LAB

Develop prompt templates using variables to generate output from LLMs

IBM **SkillsBuild**

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Introduction

In this lab, you will identify variables and develop prompt templates to generate relevant output from large language models (LLMs).

Software requirements

To complete this lab, you don't have to install any software on your computer. You only require a Google account to access Google Colab and a Replicate account to access and use various artificial intelligence (AI) models.

Objective

After completing this lab, you should be able to:

- Develop prompt templates using variables to generate output from LLMs

Lab steps

This lab requires you to complete the following procedures:

1. Create a GitHub account
2. Create a Replicate account
3. Sign up for Google Colab
4. Load the Jupyter notebook and initialize the model
5. Draft a baseline prompt for a recurring task
6. Identify variable elements and convert to a template
7. Test and finalize the prompt template

Estimated duration to complete

20 minutes

Scenario

Background information

Codal Technologies is expanding and offering consultation services to some of its major clients. With more stakeholders involved, analysts need to produce accurate weekly project updates for them.

Challenge

However, the variety of formats and prompting styles has led to inconsistencies in quality, tone, and completeness of these outputs.

Solution

To address this, your manager asks you, a senior analyst, to create the firm's first prompt template. This template will streamline the workflow by allowing analysts to update only a few project-specific variables while maintaining a uniform structure. The goal is to deliver high-quality and consistent communication, no matter who prepares the update or which client it is for.

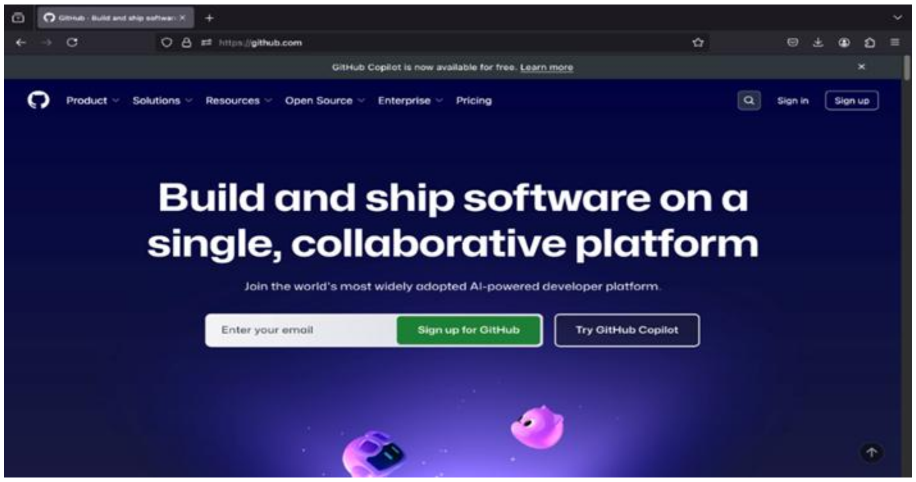
Create a GitHub account

Overview

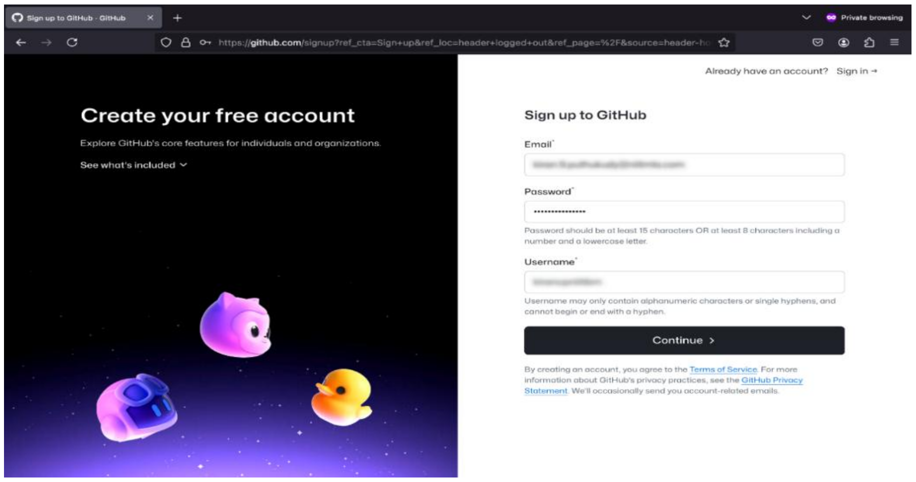
In this procedure, you'll set up a GitHub account. GitHub is a platform that helps developers store, manage, and share code, while also supporting collaboration through tools such as version control, bug tracking, and task management. Setting up a GitHub account provides access to the Replicate platform, which is required to complete the lab efficiently.

Instructions

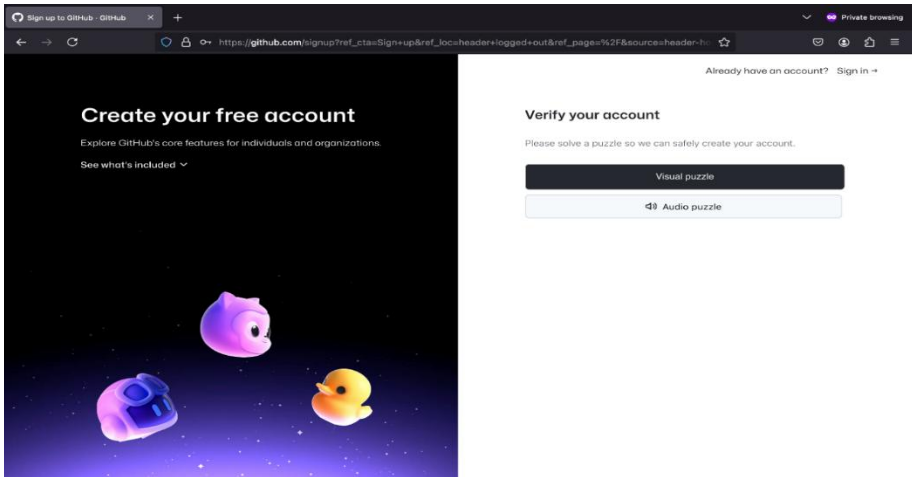
1. To create a GitHub account, go to the GitHub website.
2. Select the **Sign up for GitHub** button, as shown in the following screenshot.


GitHub Copilot is now available for free. Learn more
Product
Solutions
Resources
Open Source
Enterprise
Pricing
Sign in
Sign up
Build and ship software on a single, collaborative platform
Join the world's most widely adopted AI-powered developer platform.
Enter your email
Sign up for GitHub
Try GitHub Copilot

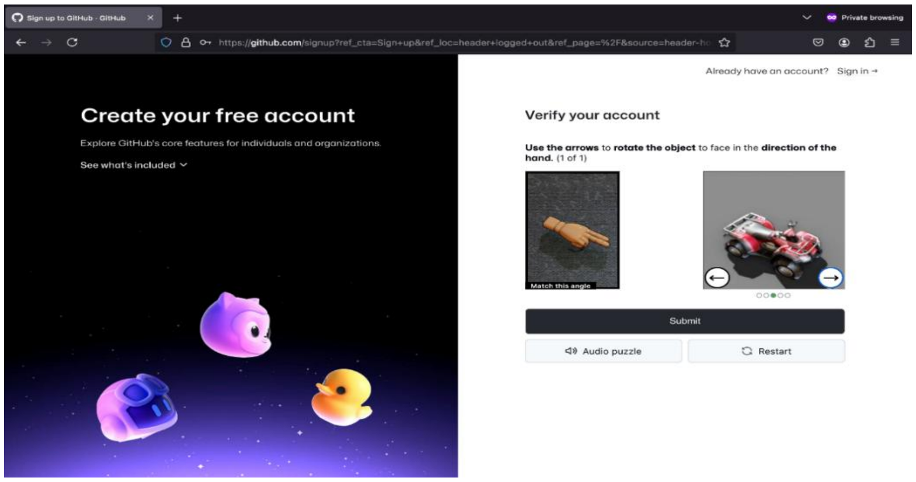
3. The following screenshot shows the "Sign up to GitHub" page. Enter your details in the **Email**, **Password**, and **Username** fields. Then, select **Continue**.


Create your free account
Explore GitHub's core features for individuals and organizations.
See what's included
Already have an account? Sign in →
Sign up to GitHub
Email
Password
Password should be at least 15 characters OR at least 8 characters including a number and a lowercase letter.
Username
Username may only contain alphanumeric characters or single hyphens, and cannot begin or end with a hyphen.
Continue
By creating an account, you agree to the Terms of Service. For more information about GitHub's privacy practices, see the GitHub Privacy Statement. We'll occasionally send you account-related emails.

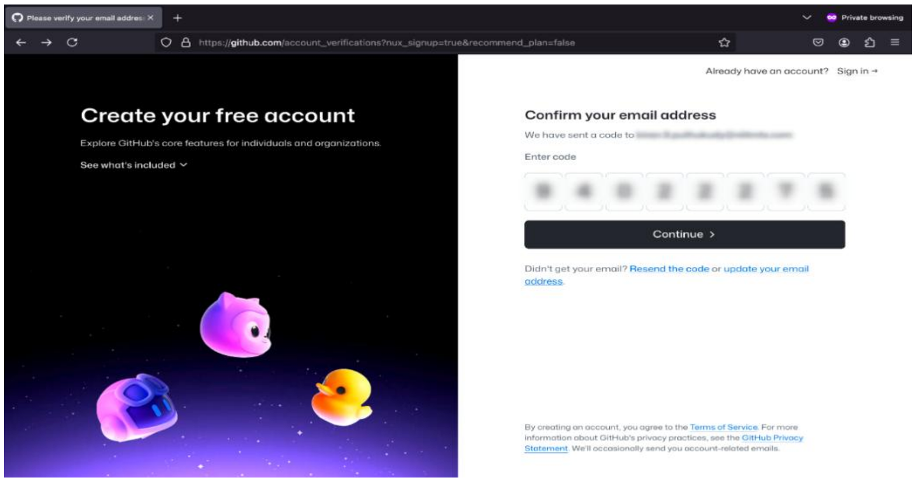
4. To verify your account, select the **Visual puzzle** button.


Sign up to GitHub · GitHub
Private browsing
https://github.com/signup?ref_cta=Sign+up&ref_loc=header+logged+out&ref_page=%2F&source=header-ho
Already have an account? Sign in →
Create your free account
Explore GitHub's core features for individuals and organizations.
See what's included
Verify your account
Please solve a puzzle so we can safely create your account.
Visual puzzle
Audio puzzle

5. Solve the visual puzzle and select **Submit**.


Sign up to GitHub · GitHub
Private browsing
https://github.com/signup?ref_cta=Sign+up&ref_loc=header+logged+out&ref_page=%2F&source=header-ho
Already have an account? Sign in →
Create your free account
Explore GitHub's core features for individuals and organizations.
See what's included
Verify your account
Use the arrows to rotate the object to face in the direction of the hand. (1 of 1)
Match this angle
Submit
Audio puzzle
Restart

6. To confirm your email, enter the confirmation code sent to your registered email in the **Enter code** field and select **Continue**.



https://github.com/account_verifications?nux_signup=true&recommend_plan=false

Already have an account? Sign in →

Create your free account

Explore GitHub's core features for individuals and organizations.

See what's included

Confirm your email address

We have sent a code to [redacted]

Enter code

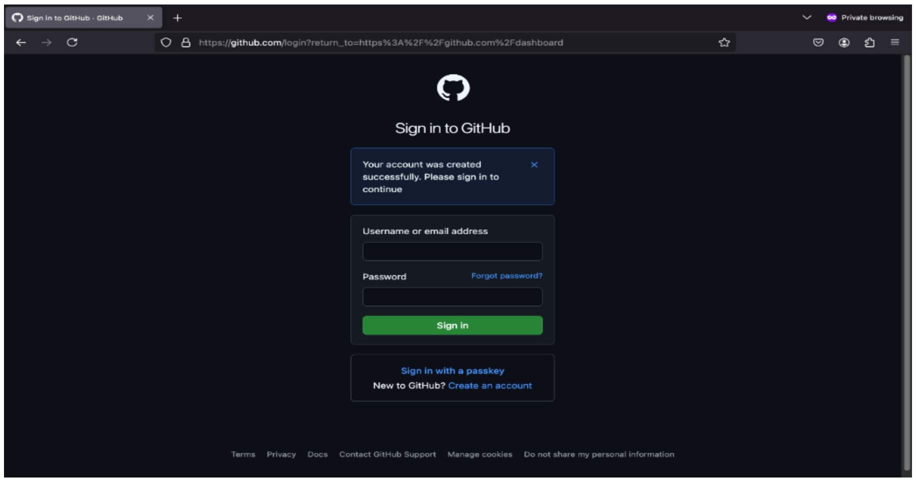
[redacted]

Continue >

Didn't get your email? Resend the code or update your email address.

By creating an account, you agree to the Terms of Service. For more information about GitHub's privacy practices, see the GitHub Privacy Statement. We'll occasionally send you account-related emails.

7. After your GitHub account has been successfully created, a confirmation message is displayed as shown in the following screenshot.



https://github.com/login?return_to=https%3A%2F%2Fgithub.com%2Fdashboard

Sign in to GitHub

Your account was created successfully. Please sign in to continue

Username or email address

Password

Forgot password?

