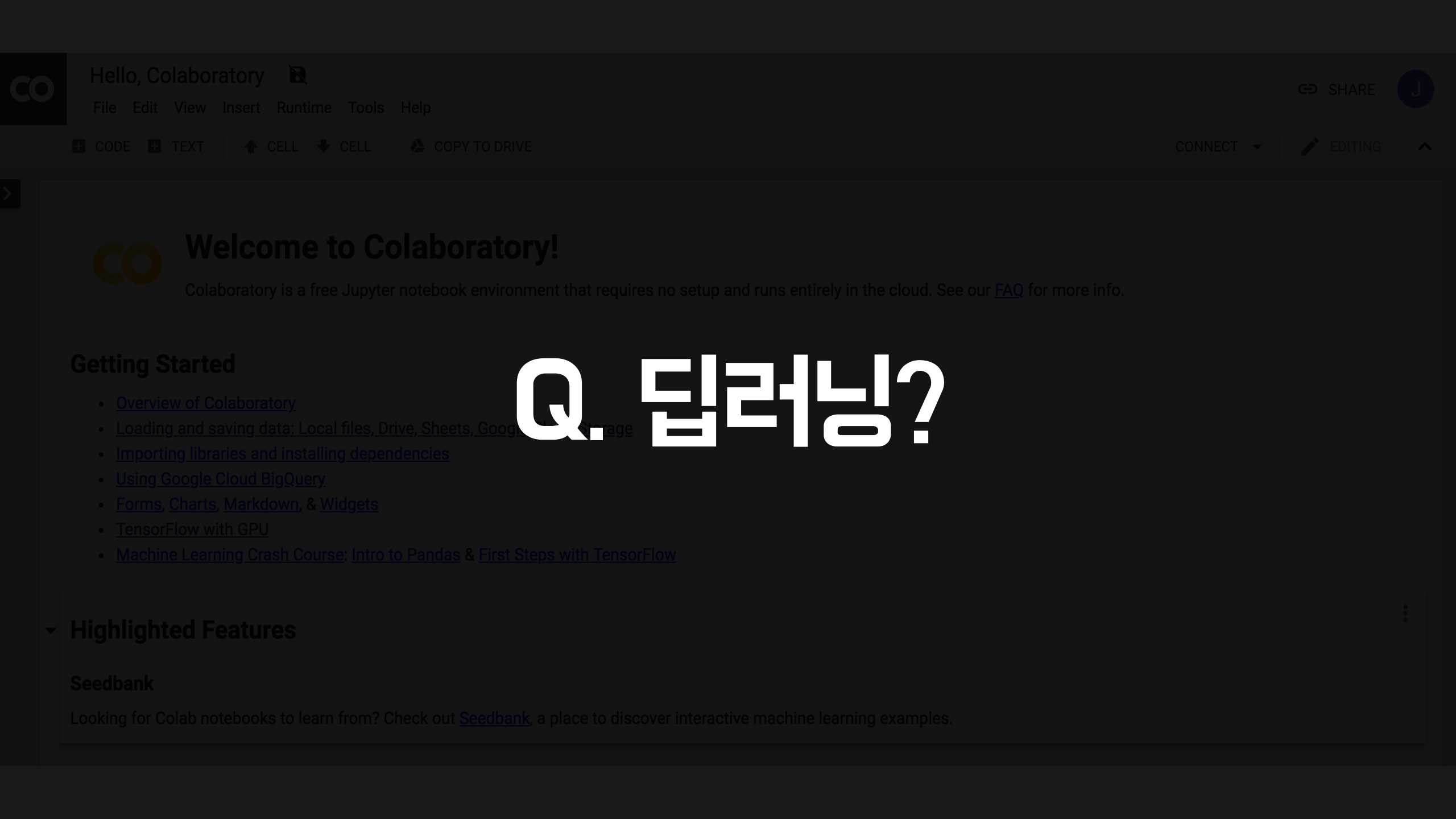
시작하기 전에...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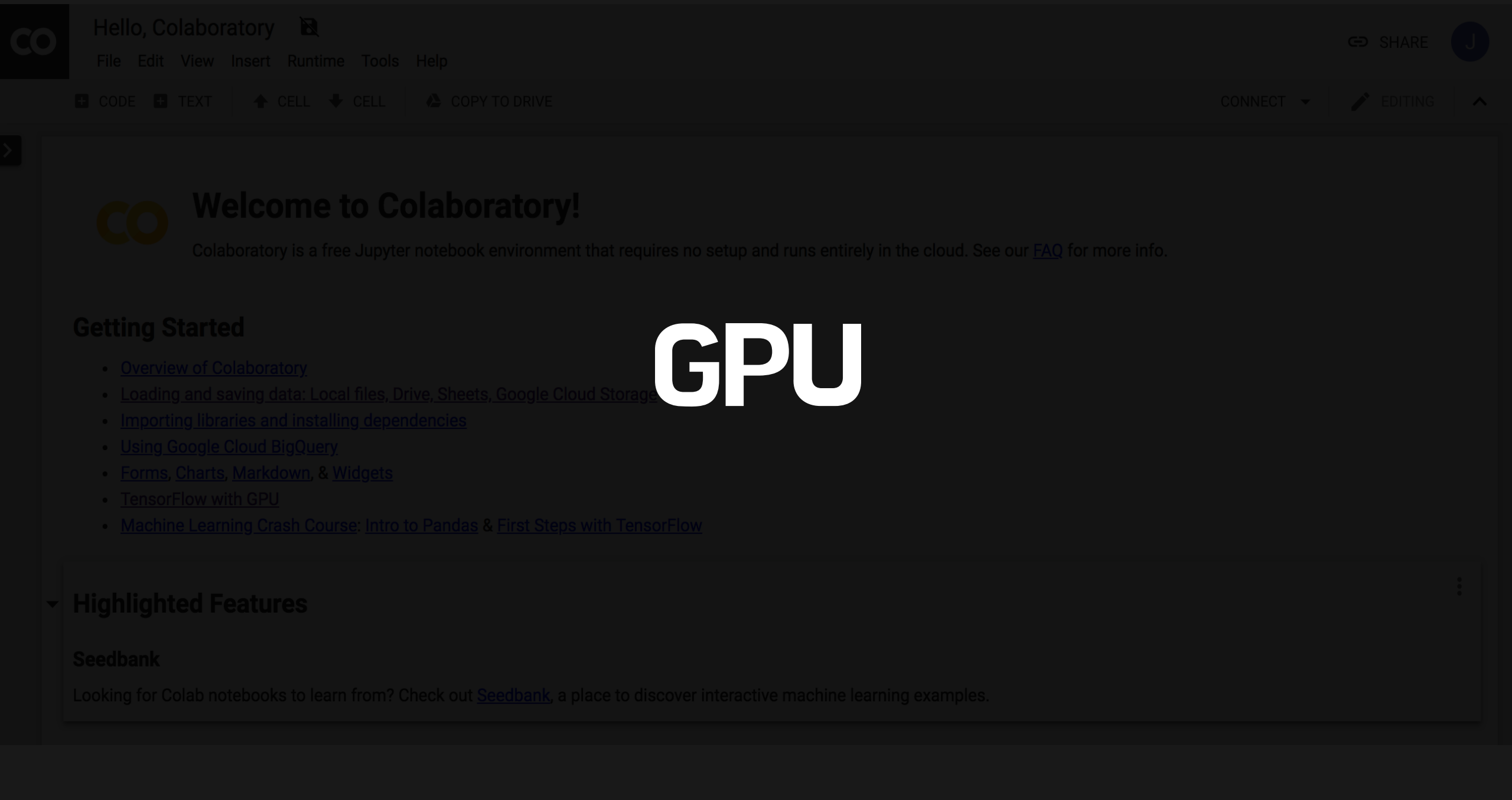
Q. 딥러닝?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NVIDIA

Nvidia Tesla v100 16GB

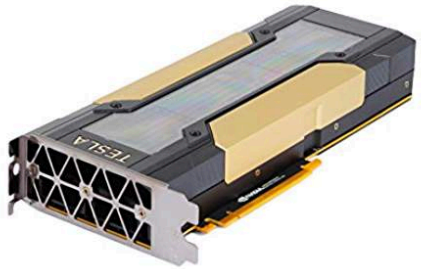
by PNY

Eligible for Shipping to Korea, Republic of

$5,995.00

Only 13 left in stock - order soon.

Produ
... NVID
...



