GAI-3101 Lab Guide

Crafting Custom Agentic AI Solutions

ascendient learning

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Accessing and Running Labs in Amazon SageMaker

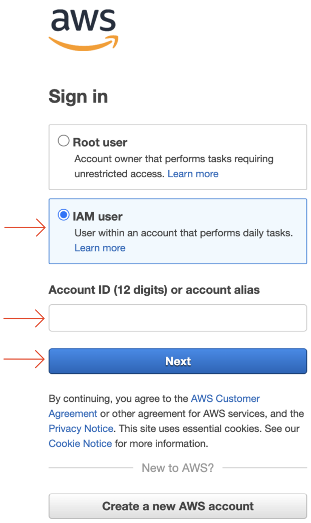
MODULE 1

The labs in this course use Amazon SageMaker to host Jupyter Lab environments. This section provides an overview of SageMaker and guides you through accessing and using the Jupyter Lab interface.

1.1. Logging into the AWS Console

> ⓘ Note
>
> Your credentials are available in the student portal. If you don't have access to the portal, ask the instructor for help.
> Please log into AWS with your assigned credentials. AWS is a cloud technology and is frequently updated. As a result, you may have to improvise if there are changes in the interface. Please don't hesitate to ask your instructor if there are any questions.

1. Open your preferred web browser and navigate to: https://console.aws.amazon.com
2. Select "IAM User"
3. Enter your account alias.
4. Press Next



Sign in

○ Root user
Account owner that performs tasks requiring unrestricted access. Learn more

● IAM user
User within an account that performs daily tasks. Learn more

Account ID (12 digits) or account alias

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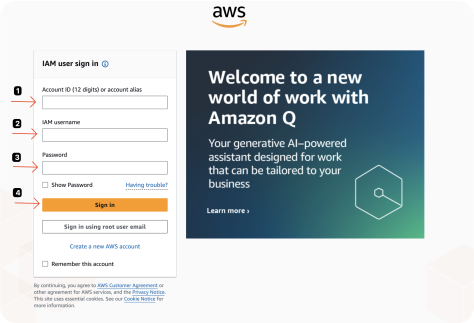
5. Sign in with your AWS credentials



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1.2. Navigating to Amazon Sagemaker AI

From the AWS Console, you will be able to access the AWS Sagemaker AI environment.

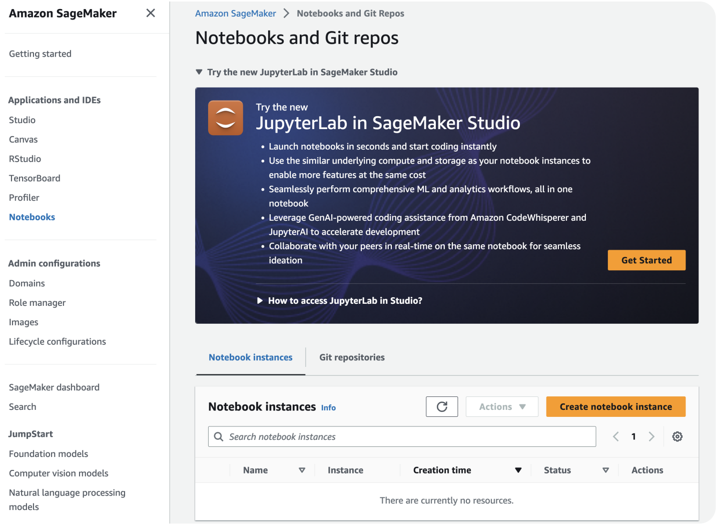
1. In the AWS Management Console search bar, type "SageMaker AI"

Sagemaker

2. Open Sagemaker dashboard by clicking the result for "Amazon Sagemaker AI"

3. In the SageMaker dashboard, click on "Notebooks" in the left sidebar

4. Under the "Notebook Instances" header, you will see a list of existing Notebook instances.



- Launch notebooks in seconds and start coding instantly
- Use the similar underlying compute and storage as your notebook instances to enable more features at the same cost
- Seamlessly perform comprehensive ML and analytics workflows, all in one notebook
- Leverage GenAI-powered coding assistance from Amazon CodeWhisperer and JupyterAI to accelerate development
- Collaborate with your peers in real-time on the same notebook for seamless ideation

There are currently no resources.

> ⓘ Important
>
> If you don’t see any existing notebooks, check these things:
>
> - Make sure you’re in the correct AWS region (typically `us-west-2`).
> - Make sure to use the correct account if you have multiple AWS accounts.
>
> Ask the instructor for help if you’re still unable to locate the SageMaker notebook.