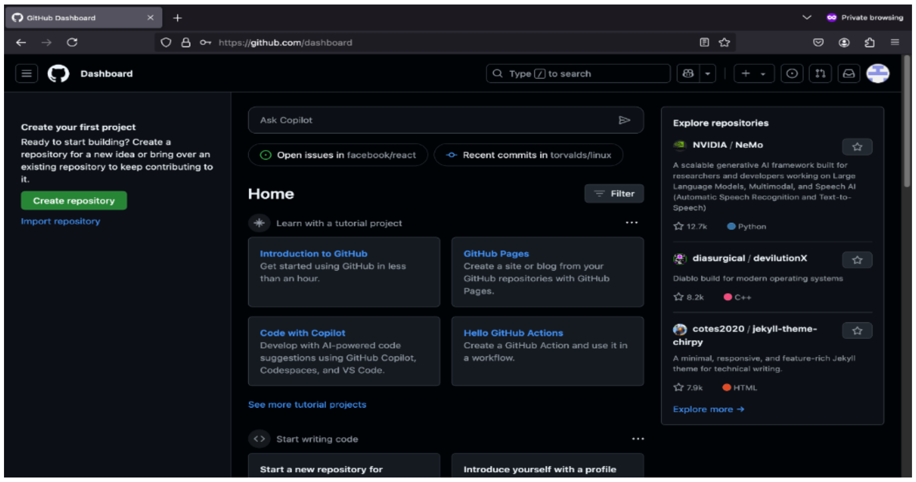
Sign in

Sign in with a passkey

New to GitHub? Create an account

8. To sign in to your account, enter your credentials in the **Username or email address** and **Password** fields, and then select **Sign in**.

9. After you sign in, the GitHub dashboard displays as shown in the following screenshot.


GitHub Dashboard
Private browsing
https://github.com/dashboard
Dashboard
Type / to search
Create repository
Import repository
Ask Copilot
Open issues in facebook/react
Recent commits in torvalds/linux
Home
Filter
Learn with a tutorial project
See more tutorial projects
Start writing code
Start a new repository for
Introduce yourself with a profile
Explore repositories
Explore more →

Create your first project
Ready to start building? Create a repository for a new idea or bring over an existing repository to keep contributing to it.

Introduction to GitHub
Get started using GitHub in less than an hour.

GitHub Pages
Create a site or blog from your GitHub repositories with GitHub Pages.

Code with Copilot
Develop with AI-powered code suggestions using GitHub Copilot, Codespaces, and VS Code.

Hello GitHub Actions
Create a GitHub Action and use it in a workflow.

NVIDIA / NeMo
A scalable generative AI framework built for researchers and developers working on Large Language Models, Multimodal, and Speech AI (Automatic Speech Recognition and Text-to-Speech)
12.7k Python

diasurgical / devilutionX
Diablo build for modern operating systems
8.2k C++

cotes2020 / jekyll-theme-chirpy
A minimal, responsive, and feature-rich Jekyll theme for technical writing.
7.9k HTML

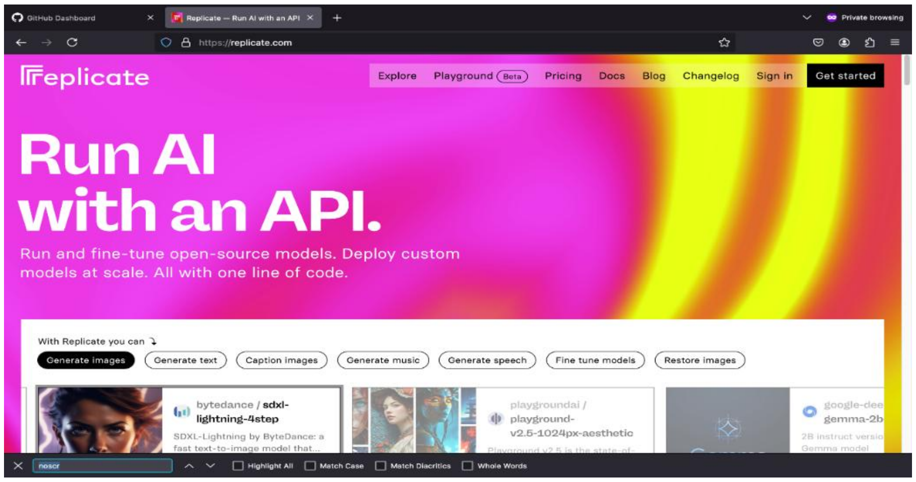
Create a Replicate account

Overview

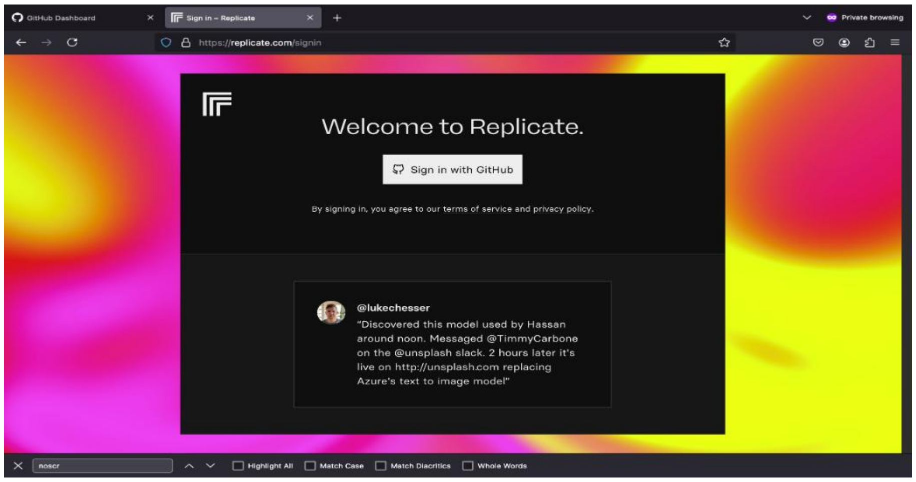
In this procedure, you'll use your GitHub account to register for a Replicate account. Replicate is a cloud-based platform that lets you use AI models such as IBM Granite without requiring advanced hardware. As part of this procedure, you'll create a Replicate token, a secure access key that allows the lab environment to authenticate with Replicate and run models from your account in Google Colab.

Instructions

1. Go to the Replicate website.
2. Select **Get started**, as shown in the following screenshot.

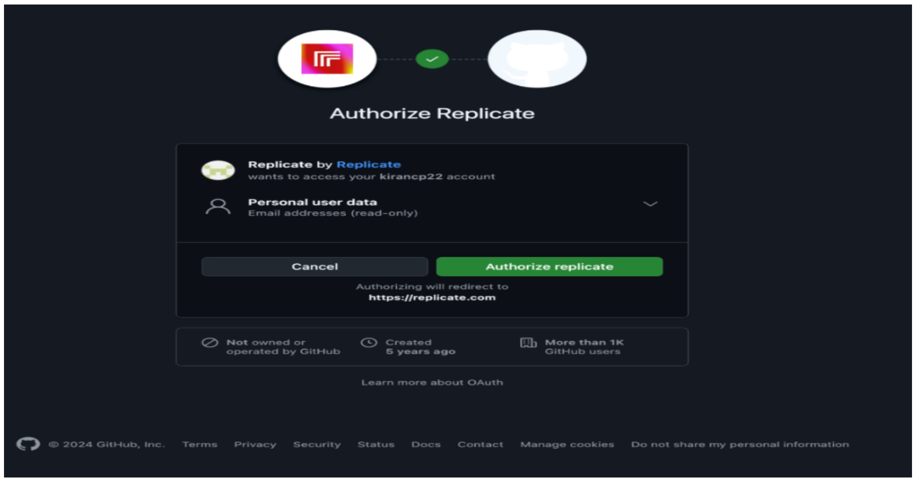


3. Select the **Sign in with GitHub** button, as shown in the following screenshot.

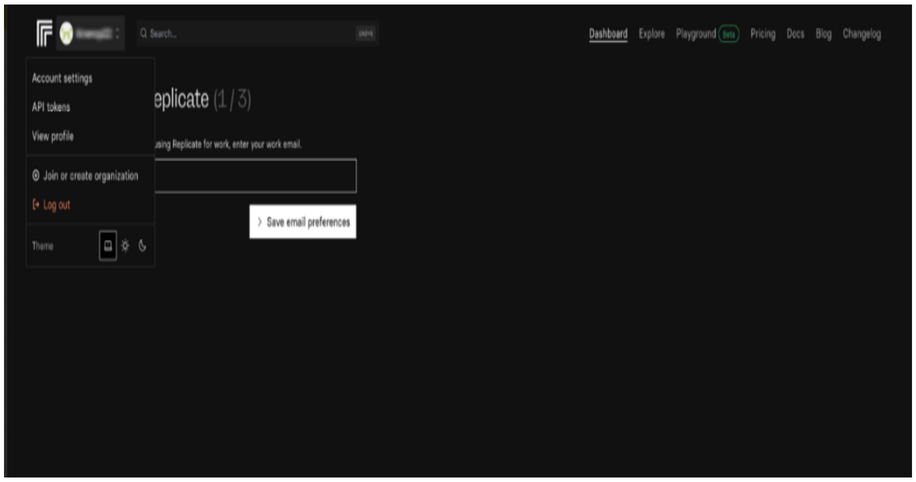

Welcome to Replicate.
Sign in with GitHub
By signing in, you agree to our terms of service and privacy policy.

@lukechesser
"Discovered this model used by Hassan around noon. Messaged @TimmyCarbone on the @unsplash slack. 2 hours later it's live on http://unsplash.com replacing Azure's text to image model"

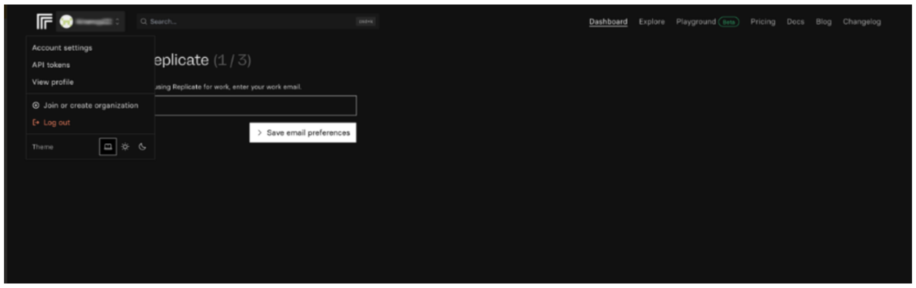
4. Select **Authorize replicate** to continue, as shown in the following screenshot.


Authorize Replicate
Replicate by Replicate
wants to access your kirancp22 account
Personal user data
Email addresses (read-only)
Cancel
Authorize replicate
Authorizing will redirect to
https://replicate.com
Not owned or operated by GitHub
Created 5 years ago
More than 1K GitHub users
Learn more about OAuth
© 2024 GitHub, Inc. Terms Privacy Security Status Docs Contact Manage cookies Do not share my personal information

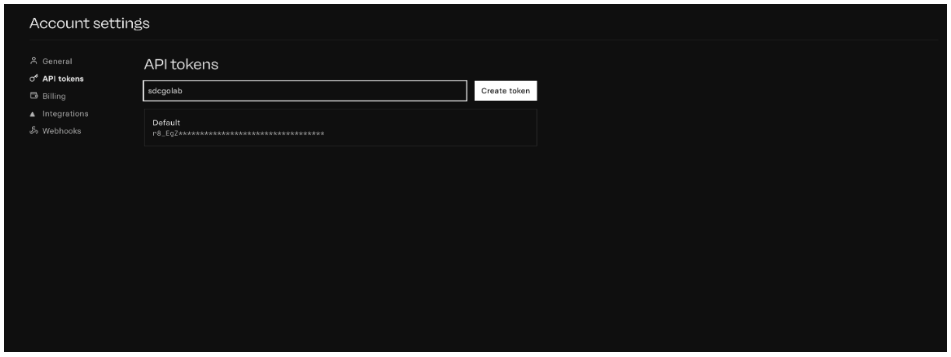
5. After your Replicate account is created, the Replicate dashboard displays as shown in the following screenshot. To create a Replicate token, select the **Account settings** option from the navigation menu.


Search...
Dashboard Explore Playground Pricing Docs Blog Changelog
Account settings
API tokens
View profile
Join or create organization
Log out
Theme
eplicate (1 / 3)
using Replicate for work, enter your work email.
Save email preferences

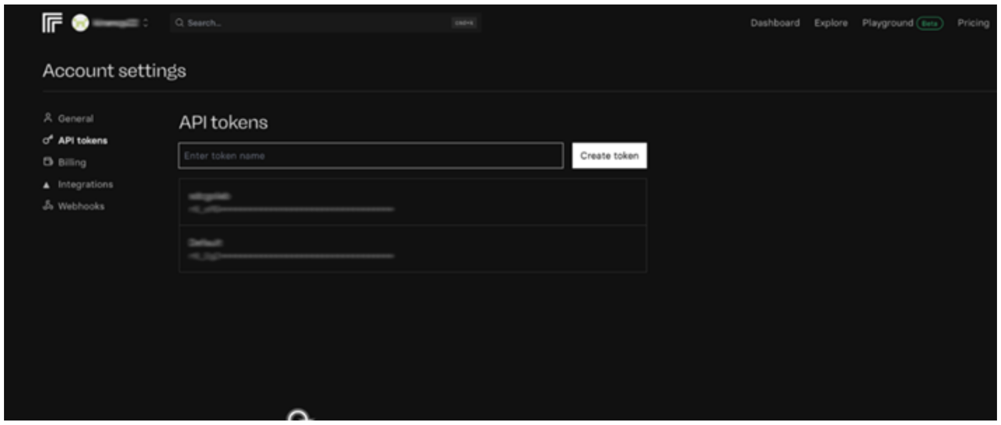
6. The following screenshot shows the Replicate dashboard. Select **API tokens** from the "Account settings" panel.
.