NVIDIA Tesla V100 Volta GPU Accelerator 32GB Graphics Card

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TENSO

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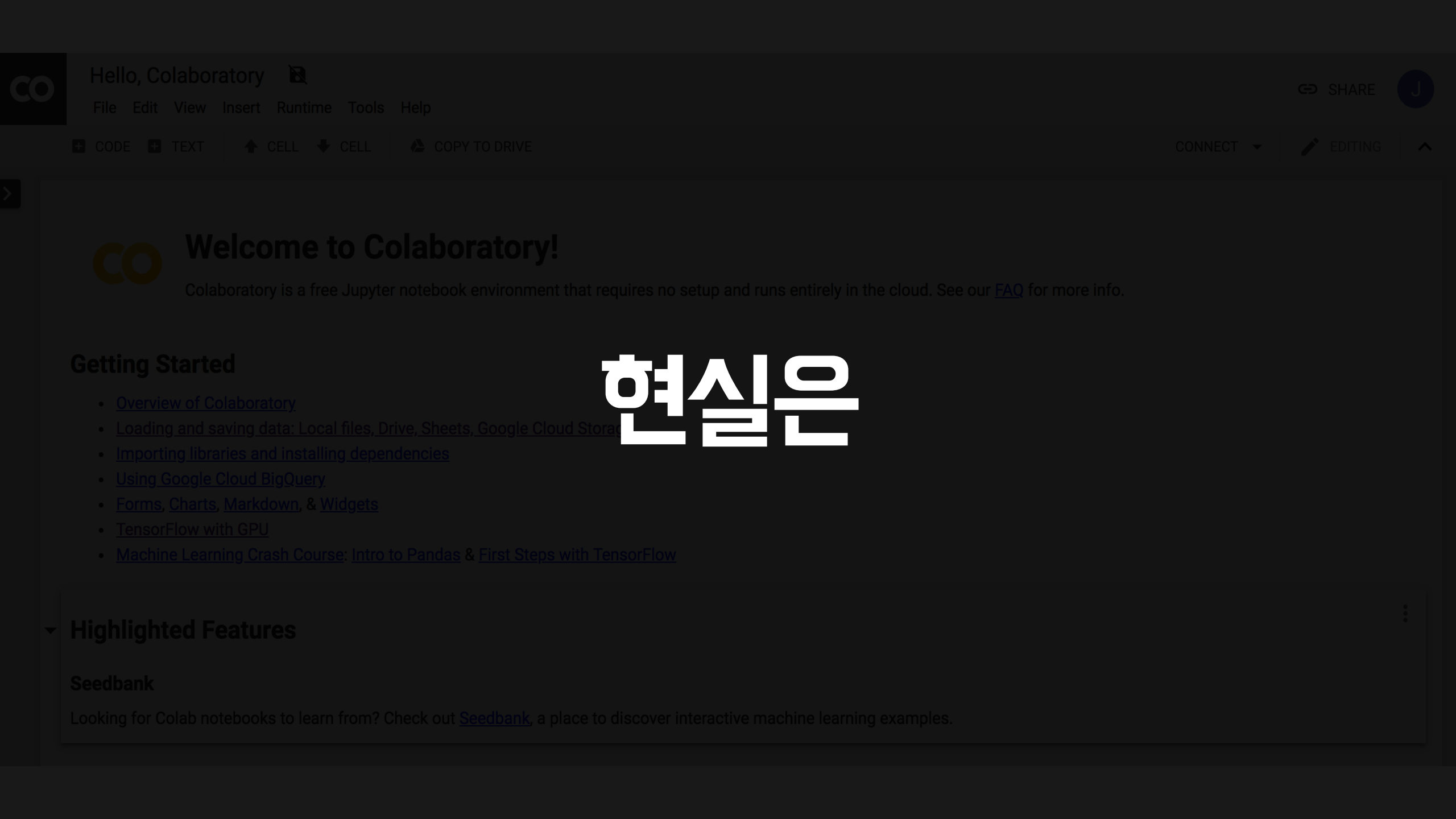
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GTX 1060

3 GB

VS

GTX 1060

6 GB

10 Entered Competitions

Jigsaw Unintended Bias in Toxicity Classification
Detect toxicity across a diverse range of conversations
Featured · Kernels Competition · 7 days to go · biases, nlp, text data

$65,000
10/3167

APTOS 2019 Blindness Detection
Detect diabetic retinopathy to stop blindness before it's too late
Featured · Kernels Competition · 2 months to go · healthcare, medicine, image data, multiclass...

$50,000
587 teams

SIIM-ACR Pneumothorax Segmentation
Identify Pneumothorax disease in chest x-rays
Featured · 2 months to go · image data, object segmentation

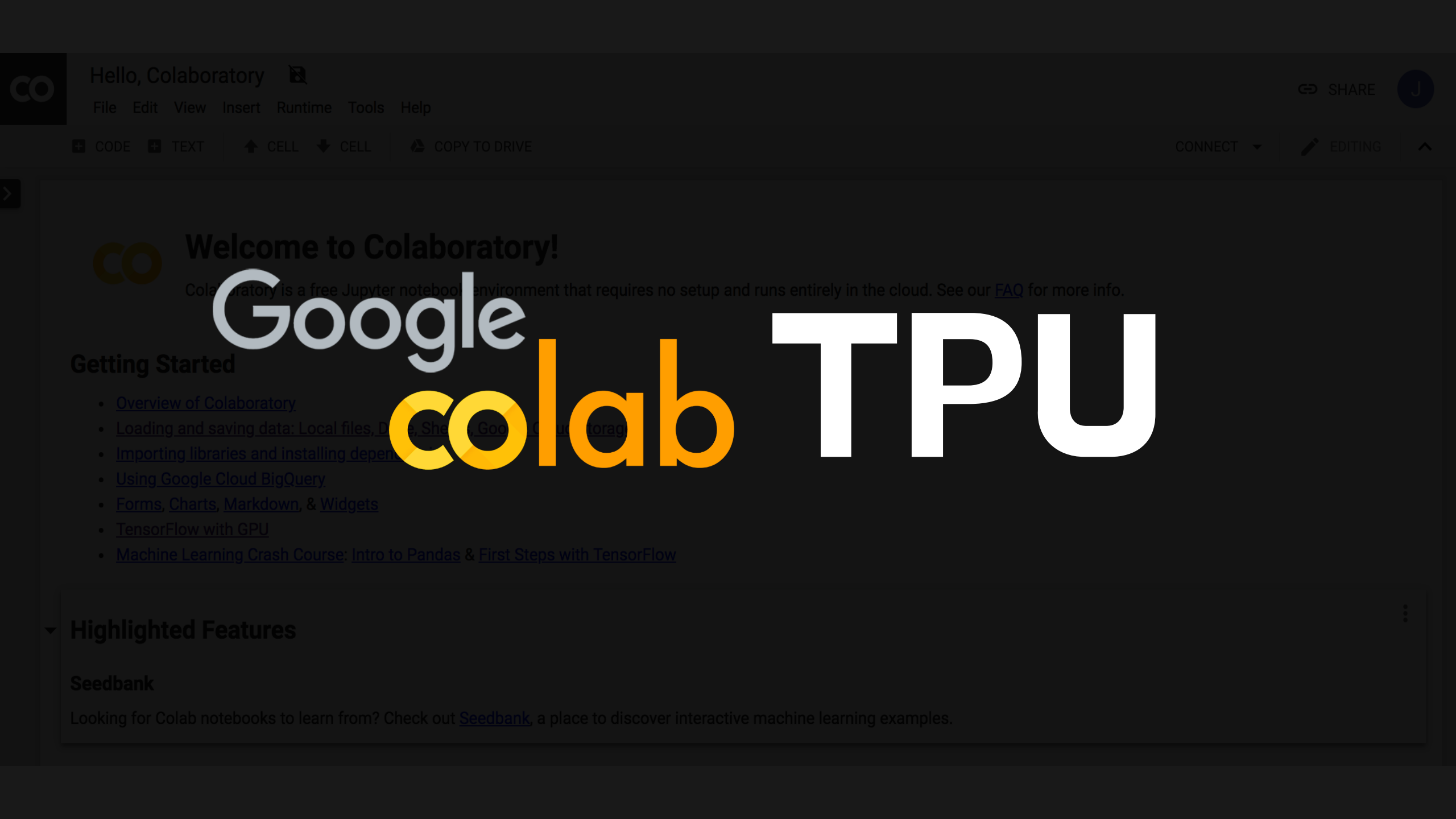
$30,000

Predicting Molecular Properties
Can you measure the magnetic interactions between a pair of atoms?
Featured · 2 months to go · chemistry, tabular data, regression

Data Science for Good: City of Los Angeles
Help the City of Los Angeles to structure and analyze its job descriptions
Analytics · 12 days ago · employment, nlp, image data, text data

Recursion Cellular Image Classification
CellSignal: Disentangling biological signal from experimental noise in cellular images
Research · 3 months to go · research, biology, classification, image data