1.3. Managing Notebook Instances

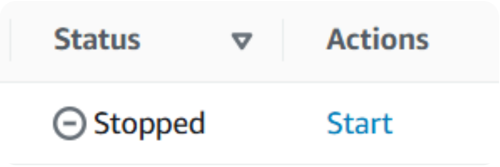
Notebook instances are the primary lab environment for SageMaker. You can start, stop, and manage these instances from the SageMaker dashboard. The status for each notebook instance is displayed in the "Status" column.

The primary states are:

- **InService**: The notebook instance is running and ready to use
- **Stopped**: The notebook instance is stopped and not incurring compute charges
- **Pending**: The notebook instance is being provisioned

1.3.1. Starting a Notebook Instance

To start a new notebook instance click the "Start" button next to the notebook instance name.

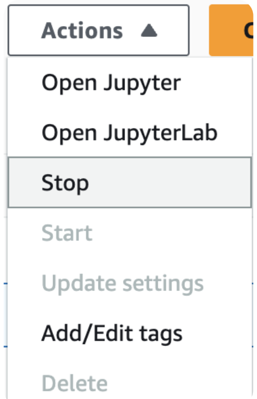


Status ▼	Actions
⊖ Stopped	Start

1.3.2. Stopping a Notebook Instance

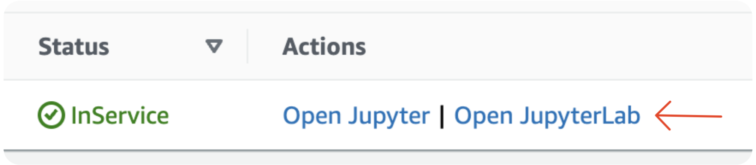
To stop a notebook instance:

1. Select the notebook instance by clicking the name
2. Click Actions ▸ Stop next to the notebook instance name.



1.4. Accessing Jupyter Lab

Once the notebook is "InService" you can access the Jupyter Lab environment by clicking the "Open JupyterLab" button next to the notebook instance name.



Status ▼	Actions
✓ InService	Open Jupyter | Open JupyterLab ←

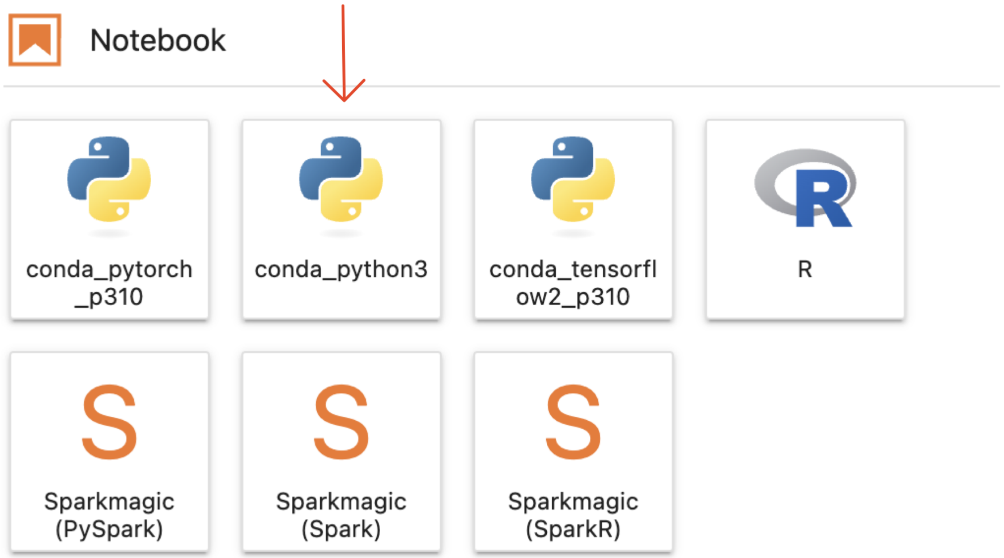
1.5. Working with JupyterLab

If you have not worked with Jupyter Lab before, it's a powerful tool for data science and machine learning workflows. This section will guide you through creating your first notebook and writing some code. If you're already familiar with Jupyter Lab, you can skip this section.