Search...
Dashboard Explore Playground Pricing Docs Blog Changelog
Account settings
API tokens
View profile
Join or create organization
Log out
Theme
eplicate (1 / 3)
using Replicate for work, enter your work email.
Save email preferences

7. Enter a name for the token in the **API tokens** field and then select **Create token**, as shown in the following screenshot.



8. After your API token is created, it is displayed on the "Account settings" page as shown in the following screenshot.

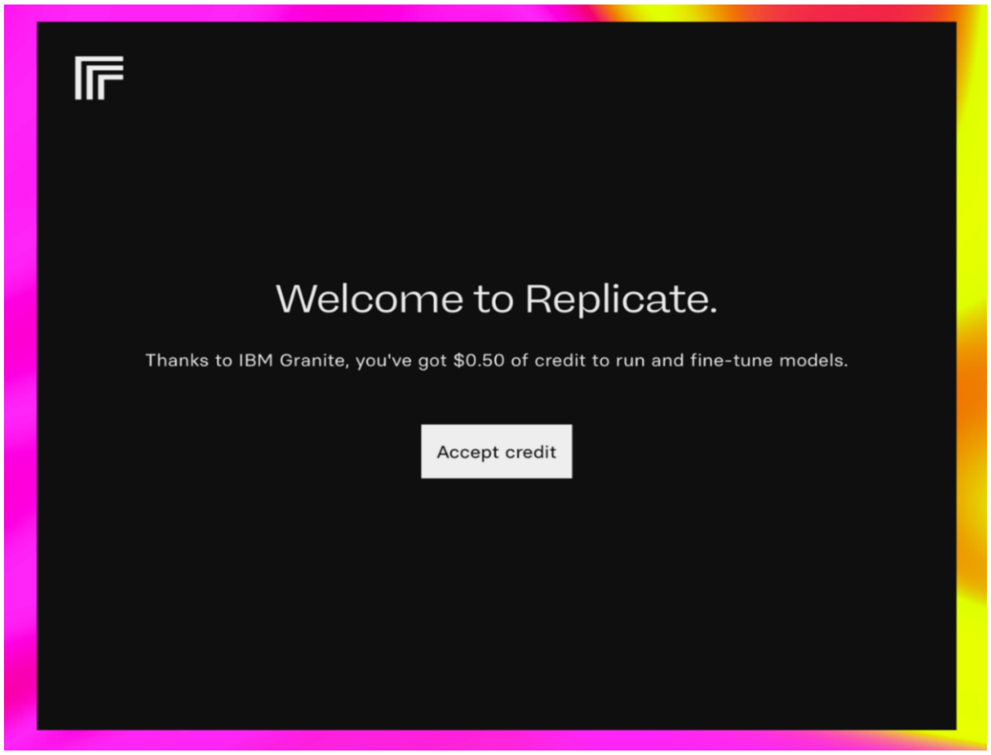


9. To copy the Replicate API, select the **Copy token** icon, as shown in the following screenshot.

   Note: Save the Replicate token because you'll need it to authenticate with the Replicate API when running code in the Google Colab environment later in this lab.

10. To run the lab without interruptions, you'll require some Replicate credits. Go to the Replicate invite link to claim your free $0.50 credit.

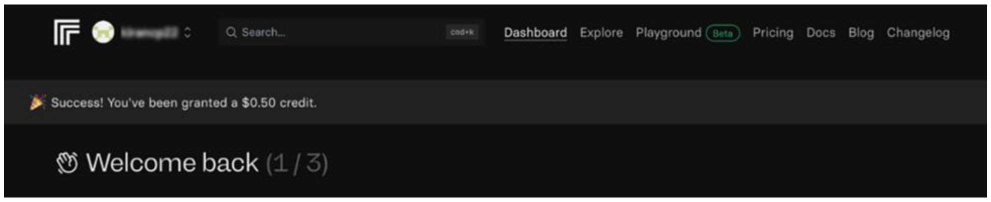
11. To claim the amount, select **Accept credit**.



Welcome to Replicate.

Thanks to IBM Granite, you've got $0.50 of credit to run and fine-tune models.

12. A confirmation message is displayed indicating that a $0.50 credit has been added to your Replicate account as shown in the following screenshot.



Success! You've been granted a $0.50 credit.

Welcome back (1 / 3)

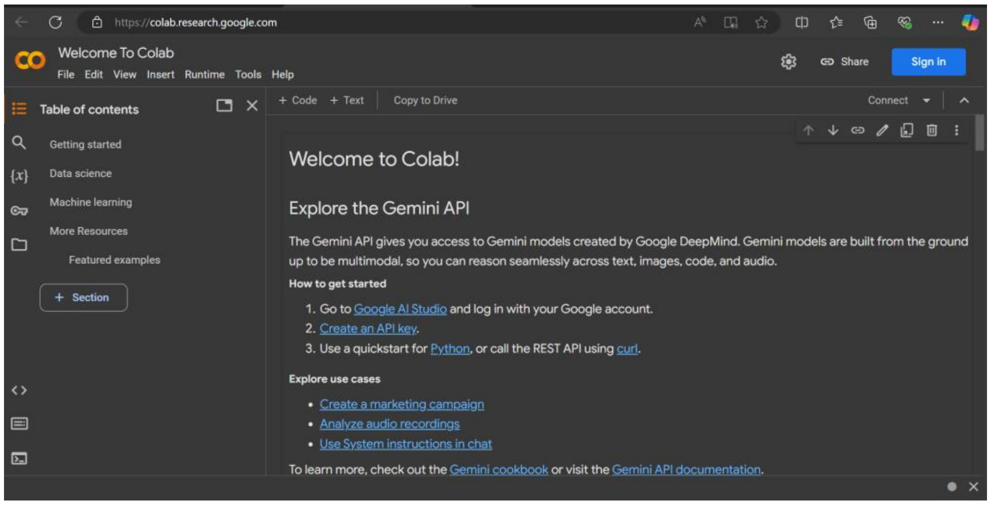
Sign up for Google Colab

Overview

In this procedure, you'll set up a Google Colab account. Google Colab is a free cloud platform that lets you run code in notebooks, which are commonly used for machine learning, data science, and AI tasks. A Google Colab account allows you to install and use the tools needed to complete this lab.

Instructions

1. To sign up, go to the Google Colab website.
2. Select **Sign in**, as shown in the following screenshot.



Welcome to Colab!

Explore the Gemini API

The Gemini API gives you access to Gemini models created by Google DeepMind. Gemini models are built from the ground up to be multimodal, so you can reason seamlessly across text, images, code, and audio.

How to get started

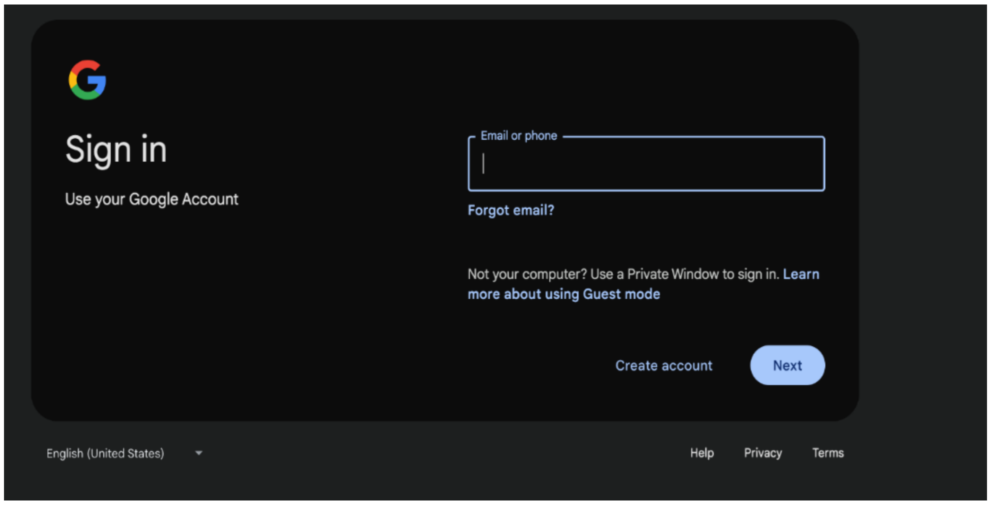
1. Go to Google AI Studio and log in with your Google account.
2. Create an API key.
3. Use a quickstart for Python, or call the REST API using curl.

Explore use cases

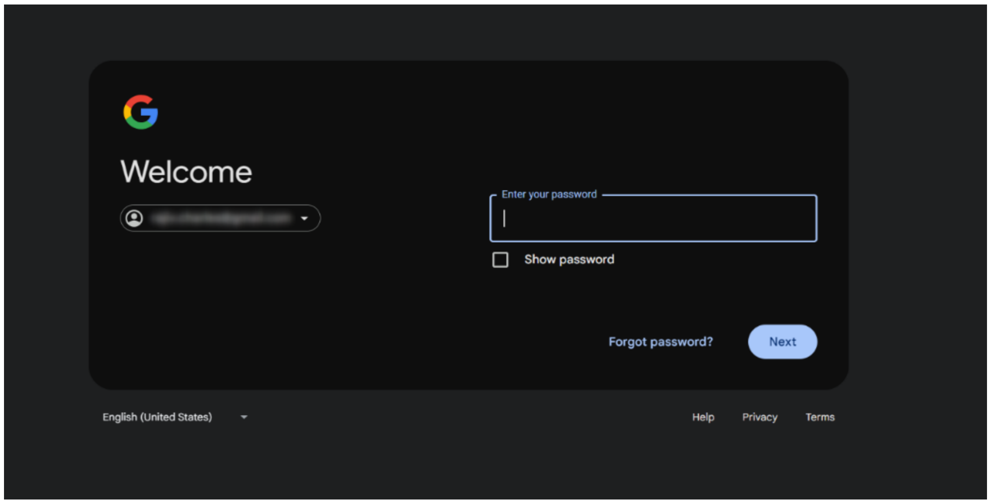
- Create a marketing campaign
- Analyze audio recordings
- Use System instructions in chat

To learn more, check out the Gemini cookbook or visit the Gemini API documentation.

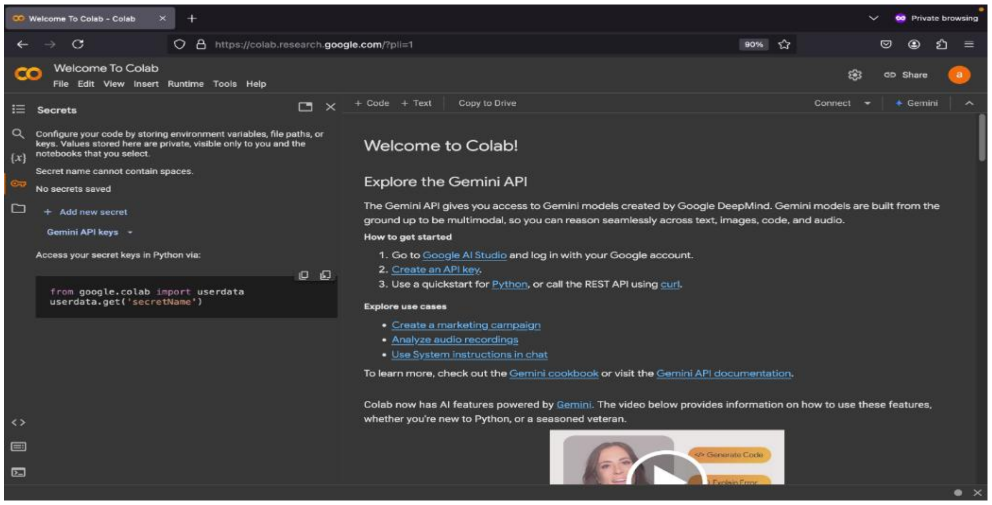
3. Enter your email or phone number in the **Email or phone** field, and then select **Next**. The following screenshot shows the Google sign-in page.



4. Enter your password in the **Enter your password** field, and then select **Next**.



5. To store your Replicate API token, select the key icon from the Secrets tab on the Welcome to Colab page, as shown in the following screenshot.


Welcome To Colab - Colab
Private browsing
https://colab.research.google.com/?pli=1
90%
Welcome To Colab
File Edit View Insert Runtime Tools Help
Share
Secrets
+ Code + Text Copy to Drive
Connect
Gemini

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

No secrets saved

+ Add new secret

Gemini API keys

Access your secret keys in Python via:

```
from google.colab import userdata
userdata.get('secretName')
```

Welcome to Colab!