Generative Dog Images
Experiment with creating puppy pics
Research · Kernels Competition · a month to go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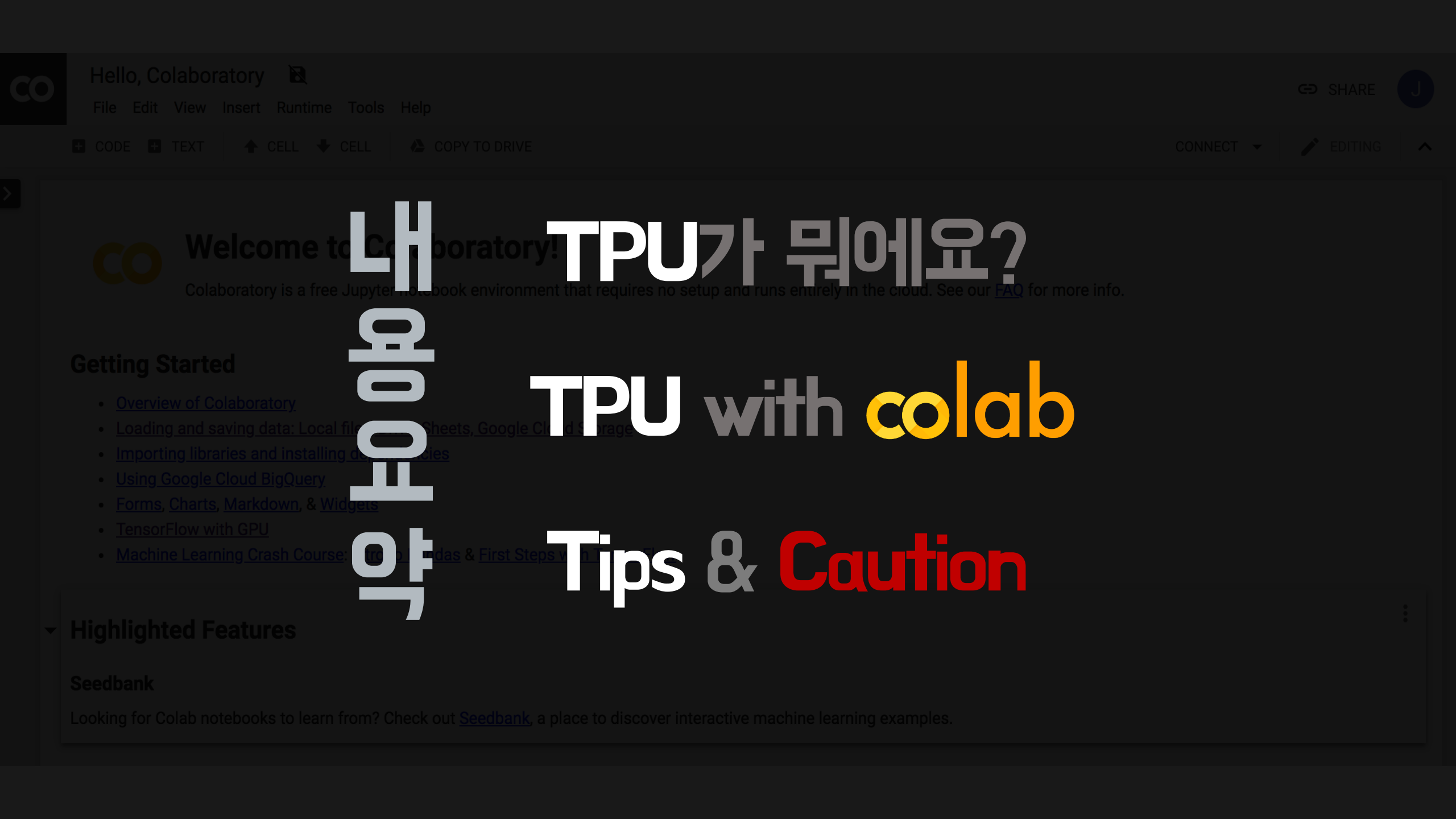
Google
colab
TPU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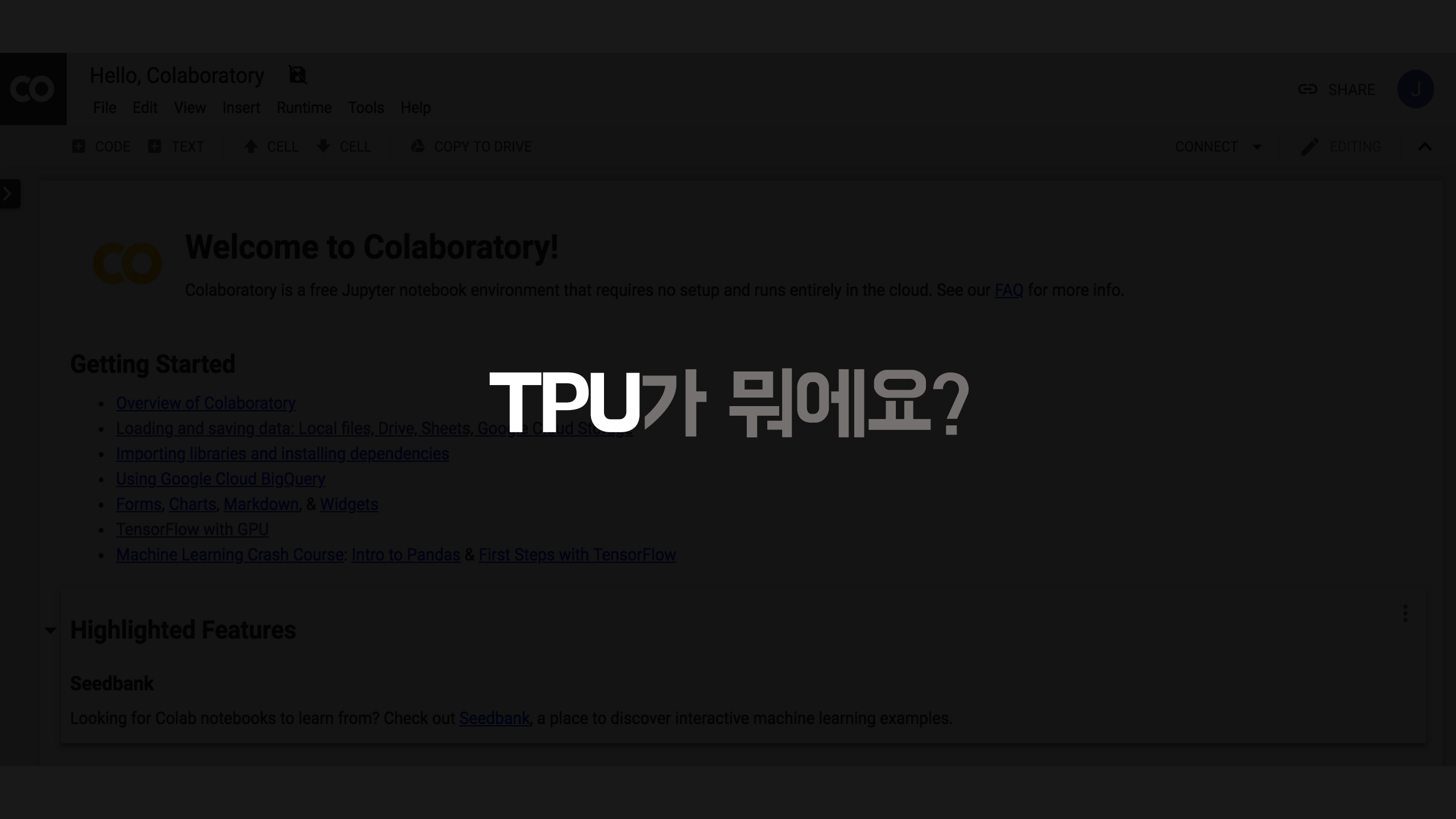
내 용 요 약
TPU가 뭐에요?
TPU with colab
Tips & Caution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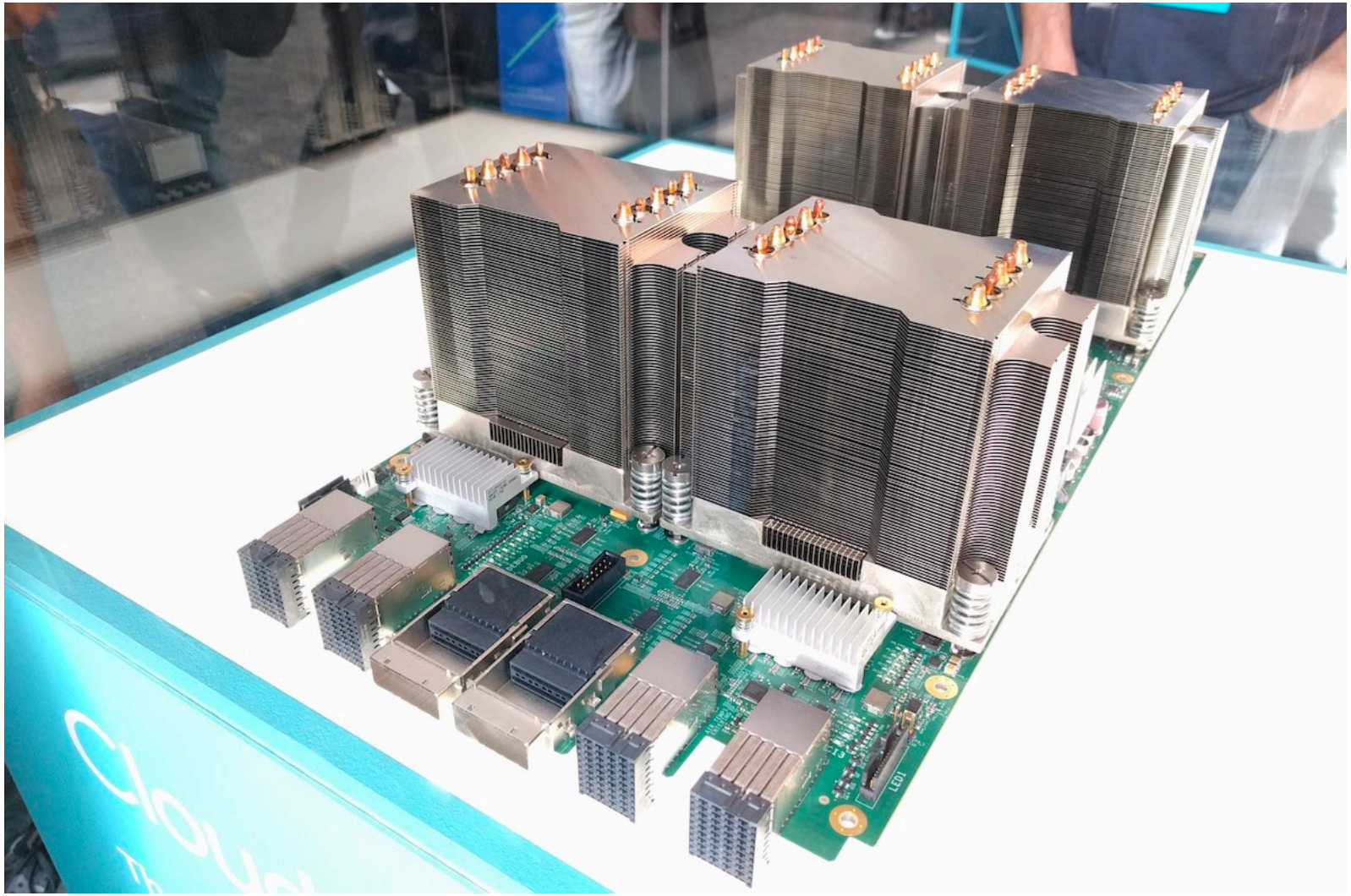
TPU가 뭐에요?

TPU가 뭐에요?

Tensor Processing Unit

(텐서 처리 장치)

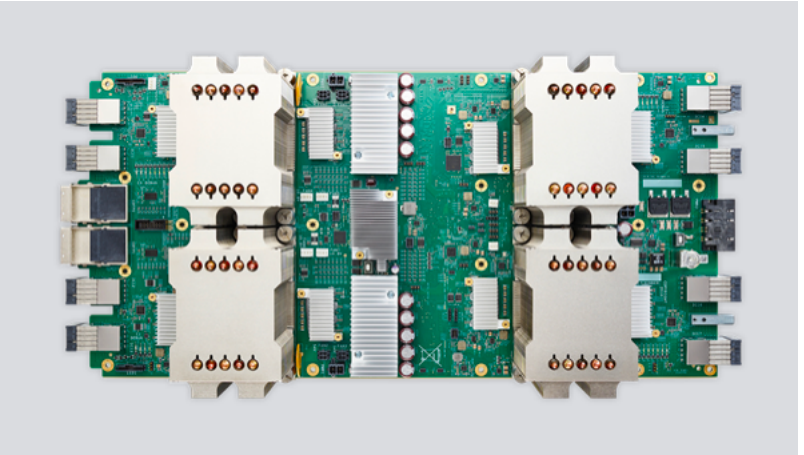


TPU가
뭐에요?

Tensor Processing Unit

Resource (TPU v2 기준)

- 180 TFLOPS
- 64 GB HBM

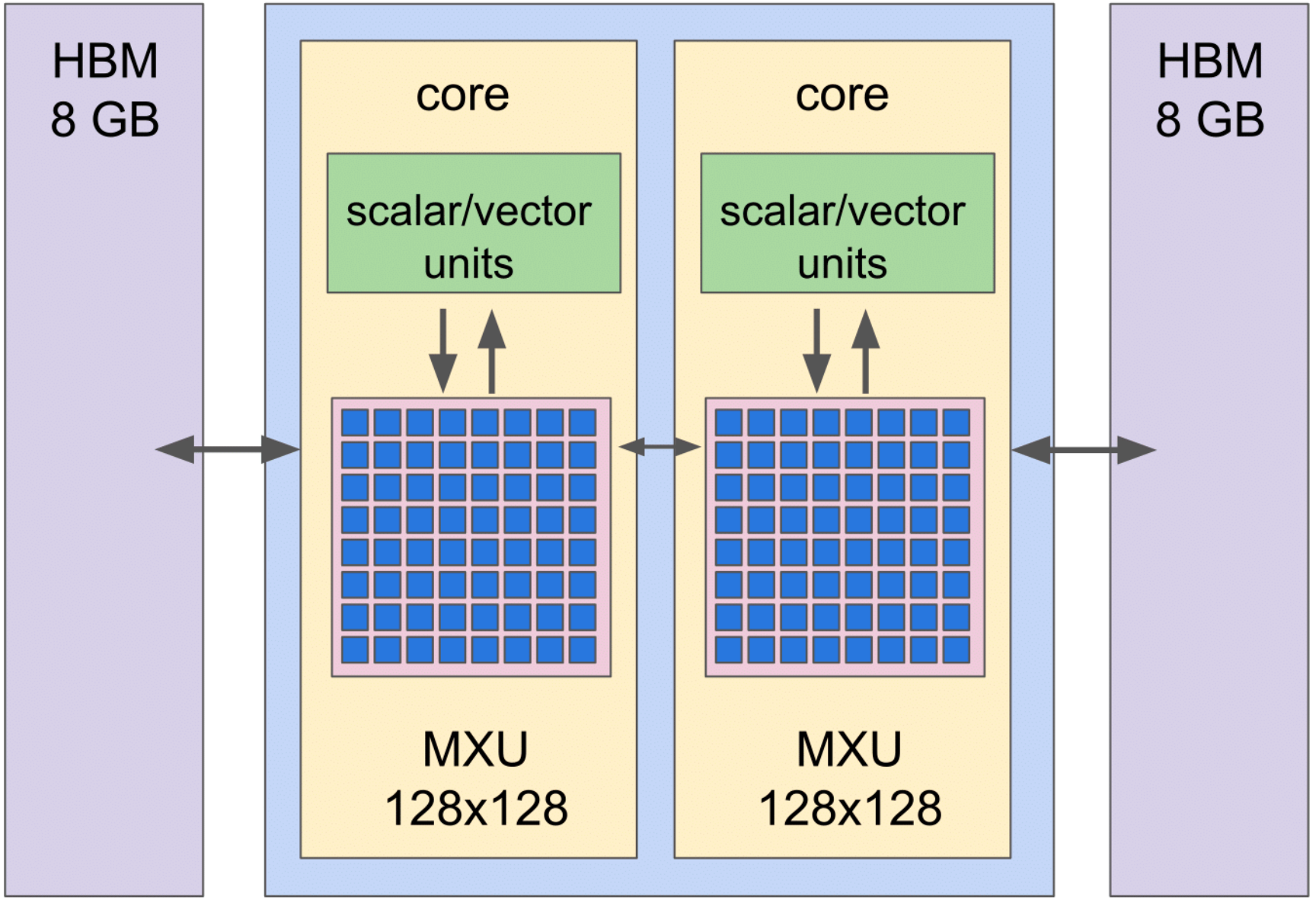


특징

- Matrix Machine
  (Systolic Array Architecture)
- Cloud 기반

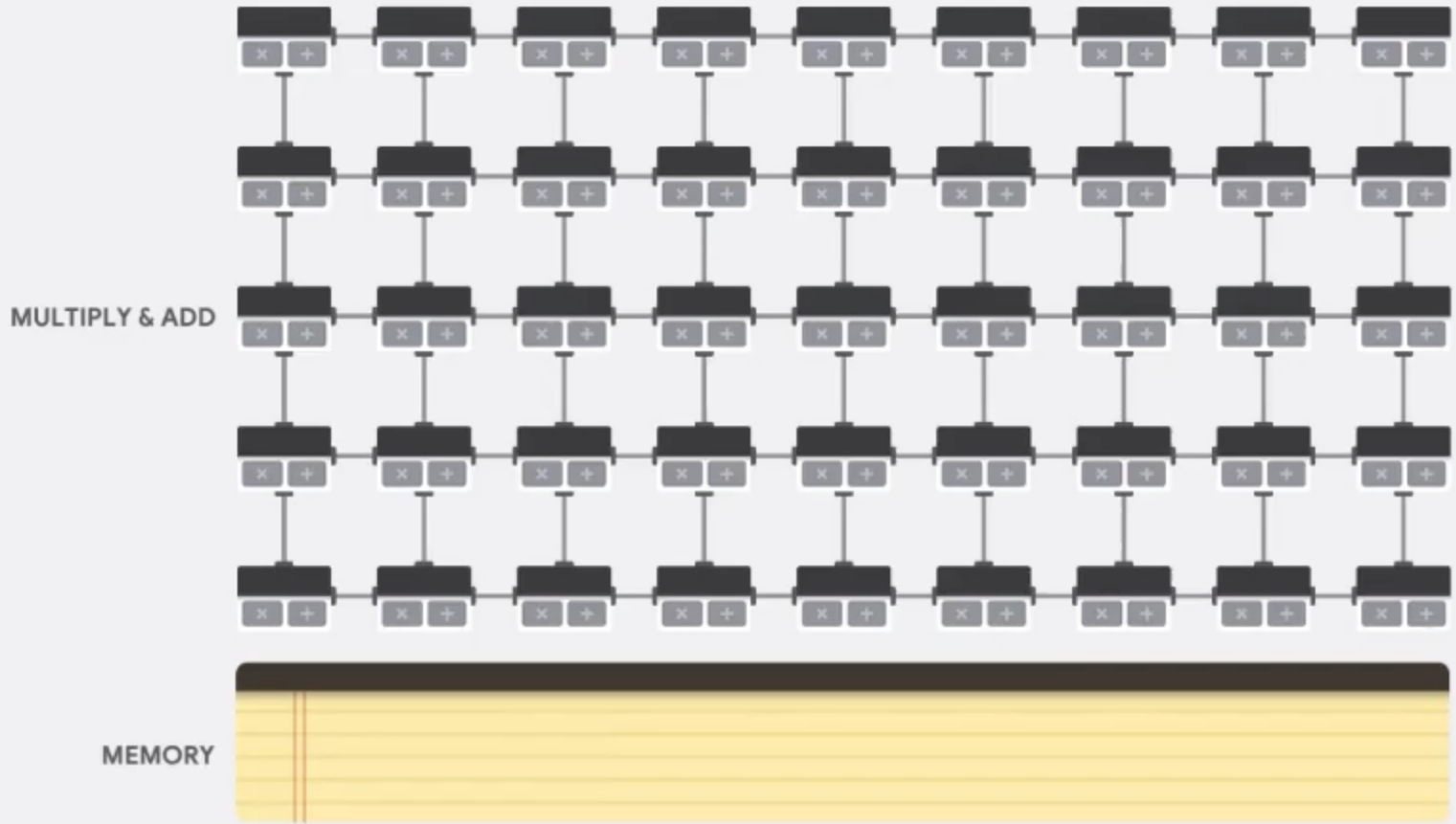
TPU가
뭐에요?

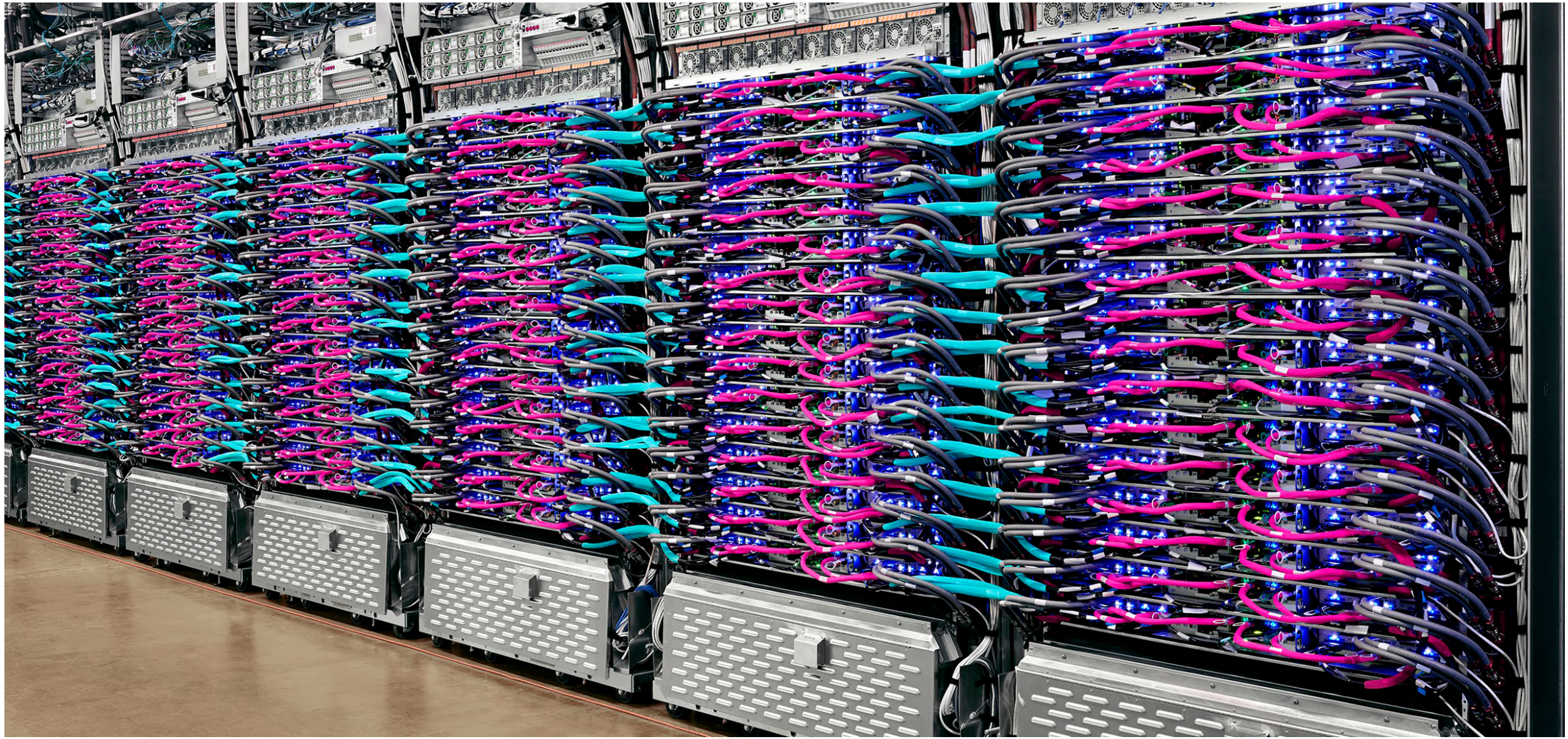
Systolic Array Architecture(2/8 core)



How TPU works

OUTPUT





TPU가
뭐에요?