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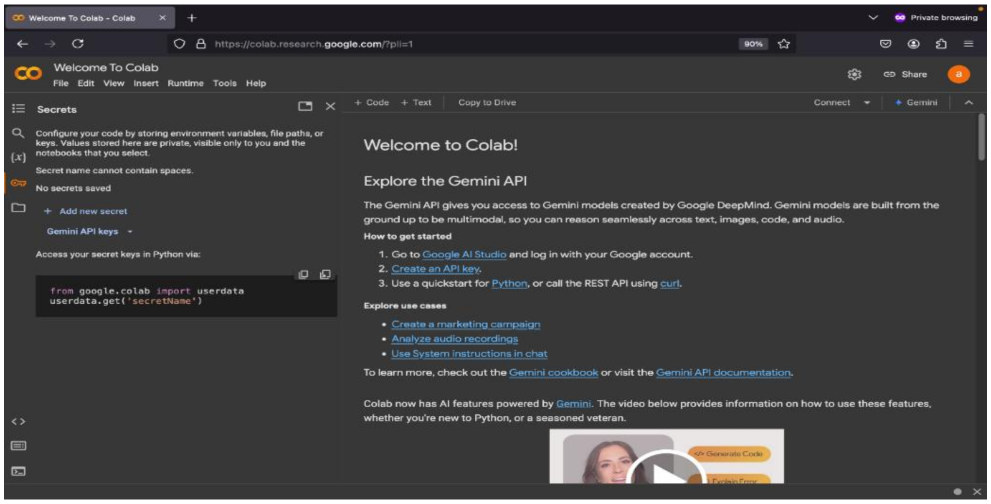
To learn more, check out the Gemini cookbook or visit the Gemini API documentation.

Colab now has AI features powered by Gemini. The video below provides information on how to use these features, whether you're new to Python, or a seasoned veteran.

6. Select **Add new secret**.


Welcome To Colab - Colab
Private browsing
https://colab.research.google.com/?pli=1
90%
Welcome To Colab
File Edit View Insert Runtime Tools Help
Share
Secrets
+ Code + Text Copy to Drive
Connect
Gemini

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

No secrets saved

+ Add new secret

Gemini API keys

Access your secret keys in Python via:

```
from google.colab import userdata
userdata.get('secretName')
```

Welcome to Colab!

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- Create a marketing campaign
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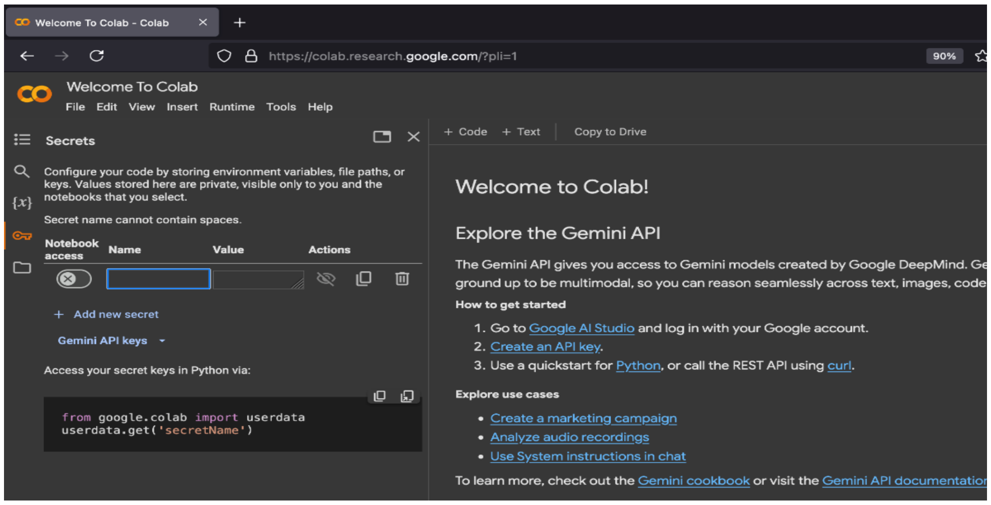
To learn more, check out the Gemini cookbook or visit the Gemini API documentation.

Colab now has AI features powered by Gemini. The video below provides information on how to use these features, whether you're new to Python, or a seasoned veteran.

7. Type `REPLICATE_api_token` in the **Name** field.


Welcome To Colab - Colab
https://colab.research.google.com/?pli=1
90%
Welcome To Colab
File Edit View Insert Runtime Tools Help
+ Code + Text Copy to Drive

Secrets

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

Notebook access	Name	Value	Actions

+ Add new secret

Gemini API keys

Access your secret keys in Python via:

```
from google.colab import userdata
userdata.get('secretName')
```

Welcome to Colab!

Explore the Gemini API

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ground up to be multimodal, so you can reason seamlessly across text, images, code

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3. Use a quickstart for Python, or call the REST API using curl.

Explore use cases

- Create a marketing campaign
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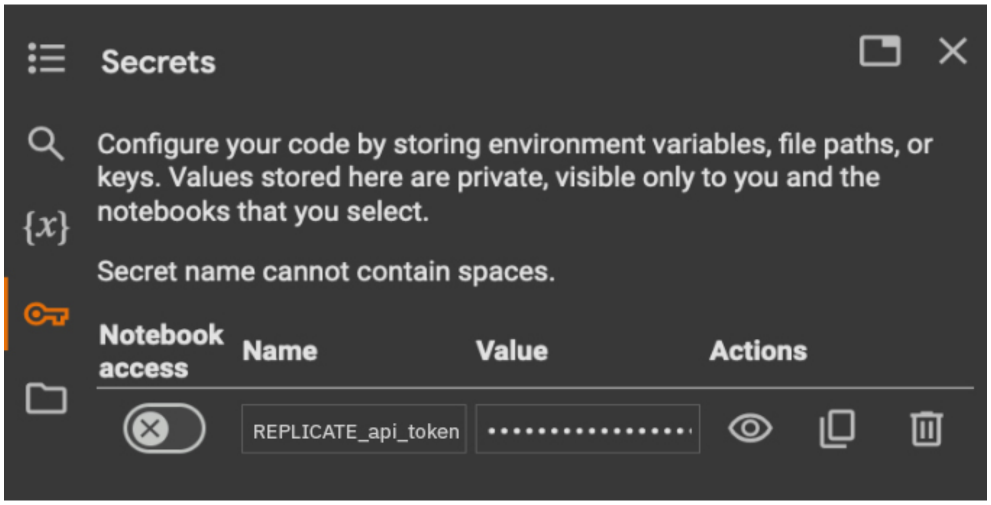
- Use System instructions in chat

To learn more, check out the Gemini cookbook or visit the Gemini API documentatio

8. Paste your Replicate API token you copied into the **Value** field, as shown in the following screenshot.



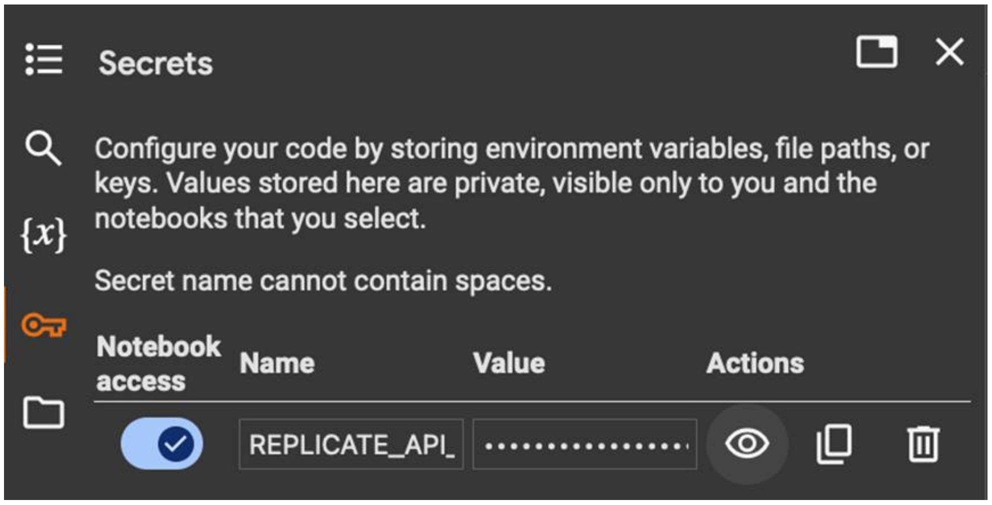
Secrets

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

Notebook access	Name	Value	Actions
	REPLICATE_api_token	•••••••••••••••••	

9. Set the **Notebook access** switch on, as shown in the following screenshot. Then, select the close icon to exit the configuration.



Secrets

Configure your code by storing environment variables, file paths, or keys. Values stored here are private, visible only to you and the notebooks that you select.

Secret name cannot contain spaces.

Notebook access	Name	Value	Actions
✓	REPLICATE_API_	••••••••••••••••	

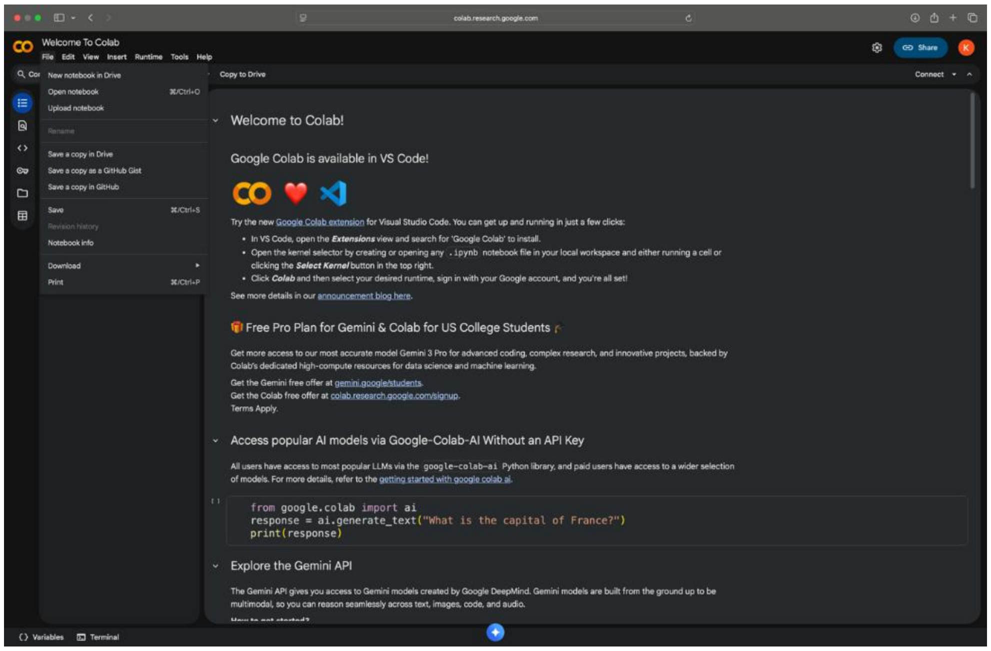
Load the Jupyter notebook and initialize the model

Overview

In this procedure, you'll load the Jupyter notebook and initialize the AI model. This sets up your environment before you can interact with the AI model.

Instructions

1. In your Google Colab workspace, select **File > Open notebook**.



Welcome to Colab!

Google Colab is available in VS Code!

Try the new Google Colab extension for Visual Studio Code. You can get up and running in just a few clicks:

- In VS Code, open the ***Extensions*** view and search for 'Google Colab' to install.
- Open the kernel selector by creating or opening any `.ipynb` notebook file in your local workspace and either running a cell or clicking the ***Select Kernel*** button in the top right.
- Click ***Colab*** and then select your desired runtime, sign in with your Google account, and you're all set!

See more details in our announcement blog here.

🎁 Free Pro Plan for Gemini & Colab for US College Students

Get more access to our most accurate model Gemini 3 Pro for advanced coding, complex research, and innovative projects, backed by Colab's dedicated high-compute resources for data science and machine learning.

Get the Gemini free offer at gemini.google/students.
Get the Colab free offer at colab.research.google.com/signup.
Terms Apply.