Cloud TPU

Python Code

GCP VM, Colab

Google Cloud Platform

colab

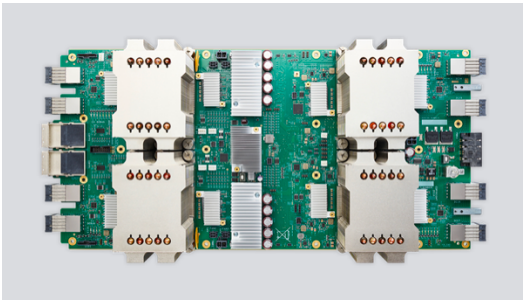
GRPC

Host

TensorFlow

Data
Weight

TPU



Training
Inference

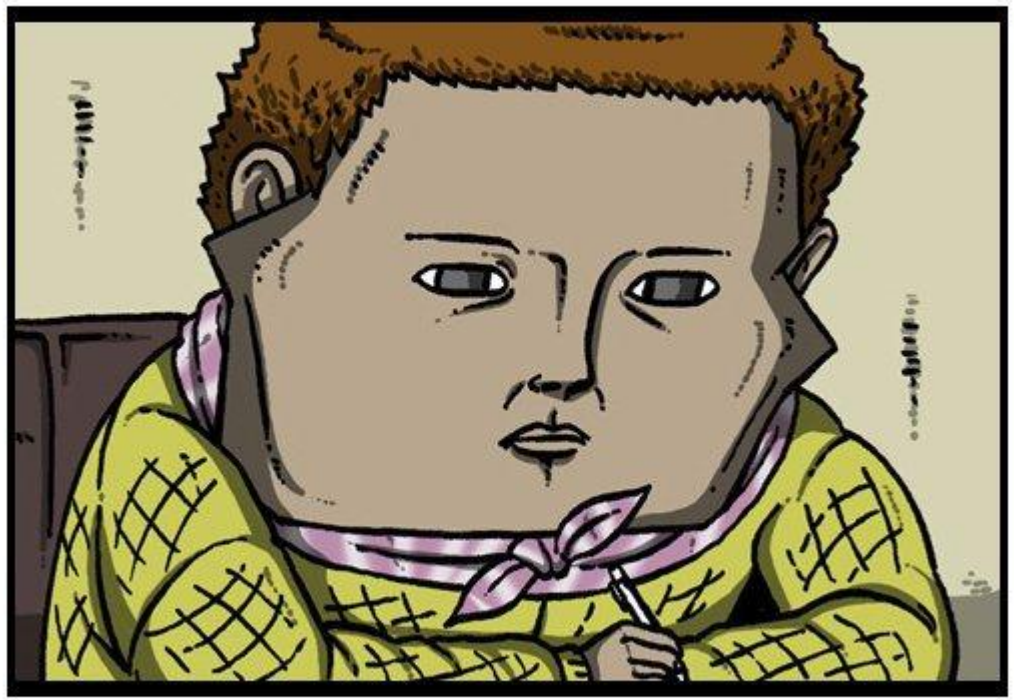
Local Data

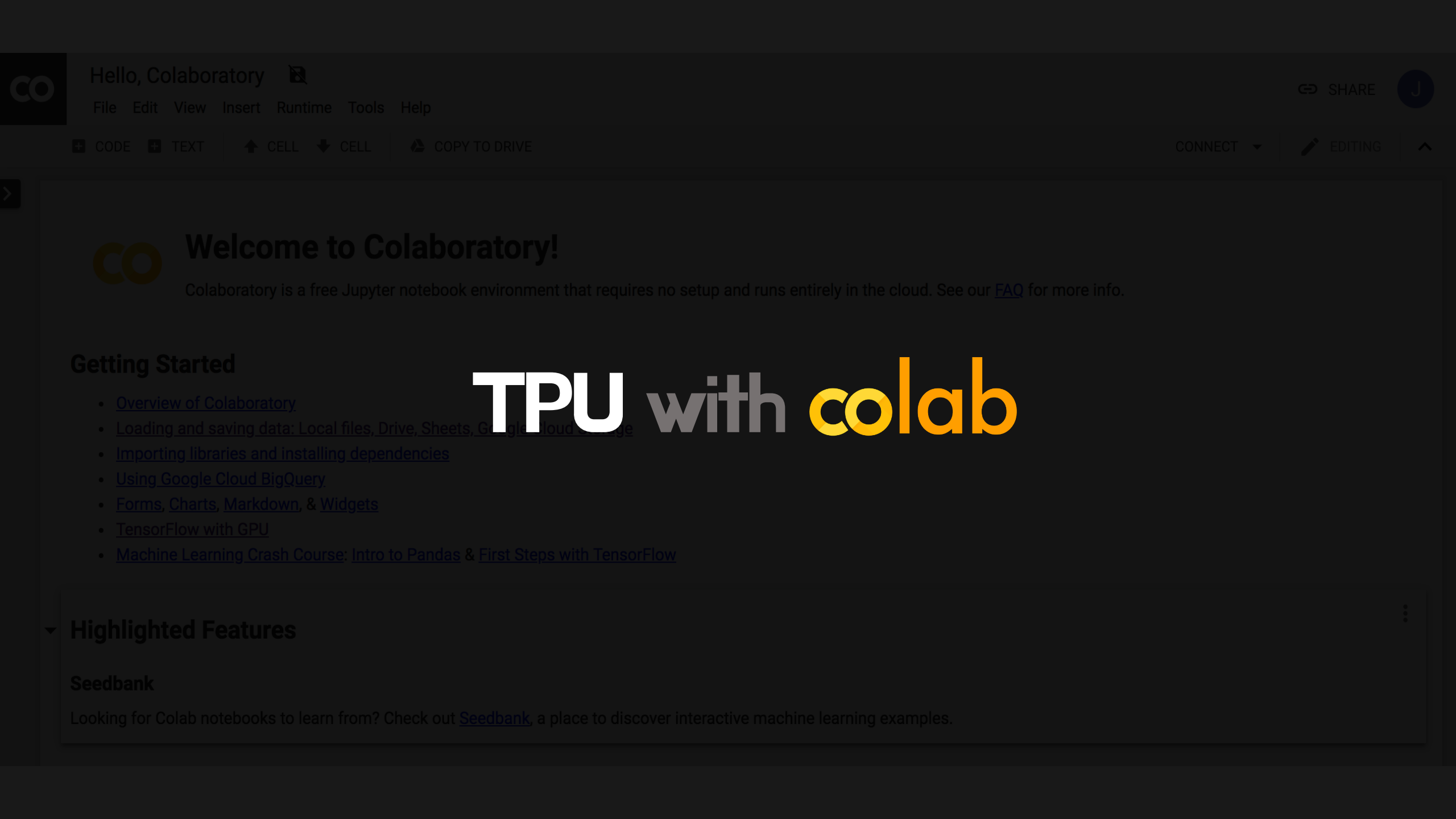
Dataset(tfrecord)
Model weight
Result

GCS Bucket

Cloud TPU Price

Version	v2	v3
비선점형	$4.50	$8.00
선점형	$1.35	$2.40

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TPU with colab

Why colab for TPU?

Free!! + α

(for 12 hours)


에이 그래 가자 가 이놈들아!!
오예 고고!!
와하하하하하하

Example usage - TPU Estimator

Below shows example usage of the TPU Estimator for a simple convolutional network.

```
import tensorflow as tf

from tensorflow.contrib.tpu.python.tpu import tpu_config
from tensorflow.contrib.tpu.python.tpu import tpu_estimator
from tensorflow.contrib.tpu.python.tpu import tpu_optimizer

def model_fn(features, labels, mode, params):
  # Define the model to construct the logits
  logits = # ...
  loss = tf.losses.softmax_cross_entropy(onehot_labels=labels, logits=logits)
  optimizer = tpu_optimizer.CrossShardOptimizer(
    tf.train.GradientDescentOptimizer(learning_rate=FLAGS.learning_rate))
  train_op = optimizer.minimize(loss, global_step=tf.train.get_global_step())
  return tf.estimator.EstimatorSpec(mode=mode, loss=loss, train_op=train_op)

def input_fn(params):
  # ...
  pass

def main():
  run_config = tpu_config.RunConfig(
    master=FLAGS.master,
    # ...
  )
  estimator = tpu_estimator.TpuEstimator(
    model_fn=model_fn,
    use_tpu=FLAGS.use_tpu,
    config=run_config,
    batch_size=FLAGS.batch_size)
  estimator.train(input_fn=input_fn, max_steps=FLAGS.train_steps)
```

For the complete [executable] example, see our open source TPU models.

세상에 공짜는 없나 봐요.

하지만...

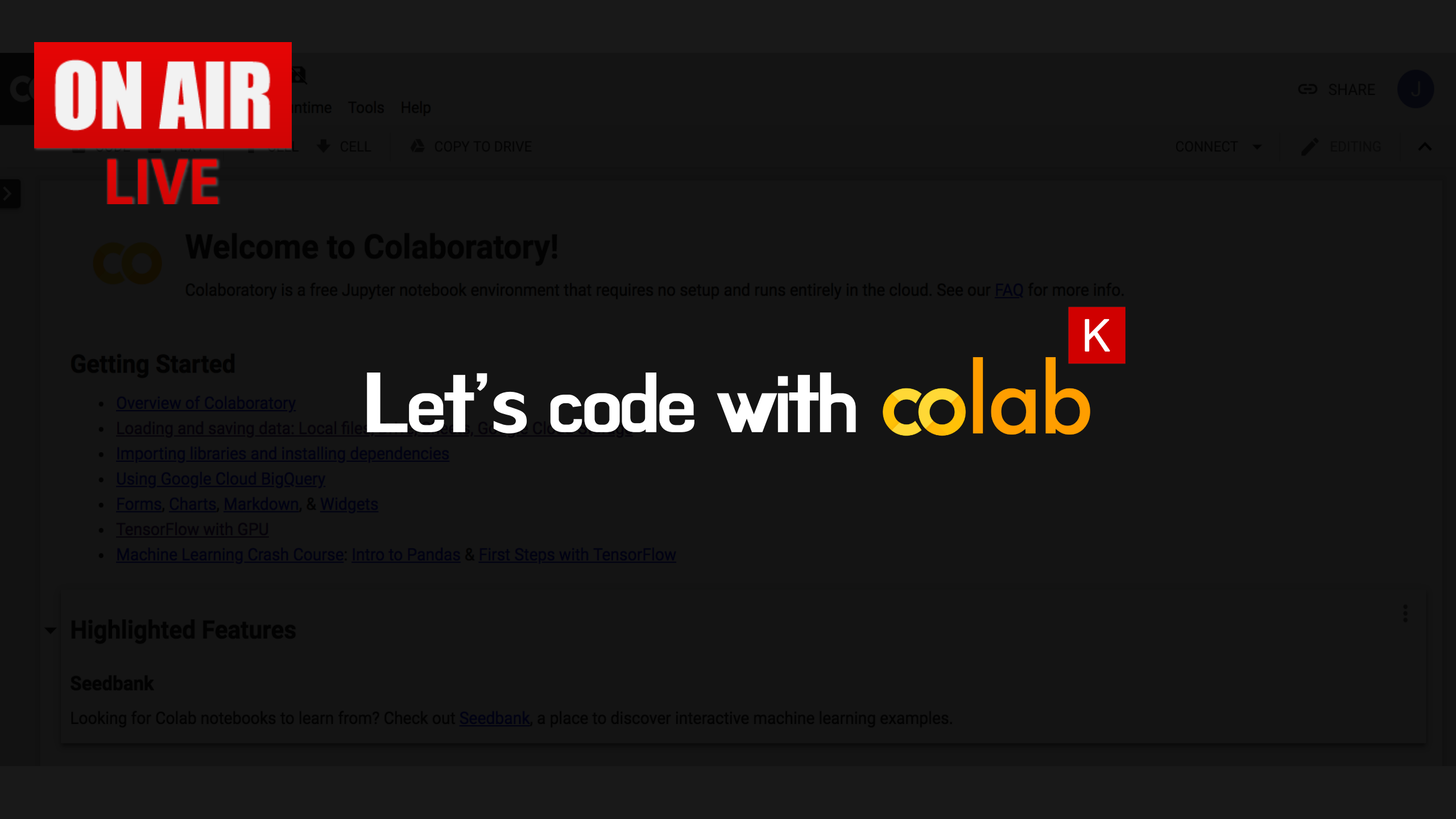
TPU with
colab

TensorFlow
2.0.0 ALPHA 0

Keras

TPU with
colab

어떻게...?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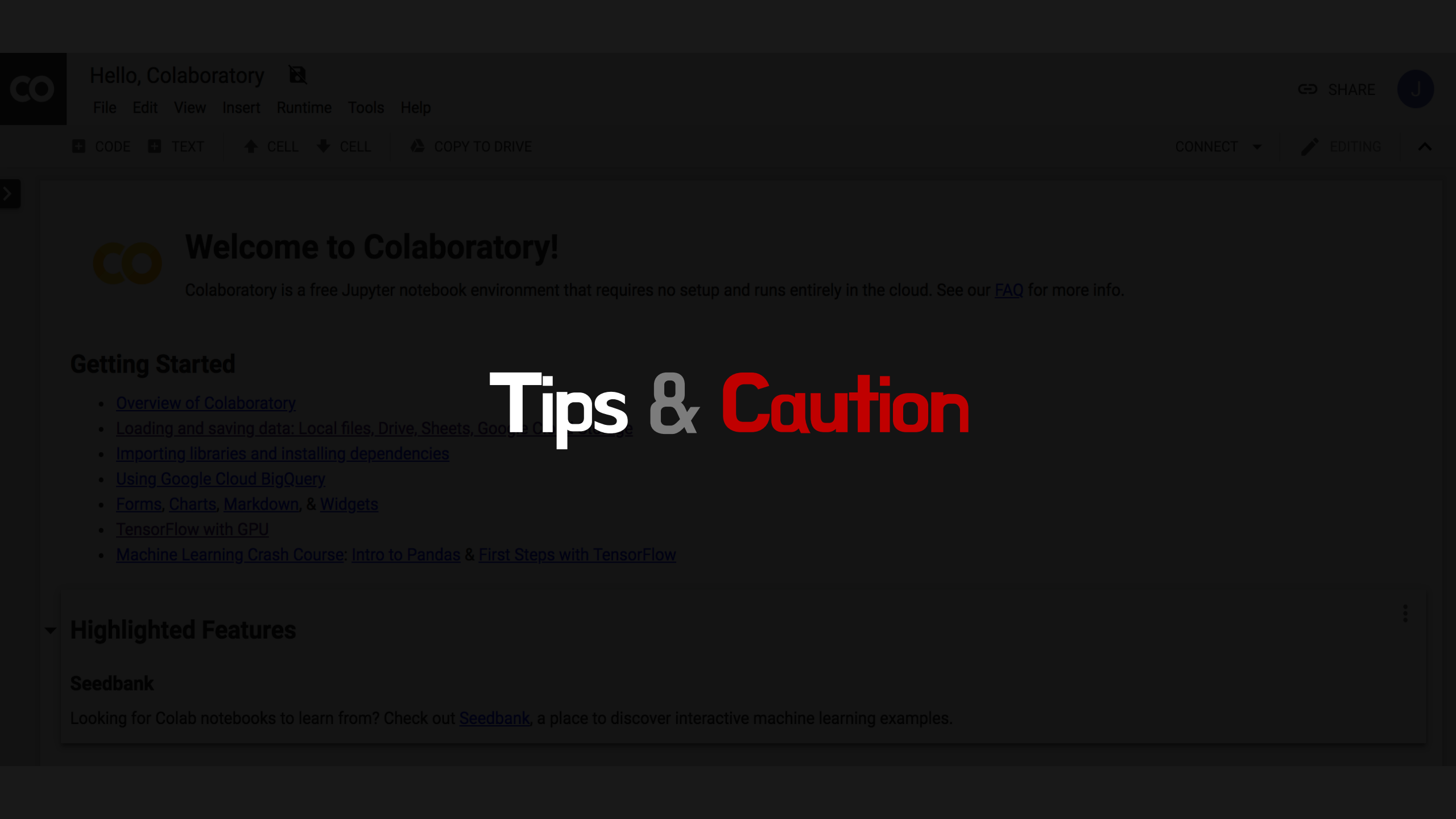
Let's code with colab
K



Tips & Caution

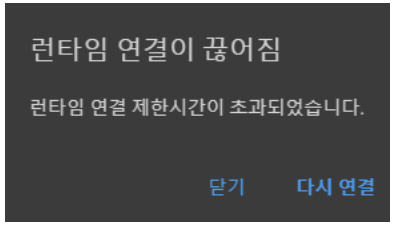
Tips &
Caution

colab Tips !

Docker 유지 시간 : 12 hours

* 12시간 동안은 디스크 내부에 작업 파일 존재

런타임 연결 OUT 후 : 약 80분



* 약 80분 내로 다시 연결 시 복원 가능

Colab 창 종료 후 : 약 80분

* 창을 종료하더라도 다시 Colab으로 접속하면 복원

Caution !

Tips &
Caution

GCS Caution !

Q. 한창 딥러닝 대회를 하고 있던 김모씨는 TPU v3 버전이 새로 나왔다는 소식을 듣고 한번 사용해보기위해 알아 보던 중 하필, 작업중이던 리전에는 v3가 없어서, 할 수 없이 다른 리전(유럽)에 있는 TPU를 할당 받아서 사용했어요.

며칠 뒤, 김모씨는 과금된 영수증을 확인하고 기겁해 쓰러지고 말았어요!

무슨 일이 ??

GCS Caution !