Access popular AI models via Google-Colab-AI Without an API Key

All users have access to most popular LLMs via the `google-colab-ai` Python library, and paid users have access to a wider selection of models. For more details, refer to the getting started with google colab ai.

```
from google.colab import ai
response = ai.generate_text("What is the capital of France?")
print(response)
```

Explore the Gemini API

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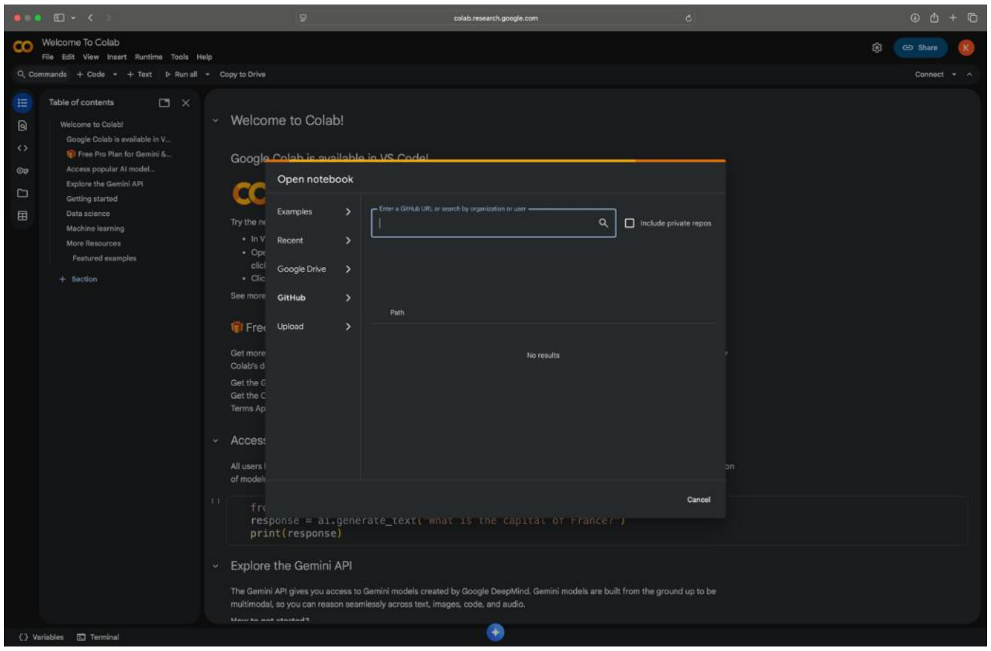
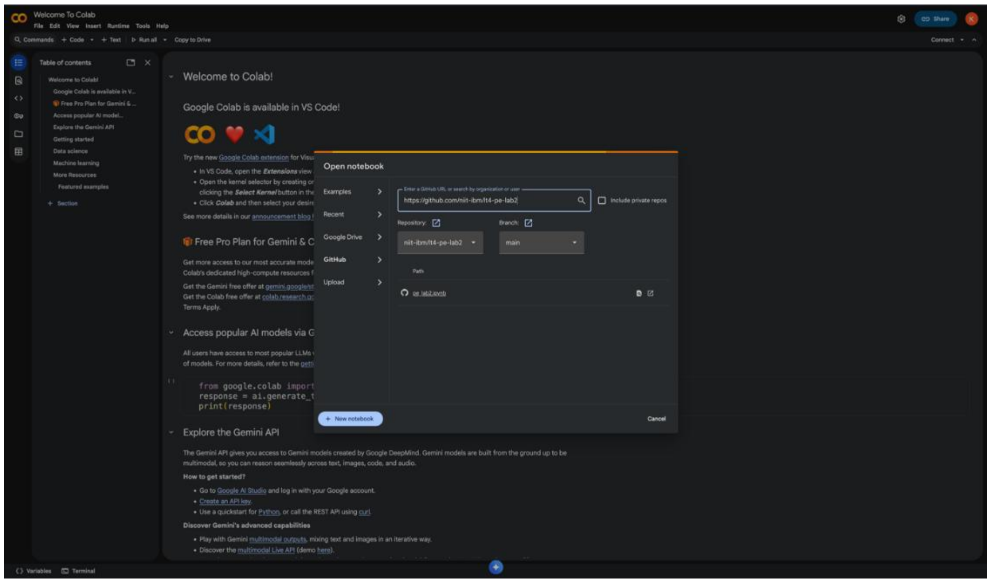
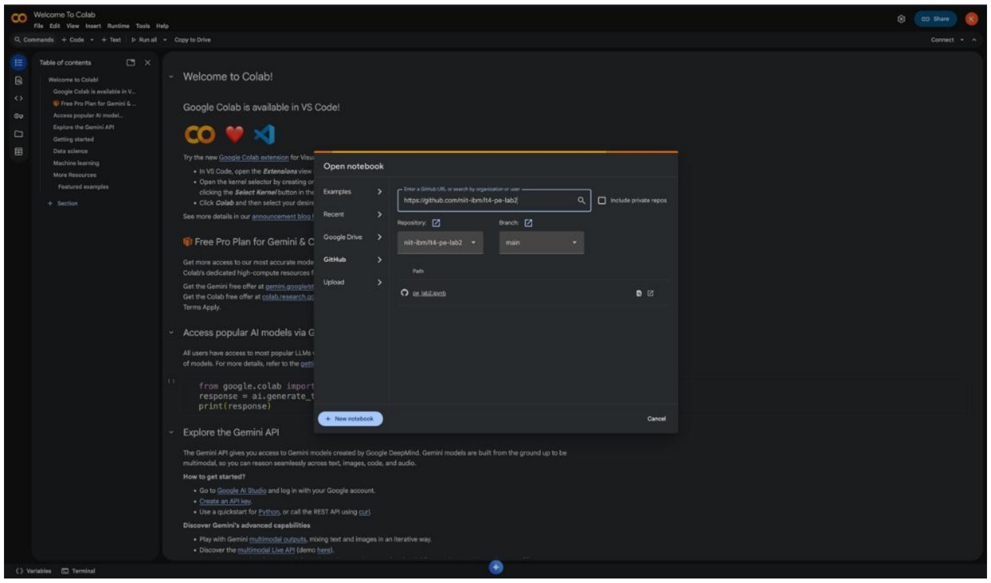
2. From the navigation menu, select **GitHub**.



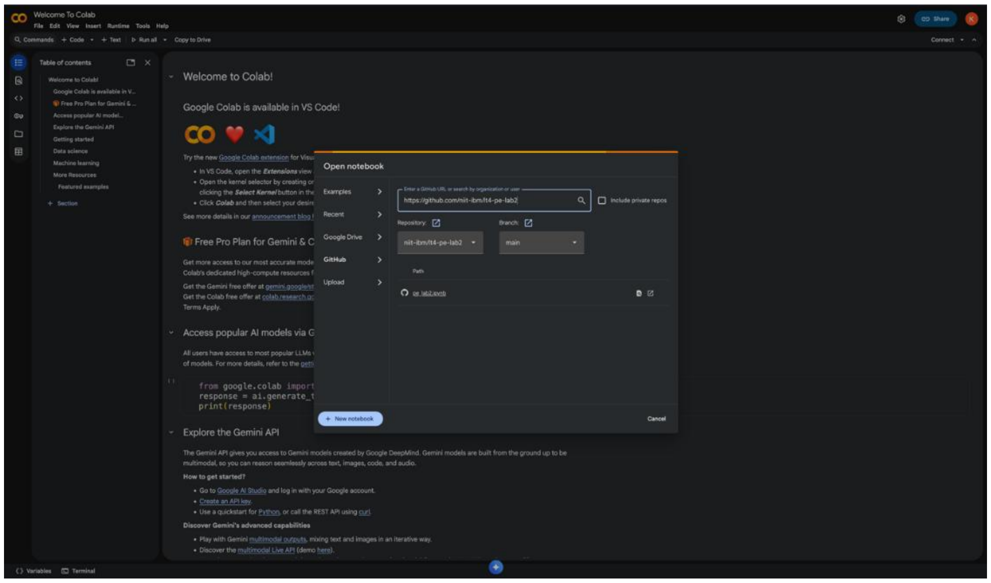
3. In the **Enter a GitHub URL or search by organization or user** field, copy and paste the following URL: https://github.com/niit-ibm/lt4-pe-lab2 and then, select the **search** icon.


Open notebook
Examples
Recent
Google Drive
GitHub
Upload
Enter a GitHub URL, or search by organization or user
https://github.com/niit-ibm/lt4-pe-lab2
Include private repos
Repository: niit-ibm/lt4-pe-lab2
Branch: main
Path
pe_lab2.ipynb
New notebook
Cancel

4. In the Branch section, select **main**.



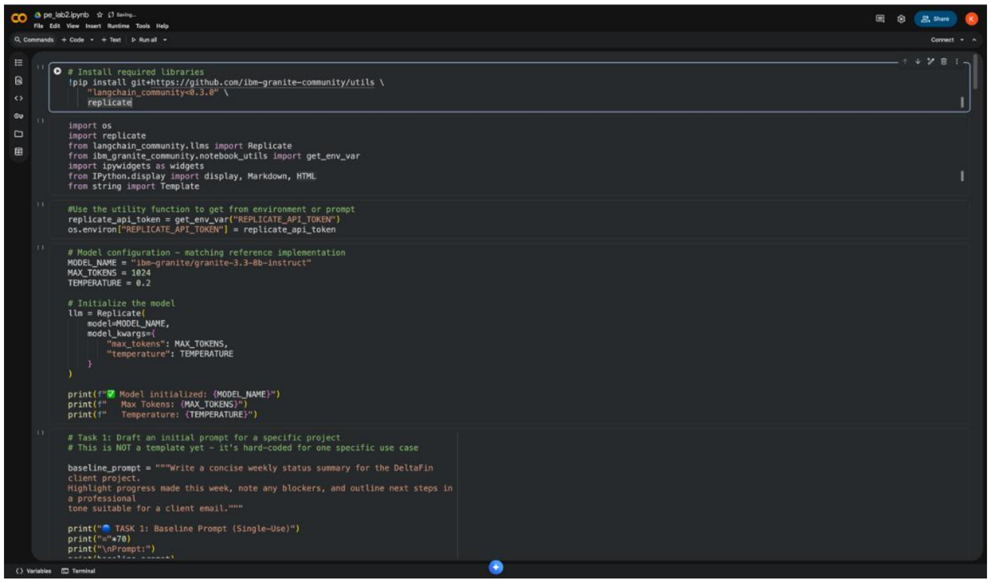
5. Select the **pe_lab2.ipynb** notebook in the Path section to open the notebook in Google Colab.



Result: A notebook titled "**`pe-lab2`**" that you need to use for this lab activity opens in the Colab Workspace. Note that each row in the notebook is referred to as a **cell**.

6. To run the code in the Jupyter notebook, you'll need to start a new instance in Google Colab runtime. For this, select the "**Connect**" menu on the Google Colab navigation bar, and then, select the **Connect to a hosted runtime** option.

Result: A green checkmark indicates that you have successfully connected to the hosted runtime.



```
# Install required libraries
!pip install git+https://github.com/ibm-granite-community/utils \
    "langchain_community<0.3.0" \
    replicate
```

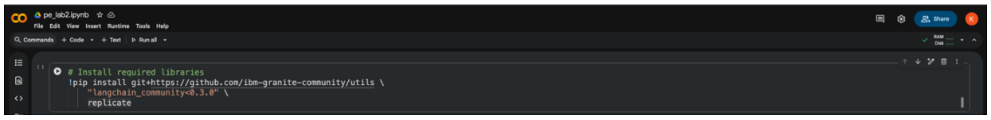
```
import os
import replicate
from langchain_community.llms import Replicate
from ibm_granite_community.notebook_utils import get_env_var
import ipywidgets as widgets
from IPython.display import display, Markdown, HTML
from string import Template
```

```
#Use the utility function to get from environment or prompt
replicate_api_token = get_env_var("REPLICATE_API_TOKEN")
os.environ["REPLICATE_API_TOKEN"] = replicate_api_token
```

```
# Model configuration - matching reference implementation
MODEL_NAME = "ibm-granite/granite-3.3-8b-instruct"
MAX_TOKENS = 1024
TEMPERATURE = 0.2

# Initialize the model
llm = Replicate(
    model=MODEL_NAME,
    model_kwargs={
        "max_tokens": MAX_TOKENS,
        "temperature": TEMPERATURE
    }
)

print(f"✅ Model initialized: {MODEL_NAME}")
print(f"   Max Tokens: {MAX_TOKENS}")
print(f"   Temperature: {TEMPERATURE}")
```

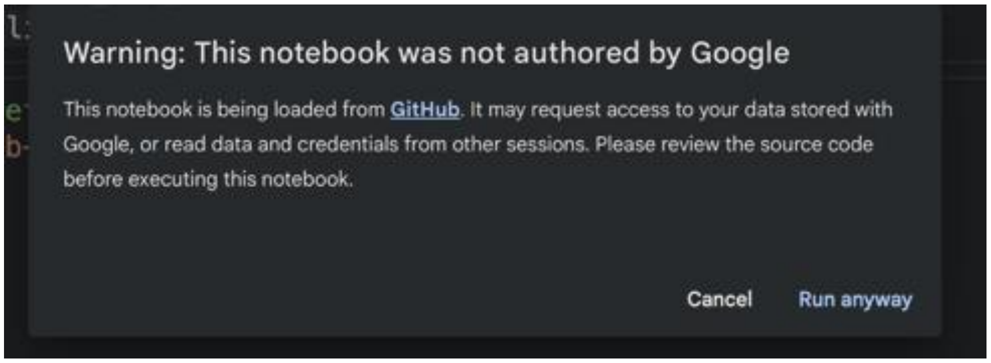
```
# Task 1: Draft an initial prompt for a specific project
# This is NOT a template yet - it's hard-coded for one specific use case

baseline_prompt = """Write a concise weekly status summary for the DeltaFin
client project.
Highlight progress made this week, note any blockers, and outline next steps in
a professional
tone suitable for a client email."""

print("🔵 TASK 1: Baseline Prompt (Single-Use)")
print("="*70)
print("\nPrompt:")
```

7. In the first cell of the notebook, select the **Play** button to install the required libraries from the Granite suite.



```
# Install required libraries
!pip install git+https://github.com/ibm-granite-community/utils \
    "langchain_community<0.3.0" \
    replicate
```

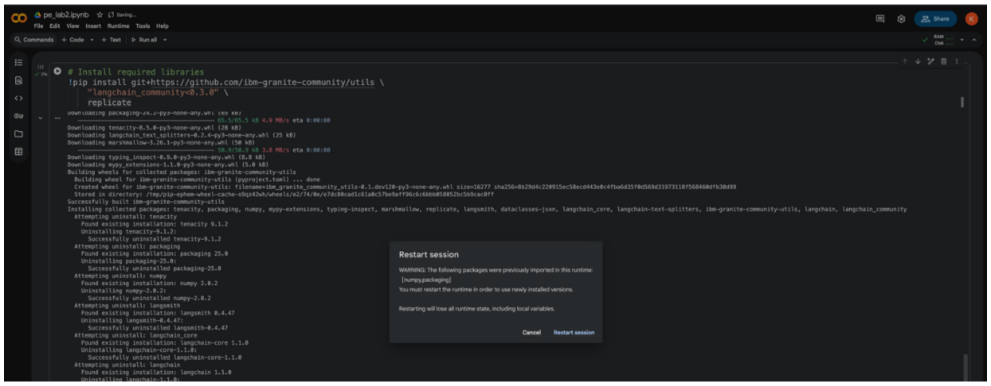
8. Select **Run anyway** to proceed loading the required libraries.



Warning: This notebook was not authored by Google

This notebook is being loaded from GitHub. It may request access to your data stored with Google, or read data and credentials from other sessions. Please review the source code before executing this notebook.

9. Once installation is complete you are prompted to restart the runtime session. Select **Restart session**.



```
# Install required libraries
!pip install git+https://github.com/ibm-granite-community/utils \
    "langchain_community<0.3.0" \
    replicate
```

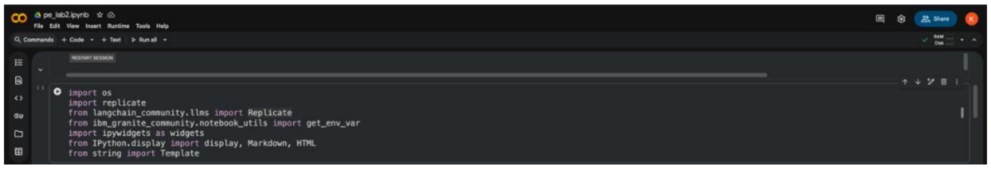
```
Downloading packaging-24.2-py3-none-any.whl (65 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 65.5/65.5 kB 4.9 MB/s eta 0:00:00
Downloading tenacity-8.5.0-py3-none-any.whl (28 kB)
Downloading langchain_text_splitters-0.2.4-py3-none-any.whl (25 kB)
Downloading marshmallow-3.26.1-py3-none-any.whl (50 kB)
   ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 50.9/50.9 kB 3.8 MB/s eta 0:00:00
Downloading typing_inspect-0.9.0-py3-none-any.whl (8.8 kB)
Downloading mypy_extensions-1.1.0-py3-none-any.whl (5.0 kB)
Building wheels for collected packages: ibm-granite-community-utils
  Building wheel for ibm-granite-community-utils (pyproject.toml) ... done
  Created wheel for ibm-granite-community-utils: filename=ibm_granite_community_utils-0.1.dev120-py3-none-any.whl size=16277 sha256=8b29d4c220915ec58ecd443e0c4fba6d35f0d569d31973118f568460dfb30d99
  Stored in directory: /tmp/pip-ephem-wheel-cache-s9qz42wh/wheels/e2/74/0e/e7dc80cad1c61a0c57be9aff96c6c6bbb058052bc5b9cac0ff
Successfully built ibm-granite-community-utils
Installing collected packages: tenacity, packaging, numpy, mypy-extensions, typing-inspect, marshmallow, replicate, langsmith, dataclasses-json, langchain_core, langchain-text-splitters, ibm-granite-community-utils, langchain, langchain_community
  Attempting uninstall: tenacity
    Found existing installation: tenacity 9.1.2
    Uninstalling tenacity-9.1.2:
      Successfully uninstalled tenacity-9.1.2
  Attempting uninstall: packaging
    Found existing installation: packaging 25.0
    Uninstalling packaging-25.0:
      Successfully uninstalled packaging-25.0
  Attempting uninstall: numpy
    Found existing installation: numpy 2.0.2
    Uninstalling numpy-2.0.2:
      Successfully uninstalled numpy-2.0.2
  Attempting uninstall: langsmith
    Found existing installation: langsmith 0.4.47
    Uninstalling langsmith-0.4.47:
      Successfully uninstalled langsmith-0.4.47
  Attempting uninstall: langchain_core
    Found existing installation: langchain-core 1.1.0
    Uninstalling langchain-core-1.1.0:
      Successfully uninstalled langchain-core-1.1.0
  Attempting uninstall: langchain
    Found existing installation: langchain 1.1.0
    Uninstalling langchain-1.1.0:
```

Restart session

WARNING: The following packages were previously imported in this runtime:
 [numpy,packaging]
You must restart the runtime in order to use newly installed versions.

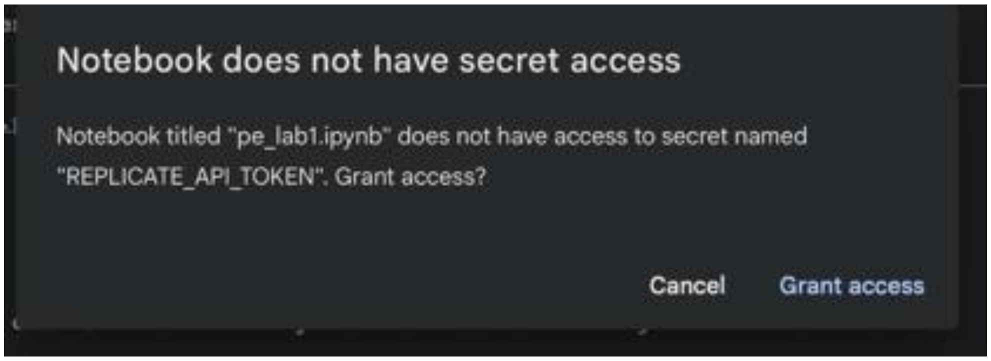
Restarting will lose all runtime state, including local variables.

10. Select **Run** to import the libraries.



```
import os
import replicate
from langchain_community.llms import Replicate
from ibm_granite_community.notebook_utils import get_env_var
import ipywidgets as widgets
from IPython.display import display, Markdown, HTML
from string import Template
```

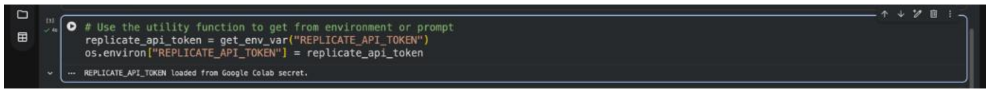
11. From the next cell, select **Grant access** to let the model access the Replicate Token from the secrets.



Notebook does not have secret access

Notebook titled "pe_lab1.ipynb" does not have access to secret named "REPLICATE_API_TOKEN". Grant access?

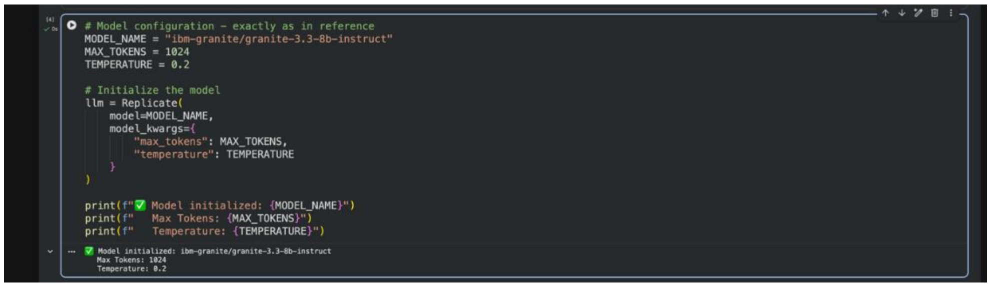
12. The following message displays at the bottom of the cell: REPLICATE_API_TOKEN loaded from Google Colab secret.



```
# Use the utility function to get from environment or prompt
replicate_api_token = get_env_var("REPLICATE_API_TOKEN")
os.environ["REPLICATE_API_TOKEN"] = replicate_api_token
```

```
REPLICATE_API_TOKEN loaded from Google Colab secret.
```

13. Select the **Play** button to initialize the granite-3.3-8B-instruct model.



```
# Model configuration - exactly as in reference
MODEL_NAME = "ibm-granite/granite-3.3-8b-instruct"
MAX_TOKENS = 1024
TEMPERATURE = 0.2

# Initialize the model
llm = Replicate(
    model=MODEL_NAME,
    model_kwargs={
        "max_tokens": MAX_TOKENS,
        "temperature": TEMPERATURE
    }
)

print(f"✅ Model initialized: {MODEL_NAME}")
print(f"   Max Tokens: {MAX_TOKENS}")
print(f"   Temperature: {TEMPERATURE}")
```

```
✅ Model initialized: ibm-granite/granite-3.3-8b-instruct
   Max Tokens: 1024
   Temperature: 0.2
```

Draft a baseline prompt for a recurring task

Overview

In this procedure, you'll draft an initial, working prompt for a specific use case.

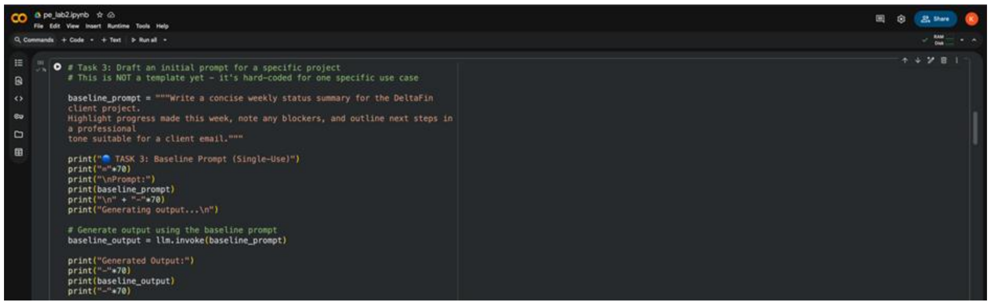
Instructions

1. Begin by writing a baseline prompt for generating weekly status summaries of the projects.

   To do this, copy the following code, paste it into a new code cell, and then select the **Play** icon to execute it.

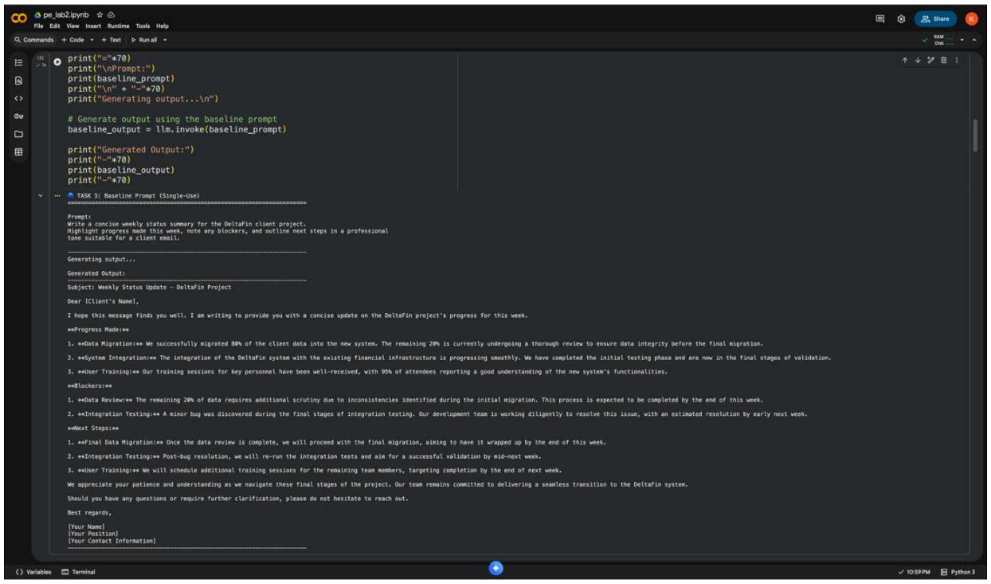
```
# Task 3: Draft an initial prompt for a specific project
# This is NOT a template yet - it's hard-coded for one specific use
case
baseline_prompt = """Write a concise weekly status summary for the
DeltaFin
client project.
Highlight progress made this week, note any blockers, and outline next
steps in a
professional
tone suitable for a client email."""

print("TASK 3: Baseline Prompt (Single-Use)")
print("-" * 70)
print("\nPrompt:")
print(baseline_prompt)
print("\n" + "-" * 70)
print("Generating output...")

# Generate output using the baseline prompt
baseline_output = lm.invoke(baseline_prompt)

print("Generated Output:")
print("-" * 70)
print(baseline_output)
print("-" * 70)
```

2. The following screenshot shows the code pasted into the code cell.



```
# Task 3: Draft an initial prompt for a specific project
# This is NOT a template yet - it's hard-coded for one specific use case

baseline_prompt = """Write a concise weekly status summary for the DeltaFin
client project.
Highlight progress made this week, note any blockers, and outline next steps in
a professional
tone suitable for a client email."""

print("🔵 TASK 3: Baseline Prompt (Single-Use)")
print("="*70)
print("\nPrompt:")
print(baseline_prompt)
print("\n" + "-"*70)
print("Generating output...\n")

# Generate output using the baseline prompt
baseline_output = llm.invoke(baseline_prompt)

print("Generated Output:")
print("-"*70)
print(baseline_output)
print("-"*70)
```