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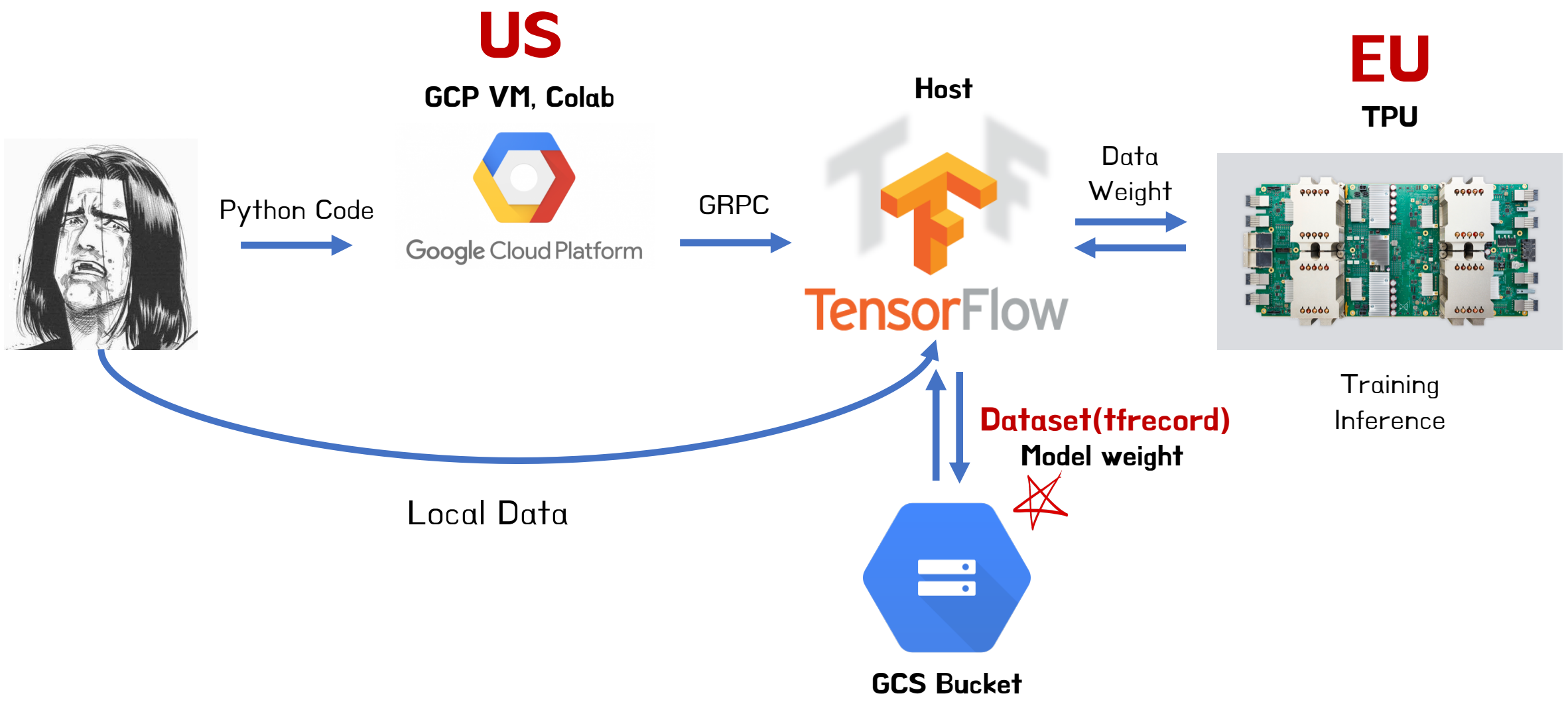
A. Network Egress

Tips &
Caution

Network Egress



Tips &
Caution

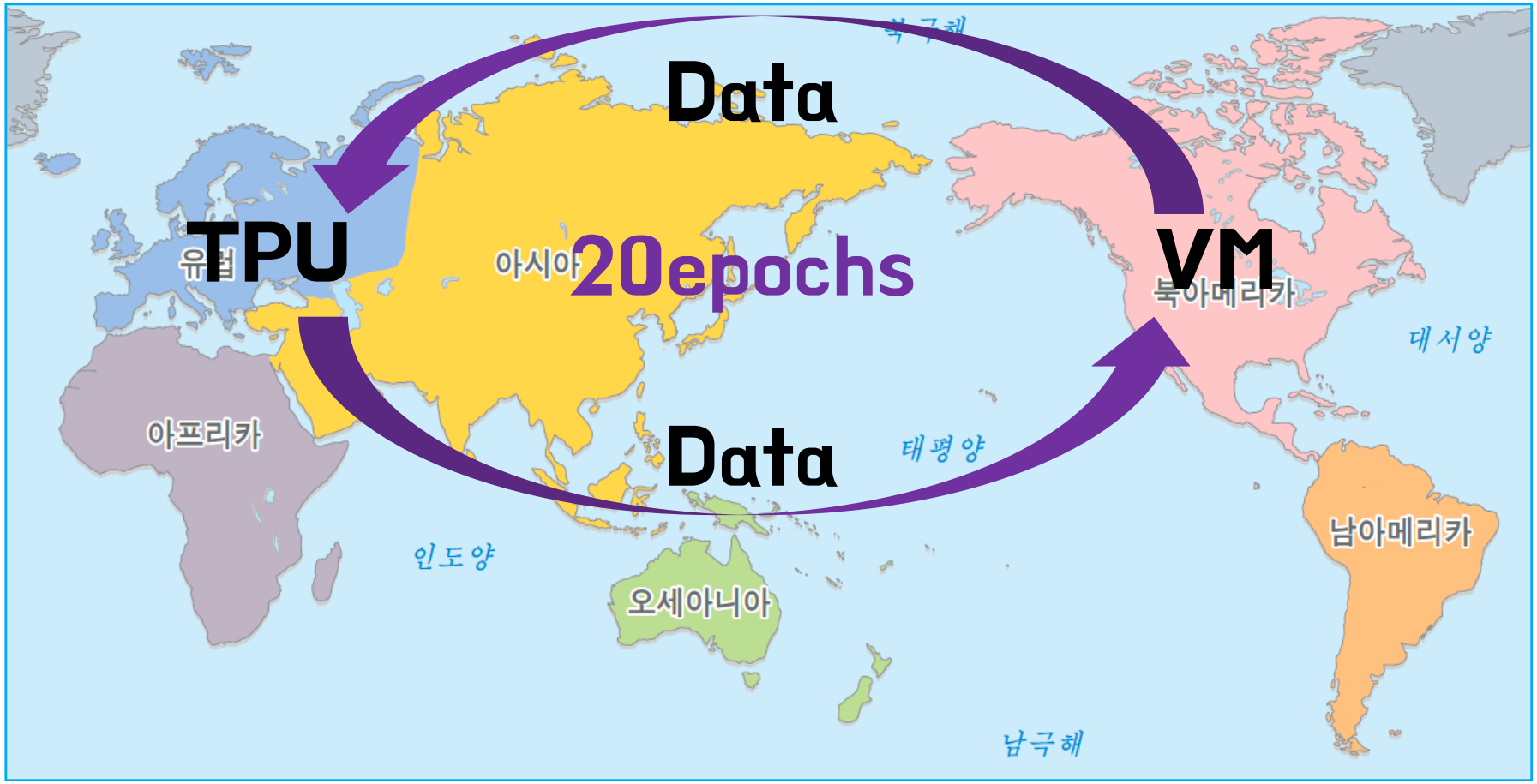
Network Egress

동일 위치 내(예: us-east1에서 us-east1으로, eu에서 eu로)	대륙 내 다른 위치 간(예: us-east1에서 northamerica-northeast1으로, us-east1에서 us로, us에서 us-central1으로)	세계 각지의 위치 간(예: us에서 asia로, australia-southeast1에서 us-east1으로)
무료	$0.01/GB[1]	일반 네트워크 사용량 요금 적용

월별 사용량	전 세계 대상 위치 이그레스(아시아 및 오스트레일리아 제외)(1GB당)	아시아 대상 위치 이그레스(중국 제외, 홍콩 포함)(1GB당)	중국 대상 위치 이그레스(홍콩 제외)(1GB당)	오스트레일리아 대상 위치 이그레스(1GB당)	인그레스
0~1TB	$0.12	$0.12	$0.23	$0.19	무료

Tips &
Caution

Network Egress



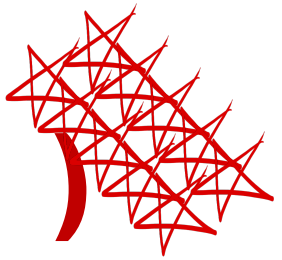
100GB * 20epoch * $0.12 = **$240**

Tips &
Caution

GCS Caution !

Q. Colab 환경에서 GCS Bucket과 연동하여 모델 학습 및 데이터 관리를 하고 싶다면?

A. GCS Bucket Region
||
Colab Region (us-central1)



Tips &
Caution

What the Error !!

```
W0615 08:41:46.915936 139858515244928 tpu_strategy_util.py:56] TPU system %s has alre
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
lstm (LSTM)                  (None, 1024, 100)         48800
_________________________________________________________________
dense (Dense)                (None, 1024, 1)           101
=================================================================
Total params: 48,901
Trainable params: 48,901
Non-trainable params: 0
_________________________________________________________________
---------------------------------------------------------------------------
AbortedError                              Traceback (most recent call last)
/usr/local/lib/python3.6/dist-packages/tensorflow/python/client/session.py in _do_cal
   1355     try:
-> 1356       return fn(*args)
   1357     except errors.OpError as e:

10 frames
AbortedError: Session 3de99dcb7d452e4f is not found.
```