Result: After you enter the baseline prompt, the LLM generates an output as shown in the following screenshot.



```
print("="*70)
print("\nPrompt:")
print(baseline_prompt)
print("\n" + "-"*70)
print("Generating output...\n")

# Generate output using the baseline prompt
baseline_output = llm.invoke(baseline_prompt)

print("Generated Output:")
print("-"*70)
print(baseline_output)
print("-"*70)
```

```
🔵 TASK 3: Baseline Prompt (Single-Use)
======================================================================

Prompt:
Write a concise weekly status summary for the DeltaFin client project.
Highlight progress made this week, note any blockers, and outline next steps in a professional
tone suitable for a client email.

----------------------------------------------------------------------
Generating output...

Generated Output:
----------------------------------------------------------------------
Subject: Weekly Status Update - DeltaFin Project

Dear [Client's Name],

I hope this message finds you well. I am writing to provide you with a concise update on the DeltaFin project's progress for this week.

**Progress Made:**

1. **Data Migration:** We successfully migrated 80% of the client data into the new system. The remaining 20% is currently undergoing a thorough review to ensure data integrity before the final migration.

2. **System Integration:** The integration of the DeltaFin system with the existing financial infrastructure is progressing smoothly. We have completed the initial testing phase and are now in the final stages of validation.

3. **User Training:** Our training sessions for key personnel have been well-received, with 95% of attendees reporting a good understanding of the new system's functionalities.

**Blockers:**

1. **Data Review:** The remaining 20% of data requires additional scrutiny due to inconsistencies identified during the initial migration. This process is expected to be completed by the end of this week.

2. **Integration Testing:** A minor bug was discovered during the final stages of integration testing. Our development team is working diligently to resolve this issue, with an estimated resolution by early next week.

**Next Steps:**

1. **Final Data Migration:** Once the data review is complete, we will proceed with the final migration, aiming to have it wrapped up by the end of this week.

2. **Integration Testing:** Post-bug resolution, we will re-run the integration tests and aim for a successful validation by mid-next week.

3. **User Training:** We will schedule additional training sessions for the remaining team members, targeting completion by the end of next week.

We appreciate your patience and understanding as we navigate these final stages of the project. Our team remains committed to delivering a seamless transition to the DeltaFin system.

Should you have any questions or require further clarification, please do not hesitate to reach out.

Best regards,

[Your Name]
[Your Position]
[Your Contact Information]
----------------------------------------------------------------------
```

Note that the output addresses all required elements and produces a complete output. However, it gives a vague time reference ("this week") and it cannot be reused for other projects without a complete rewrite. This prompt works for one specific situation, but it's not scalable.

Identify variable elements and convert to a template

Overview

In this procedure, you'll identify variables such as client name, time period, progress items, blockers, next steps, tone, and audience and convert your baseline prompt to a template.

Instructions

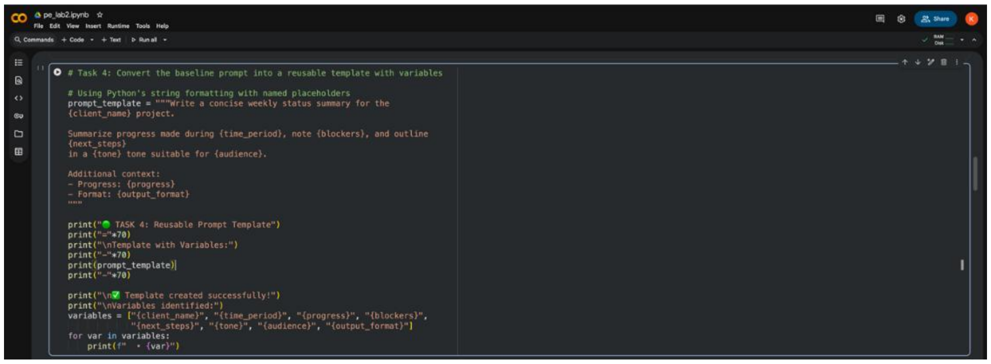
1. Enter the details of the variable of your prompt template in the LLM.

   To do this, copy the following code, paste it into a new code cell, and then select the **Play** icon to execute it.

   ```
   # Task 4: Convert the baseline prompt into a reusable template
   with variables
   # Using Python's string formatting with named placeholders
   prompt_template = """Write a concise weekly status summary for
   the
   {client_name} project.

   Summarize progress made during {time_period}, note {blockers},
   and outline
   {next_steps}
   in a {tone} tone suitable for {audience}.

   Additional context:
   - progress: {progress}
   - format: {output_format}"""


   print("TASK 4: Reusable Prompt Template")
   print("-" * 70)
   print("\nTemplate with Variables:")
   print("-" * 70)
   print(prompt_template)
   print("-" * 70)

   print("\n Template created successfully!")
   print("\nVariables identified:")
   variables = ["{client_name}", "{time_period}", "{progress}",
   "{blockers}",
                "{next_steps}", "{tone}", "{audience}",
   "{output_format}"]
   ```

```
for var in variables:
    print(f” – {var}”)
```

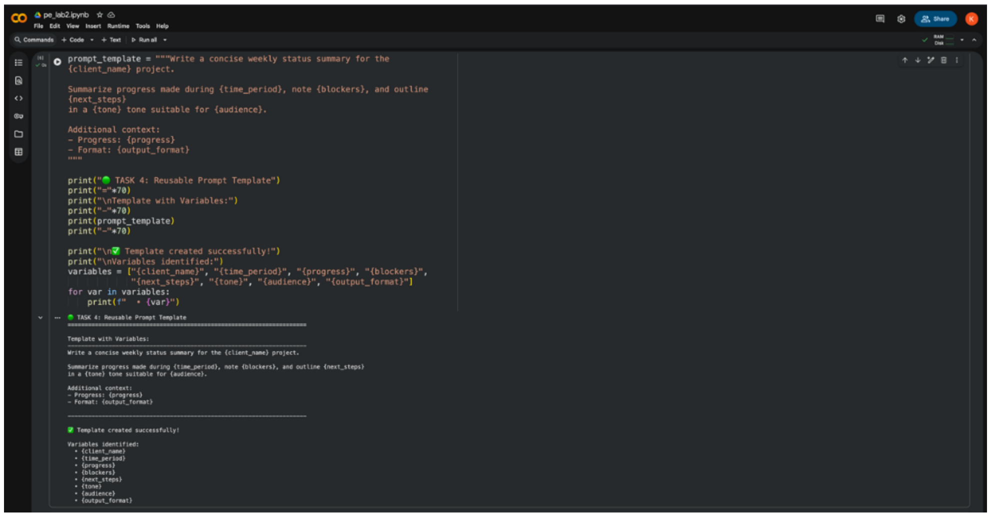
Result: The following screenshot shows the code pasted into the code cell.


pe_lab2.ipynb
File Edit View Insert Runtime Tools Help
Commands + Code + Text Run all

```
# Task 4: Convert the baseline prompt into a reusable template with variables

# Using Python's string formatting with named placeholders
prompt_template = """Write a concise weekly status summary for the
{client_name} project.

Summarize progress made during {time_period}, note {blockers}, and outline
{next_steps}
in a {tone} tone suitable for {audience}.

Additional context:
- Progress: {progress}
- Format: {output_format}
"""

print("🟢 TASK 4: Reusable Prompt Template")
print("="*70)
print("\nTemplate with Variables:")
print("-"*70)
print(prompt_template)
print("-"*70)

print("\n✅ Template created successfully!")
print("\nVariables identified:")
variables = ["{client_name}", "{time_period}", "{progress}", "{blockers}",
             "{next_steps}", "{tone}", "{audience}", "{output_format}"]
for var in variables:
    print(f"  • {var}")
```

The message “Template created successfully!” is displayed. At the end, the identified variables are displayed as follows:
- {client_name}
- {time_period}
- {progress}
- {blockers}
- {next_steps}
- {tone}
- {audience}
- {output_format}

This prompt template can be used to generate summaries for any project. It produces outputs with a consistent structure and is scalable for use across teams. You only need to supply values for the variables. The structure and instructions remain fixed, producing reliable and consistent output quality.


pe_lab2.ipynb
File Edit View Insert Runtime Tools Help
Commands + Code + Text Run all

```
prompt_template = """Write a concise weekly status summary for the
{client_name} project.

Summarize progress made during {time_period}, note {blockers}, and outline
{next_steps}
in a {tone} tone suitable for {audience}.

Additional context:
- Progress: {progress}
- Format: {output_format}
"""

print("🟢 TASK 4: Reusable Prompt Template")
print("="*70)
print("\nTemplate with Variables:")
print("-"*70)
print(prompt_template)
print("-"*70)

print("\n✅ Template created successfully!")
print("\nVariables identified:")
variables = ["{client_name}", "{time_period}", "{progress}", "{blockers}",
             "{next_steps}", "{tone}", "{audience}", "{output_format}"]
for var in variables:
    print(f"  • {var}")
```

```
🟢 TASK 4: Reusable Prompt Template
======================================================================

Template with Variables:
----------------------------------------------------------------------
Write a concise weekly status summary for the {client_name} project.

Summarize progress made during {time_period}, note {blockers}, and outline {next_steps}
in a {tone} tone suitable for {audience}.

Additional context:
- Progress: {progress}
- Format: {output_format}

----------------------------------------------------------------------

✅ Template created successfully!

Variables identified:
  • {client_name}
  • {time_period}
  • {progress}
  • {blockers}
  • {next_steps}
  • {tone}
  • {audience}
  • {output_format}
```

Test and finalize the prompt template

Overview

In this procedure, you'll test your prompt template with real inputs to verify if it produces reliable outputs. You'll test the template with two set of inputs to verify:

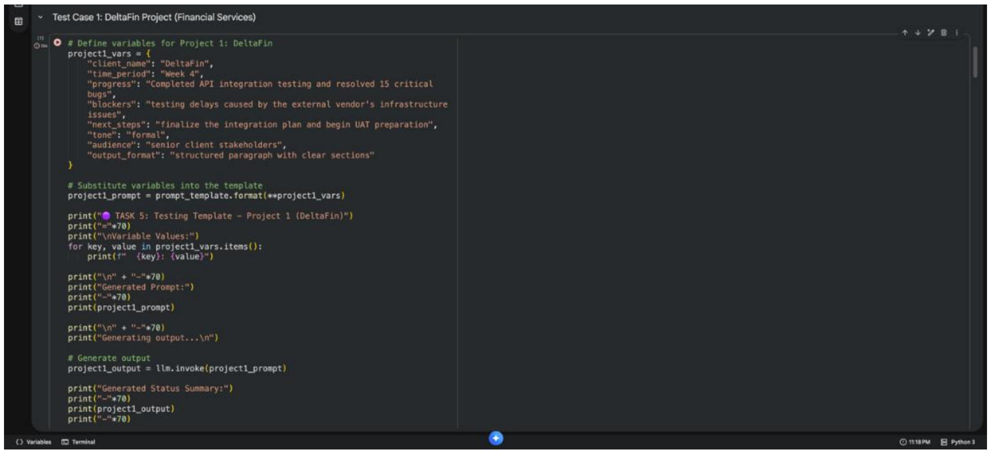
- Consistent structure across different inputs
- Proper tone adaptation
- Audience-appropriate content
- Complete coverage of requirements

Instructions

1. Begin by testing the template for defining and loading the variables for the DeltaFin Project, a Financial services project. To do this, copy the following code, paste it into a new code cell, and then select the **Play** icon to execute it.

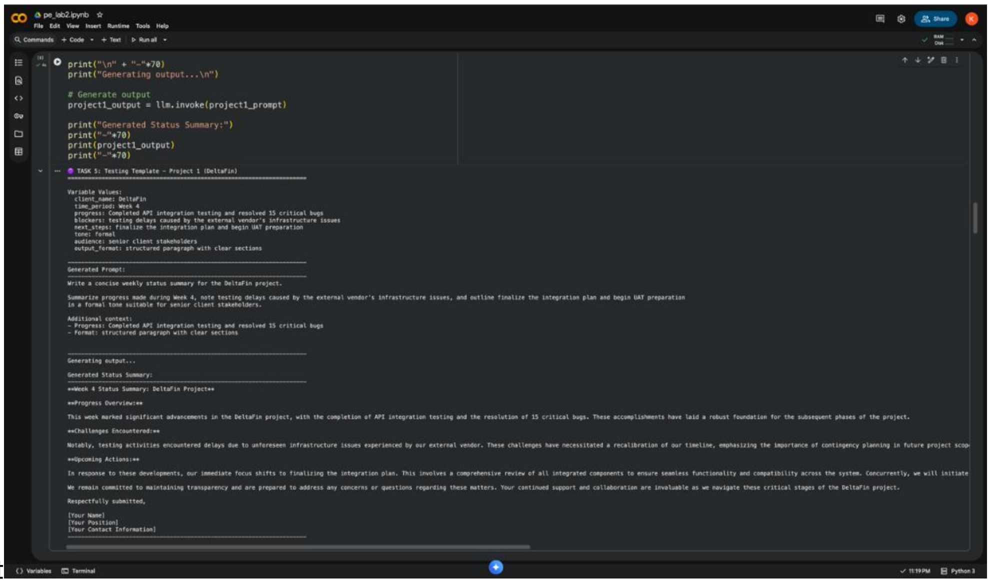
```
# Test Case 1: DeltaFin Project (Financial Services)
# Define variables for Project 1: DeltaFin
project1_vars = {
    "client_name": "DeltaFin",
    "time_period": "Week 4",
    "progress": "Completed API integration testing and resolved 15
critical bugs",
    "blockers": "Testing delays caused by the external vendor's
infrastructure issues",
    "next_steps": "Finalize the integration plan and begin UAT
preparation",
    "tone": "formal",
    "audience": "senior client stakeholders",
    "output_format": "structured paragraph with clear sections"
}

# Substitute variables into the template
project1_prompt = prompt_template.format(**project1_vars)

print("TASK 5: Testing Template - Project 1 (DeltaFin)")
print("-" * 70)
print("\nVariable Values:")
for key, value in project1_vars.items():
    print(f"{key}: {value}")

print("\n" + "-" * 70)
print("\nGenerated Prompt:")
print("-" * 70)
print(project1_prompt)
print("-" * 70)

print("\n" + "-" * 70)
print("Generating output... \n")

# Generate output
project1_output = lm.invoke(project1_prompt)

print("Generated Status Summary:")
print("-" * 70)
print(project1_output)
print("-" * 70)
```

The following screenshot shows the code pasted into the code cell.