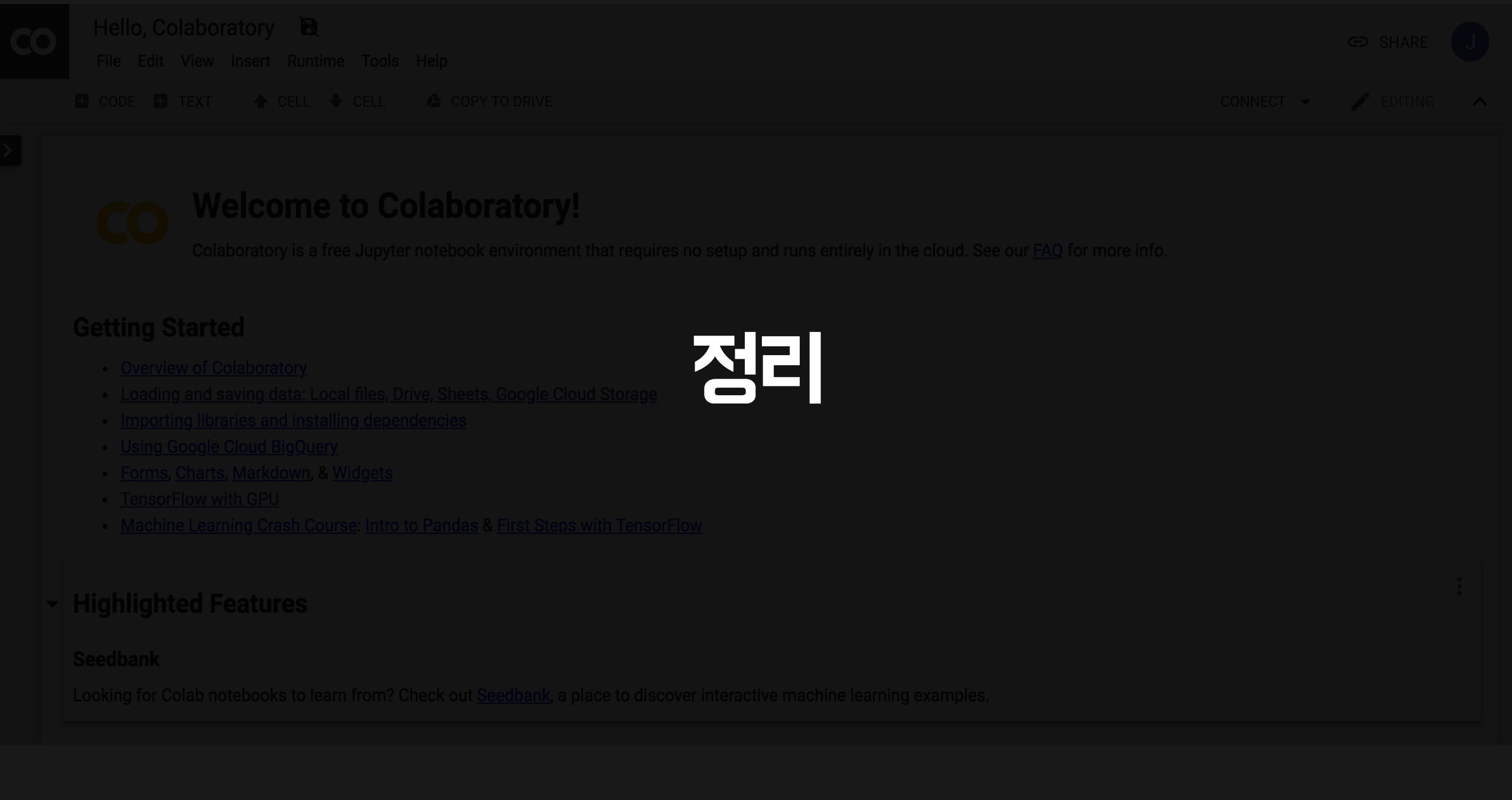
Tips &
Caution

What the Error !!

이 세상 에러들이 아니에요.

정신건강에 그리 좋지 않습니다.

이유는 단 하나 ! 공짜


Hello, Colaboratory
File Edit View Insert Runtime Tools Help
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EDITING
Welcome to Colaboratory!
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Getting Started
Overview of Colaboratory
Loading and saving data: Local files, Drive, Sheets, Google Cloud Storage
Importing libraries and installing dependencies
Using Google Cloud BigQuery
Forms, Charts, Markdown, & Widgets
TensorFlow with GPU
Machine Learning Crash Course: Intro to Pandas & First Steps with TensorFlow
Highlighted Features
Seedbank
Looking for Colab notebooks to learn from? Check out Seedbank, a place to discover interactive machine learning examples.

정리

정리

장점

공짜
크롬 돌아갈 메모리면 OK
가격대비 성능 끝판왕

단점

멘탈 회복에 돈이 더 들어갈 수도...
현실은 Out Of Memory
언제 어떻게 바뀔지 아무도 모름

Tips &
Caution

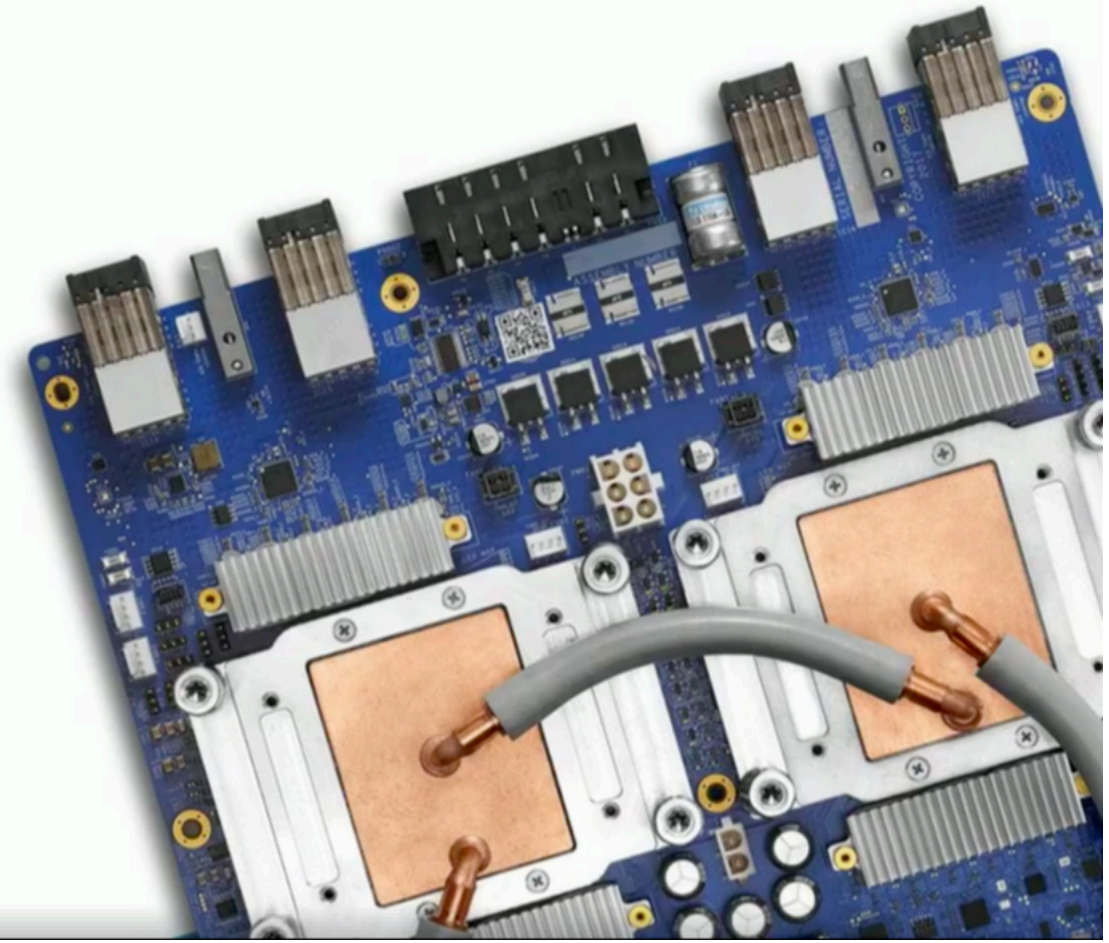
News !

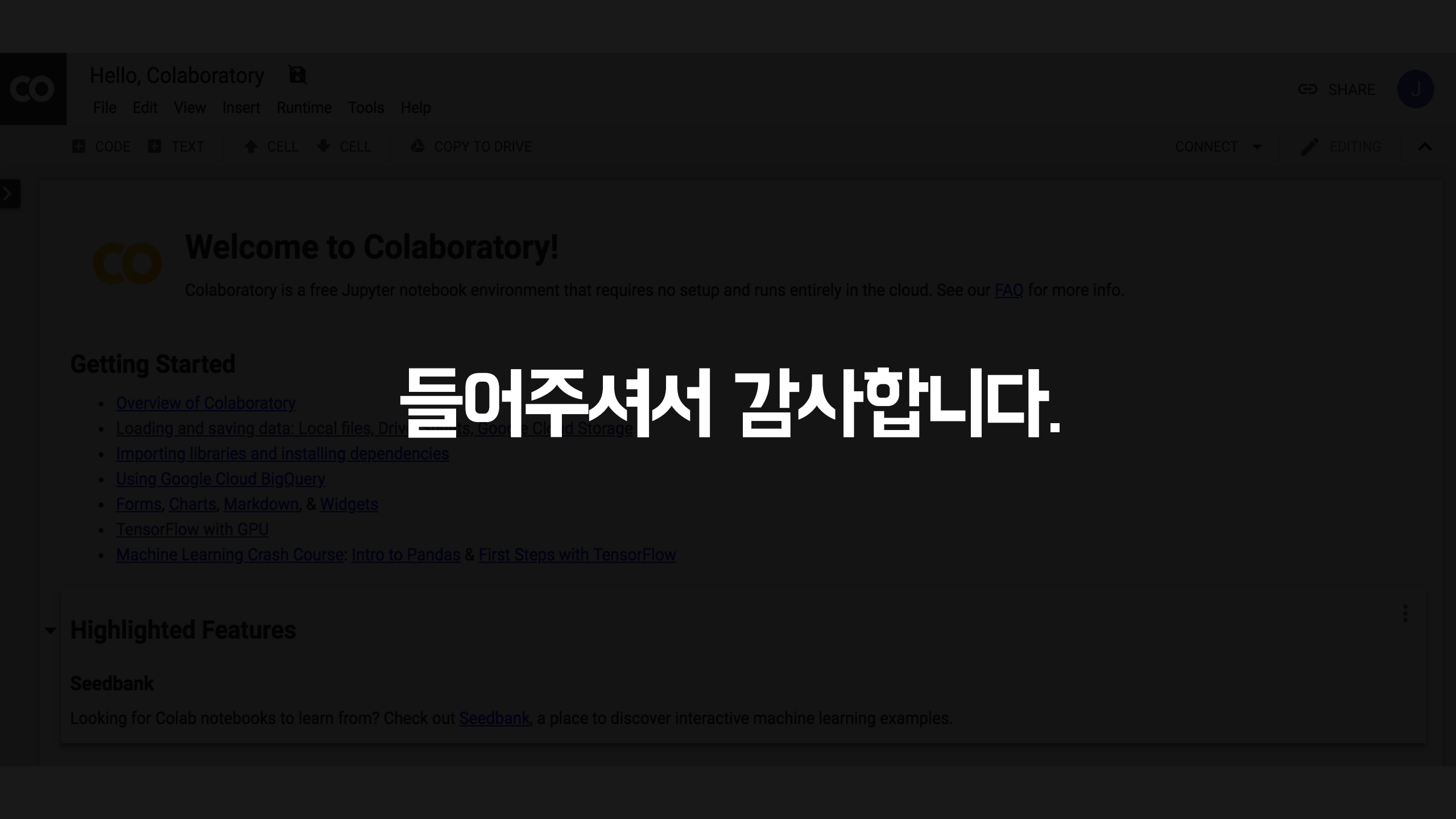
PyTorch + Cloud TPU

Collaboration in progress!

- Prototype training ResNet-50 now
- Planning to open source and expand functionality in collaboration with the community
- Email pytorch-tpu@googlegroups.com if interested!

Google Cloud

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들어주셔서 감사합니다.