Test Case 1: DeltaFin Project (Financial Services)

```
# Define variables for Project 1: DeltaFin
project1_vars = {
    "client_name": "DeltaFin",
    "time_period": "Week 4",
    "progress": "Completed API integration testing and resolved 15 critical
    bugs",
    "blockers": "testing delays caused by the external vendor's infrastructure
    issues",
    "next_steps": "finalize the integration plan and begin UAT preparation",
    "tone": "formal",
    "audience": "senior client stakeholders",
    "output_format": "structured paragraph with clear sections"
}

# Substitute variables into the template
project1_prompt = prompt_template.format(**project1_vars)

print("🟣 TASK 5: Testing Template - Project 1 (DeltaFin)")
print("="*70)
print("\nVariable Values:")
for key, value in project1_vars.items():
    print(f"  {key}: {value}")

print("\n" + "-"*70)
print("Generated Prompt:")
print("-"*70)
print(project1_prompt)

print("\n" + "-"*70)
print("Generating output...\n")

# Generate output
project1_output = llm.invoke(project1_prompt)

print("Generated Status Summary:")
print("-"*70)
print(project1_output)
print("-"*70)
```

Result: After you enter the template and edit it as per DeltaFin's project requirements, the generated result is tailored to this use case.


pe_lab2.ipynb
File Edit View Insert Runtime Tools Help
Commands + Code + Text Run all
Share
Variables Terminal
11:19 PM Python 3

```
print("\n" + "-"*70)
print("Generating output...\n")

# Generate output
project1_output = llm.invoke(project1_prompt)

print("Generated Status Summary:")
print("-"*70)
print(project1_output)
print("-"*70)
```

```
TASK 5: Testing Template - Project 1 (DeltaFin)
======================================================================

Variable Values:
  client_name: DeltaFin
  time_period: Week 4
  progress: Completed API integration testing and resolved 15 critical bugs
  blockers: testing delays caused by the external vendor's infrastructure issues
  next_steps: finalize the integration plan and begin UAT preparation
  tone: formal
  audience: senior client stakeholders
  output_format: structured paragraph with clear sections

----------------------------------------------------------------------
Generated Prompt:
----------------------------------------------------------------------
Write a concise weekly status summary for the DeltaFin project.

Summarize progress made during Week 4, note testing delays caused by the external vendor's infrastructure issues, and outline finalize the integration plan and begin UAT preparation
in a formal tone suitable for senior client stakeholders.

Additional context:
- Progress: Completed API integration testing and resolved 15 critical bugs
- Format: structured paragraph with clear sections


----------------------------------------------------------------------
Generating output...

Generated Status Summary:
----------------------------------------------------------------------
**Week 4 Status Summary: DeltaFin Project**

**Progress Overview:**

This week marked significant advancements in the DeltaFin project, with the completion of API integration testing and the resolution of 15 critical bugs. These accomplishments have laid a robust foundation for the subsequent phases of the project.

**Challenges Encountered:**

Notably, testing activities encountered delays due to unforeseen infrastructure issues experienced by our external vendor. These challenges have necessitated a recalibration of our timeline, emphasizing the importance of contingency planning in future project scop

**Upcoming Actions:**

In response to these developments, our immediate focus shifts to finalizing the integration plan. This involves a comprehensive review of all integrated components to ensure seamless functionality and compatibility across the system. Concurrently, we will initiate

We remain committed to maintaining transparency and are prepared to address any concerns or questions regarding these matters. Your continued support and collaboration are invaluable as we navigate these critical stages of the DeltaFin project.

Respectfully submitted,

[Your Name]
[Your Position]
[Your Contact Information]
----------------------------------------------------------------------
```

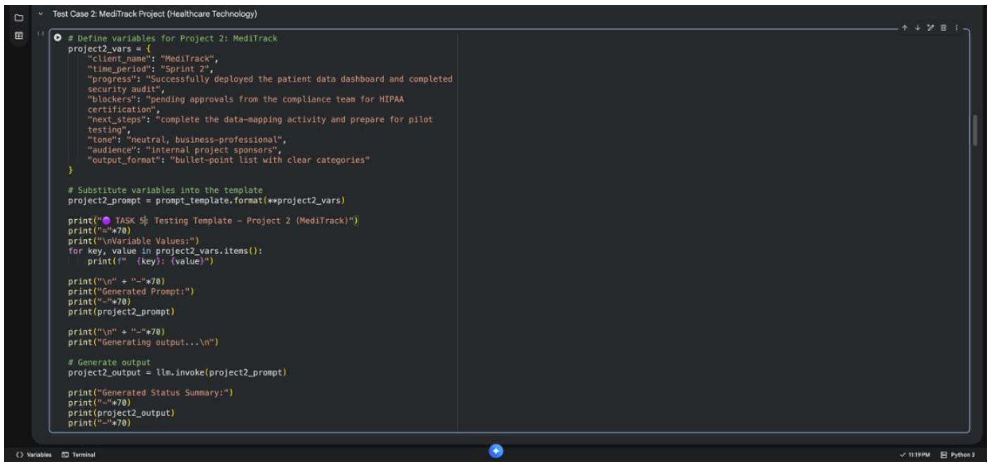
t

2. Now, try defining and loading the variables for the MediTrack, a project for a Healthcare organization. To do this, copy the following code, paste it into a new code cell, and then select the **Play** icon to execute it.

```
# Test Case 2: MediTrack Project (Healthcare Technology)
# Define variables for Project 2: MediTrack
project2_vars = {
    "client_name": "MediTrack",
    "time_period": "Sprint 2",
    "progress": "Successfully deployed the patient data dashboard 
and completed
                    security audit",
    "blockers": "pending approvals from the compliance team for 
HIPAA
                    certification",
    "next_steps": "complete the data-mapping activity and prepare 
for pilot
                    testing",
    "tone": "neutral, business-professional",
    "audience": "internal project sponsors",
    "output_format": "bullet-point list with clear categories"
}

# Substitute variables into the template
project2_prompt = prompt_template.format(**project2_vars)
```

```
print("TASK 5: Testing Template - Project 2 (MediTrack)")
print("-" * 70)
print("\nVariable Values:")
for key, value in project2_vars.items():
    print(f"{key}: {value}")

print("\n" + "-" * 70)
print("\nGenerated Prompt:")
print("-" * 70)
print(project2_prompt)
print("-" * 70)

print("\n" + "-" * 70)
print("Generating output... \n")

# Generate output
project2_output = lm.invoke(project2_prompt)

print("Generated Status Summary:")
print("-" * 70)
print(project2_output)
print("-" * 70)
2. Context: The Reusable Prompt Template Definition

# Task 4: Convert the baseline prompt into a reusable template
with variables
# Using Python's string formatting with named placeholders
prompt_template = """Write a concise weekly status summary for
the
{client_name} project.

Summarize progress made during {time_period}, note {blockers},
and outline
{next_steps}
in a {tone} tone suitable for {audience}.

Additional context:
- progress: {progress}
- format: {output_format}"""
```

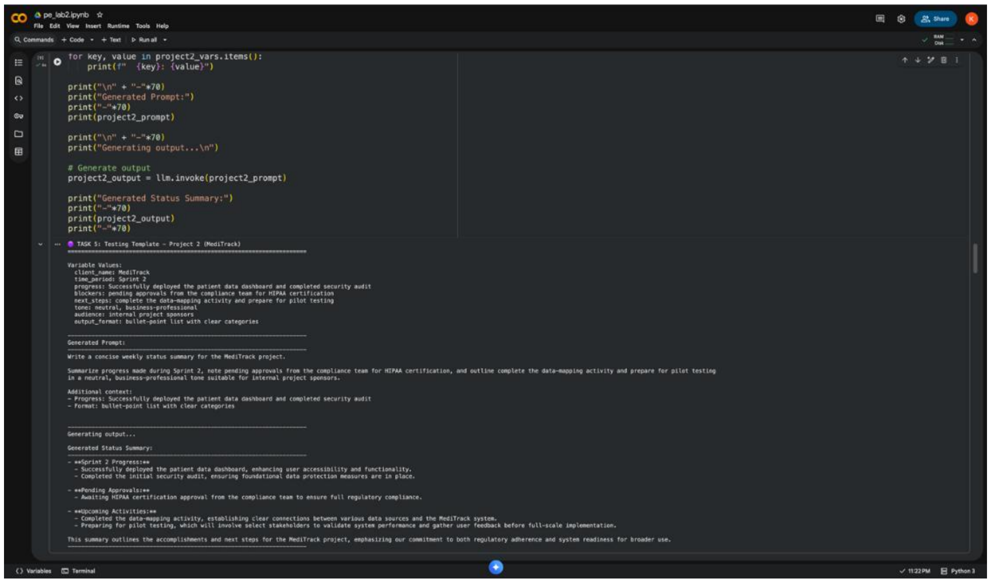
The following screenshot shows the code pasted into the code cell.


Test Case 2: MediTrack Project (Healthcare Technology)

```python
# Define variables for Project 2: MediTrack
project2_vars = {
    "client_name": "MediTrack",
    "time_period": "Sprint 2",
    "progress": "Successfully deployed the patient data dashboard and completed
    security audit",
    "blockers": "pending approvals from the compliance team for HIPAA
    certification",
    "next_steps": "complete the data-mapping activity and prepare for pilot
    testing",
    "tone": "neutral, business-professional",
    "audience": "internal project sponsors",
    "output_format": "bullet-point list with clear categories"
}

# Substitute variables into the template
project2_prompt = prompt_template.format(**project2_vars)

print("🟣 TASK 5: Testing Template - Project 2 (MediTrack)")
print("="*70)
print("\nVariable Values:")
for key, value in project2_vars.items():
    print(f"  {key}: {value}")

print("\n" + "-"*70)
print("Generated Prompt:")
print("-"*70)
print(project2_prompt)

print("\n" + "-"*70)
print("Generating output...\n")

# Generate output
project2_output = llm.invoke(project2_prompt)

print("Generated Status Summary:")
print("-"*70)
print(project2_output)
print("-"*70)
```

Result: After you enter the variables as per MediTrack's project requirements, the following output is generated.

This template produces consistent, high-quality, and well-formatted summaries that adapt to different contexts, tones, and audiences, while maintaining professional standards.


pe_lab2.ipynb

```python
for key, value in project2_vars.items():
    print(f"  {key}: {value}")

print("\n" + "-"*70)
print("Generated Prompt:")
print("-"*70)
print(project2_prompt)

print("\n" + "-"*70)
print("Generating output...\n")

# Generate output
project2_output = llm.invoke(project2_prompt)

print("Generated Status Summary:")
print("-"*70)
print(project2_output)
print("-"*70)
```

```
🟣 TASK 5: Testing Template - Project 2 (MediTrack)
======================================================================

Variable Values:
  client_name: MediTrack
  time_period: Sprint 2
  progress: Successfully deployed the patient data dashboard and completed security audit
  blockers: pending approvals from the compliance team for HIPAA certification
  next_steps: complete the data-mapping activity and prepare for pilot testing
  tone: neutral, business-professional
  audience: internal project sponsors
  output_format: bullet-point list with clear categories

----------------------------------------------------------------------
Generated Prompt:
----------------------------------------------------------------------
Write a concise weekly status summary for the MediTrack project.

Summarize progress made during Sprint 2, note pending approvals from the compliance team for HIPAA certification, and outline complete the data-mapping activity and prepare for pilot testing
in a neutral, business-professional tone suitable for internal project sponsors.

Additional context:
- Progress: Successfully deployed the patient data dashboard and completed security audit
- Format: bullet-point list with clear categories


----------------------------------------------------------------------
Generating output...

Generated Status Summary:
----------------------------------------------------------------------
- **Sprint 2 Progress:**
  - Successfully deployed the patient data dashboard, enhancing user accessibility and functionality.
  - Completed the initial security audit, ensuring foundational data protection measures are in place.

- **Pending Approvals:**
  - Awaiting HIPAA certification approval from the compliance team to ensure full regulatory compliance.

- **Upcoming Activities:**
  - Completed the data-mapping activity, establishing clear connections between various data sources and the MediTrack system.
  - Preparing for pilot testing, which will involve select stakeholders to validate system performance and gather user feedback before full-scale implementation.

This summary outlines the accomplishments and next steps for the MediTrack project, emphasizing our commitment to both regulatory adherence and system readiness for broader use.
----------------------------------------------------------------------
```

Conclusion

Congratulations! You have learned how to develop a prompt template using variables to generate output from LLMs. Your template now produces clear, consistent outputs for any project, and can be used across teams.