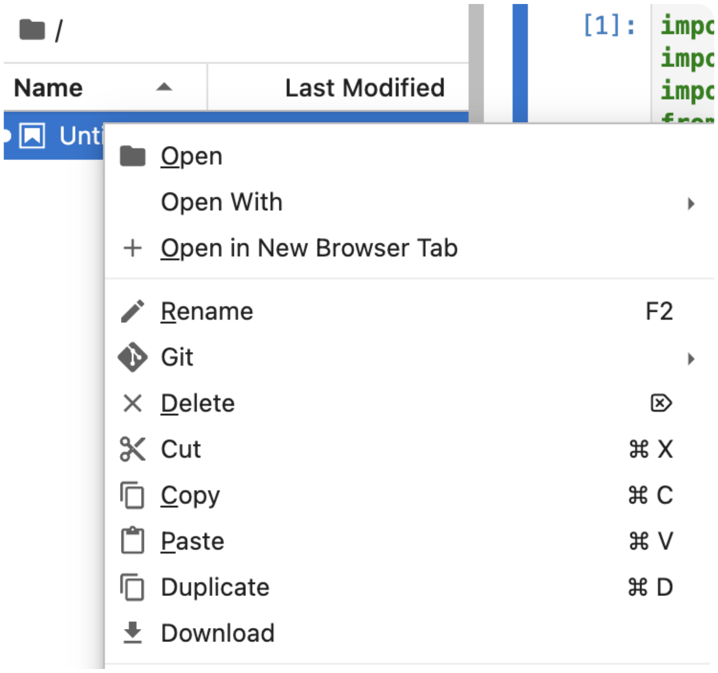
1. Click the "+" button in the top left corner of Jupyter Lab to open the *Launcher*

2. Under "Notebook" select `conda_python3` instance

   - This creates a Jupyter notebook kernel of type `conda_python3`



3. Right-click the Notebook name on the left-side menu, and select **Rename** (default is “Untitled.ipynb”)



4. Enter the new name: `SageMaker_Introduction.ipynb`

5. In the first cell, enter the following code and execute it with `Shift` + `Enter` or by pressing "Play" button on the toolbar:

```
print("Welcome to SageMaker!")
```

6. In the next cell, import common libraries and verify your SageMaker setup:

```
import numpy as np
import pandas as pd
import sagemaker
from sagemaker import get_execution_role

# Get the SageMaker execution role
role = get_execution_role()
print(f"SageMaker Role: {role}")
```

1.6. Essential Jupyter Lab Operations

Understanding keyboard shortcuts and cell operations will significantly improve the lab experience. Here are some essential shortcuts and operations to get you started.

1.6.1. Command Mode Shortcuts

To enter command mode, press Esc. Then use these shortcuts:

Shortcut	Action
A	Insert cell *above*
B	Insert cell *below*
DD	*Delete* cell
M	Change to Markdown cell
Y	Change to code cell
Shift+Enter	Run cell and move to next

1.6.2. Edit Mode Shortcuts

To enter edit mode, press Enter. Then use these shortcuts:

Shortcut	Action
Shift+Enter	Run cell and move to next
Ctrl+Enter	Run cell and stay
Alt+Enter	Run cell and insert below

Practice Exercise

1. Create a new cell (press B)

2. Enter this markdown text:

```
# My First SageMaker Notebook
This notebook demonstrates basic SageMaker functionality.
```

3. Convert to markdown (click outside shell, press M)

4. Execute the cell (press Shift+Enter)

1.6.3. Save Your Work

Proper saving ensures your work is preserved between sessions.

1. Save your notebook:

    - Press Ctrl+S, or
    - Click File → Save Notebook

2. Download a local backup:

    i. Click File → Download

    ii. Select "Notebook (.ipynb)"

Creating a Simple Python Agent

MODULE 2

1. Open the Jupyter Notebook file `simple-python-agent/simple-python-agent.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Implementing Round Robin Communication with AutoGen

MODULE 3

1. Open the Jupyter Notebook file `round-robin-chat/round-robin-chat.ipynb` in the Jupyter Lab environment.
2. Follow the instructions in the notebook to complete the lab.

Implementing a Reactive Agent in AutoGen

MODULE 4

1. Open the Jupyter Notebook file `autogen-reactive-agent/autogen-reactive-agent.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Implementing a Deliberative Agent in LangGraph

MODULE 5

1. Open the Jupyter Notebook file `langgraph-deliberative-agent/langgraph-deliberative-agent.ipynb` in the Jupyter Lab environment.
2. Follow the instructions in the notebook to complete the lab.

Building an Agent with Long-Term Memory

MODULE 6

1. Open the Jupyter Notebook file `long-term-memory/long-term-memory.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Integrating an Observation Tool in an Agent

MODULE 7

1. Open the Jupyter Notebook file `using-observation-tools/using-observation-tools.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Integrating an Action Tool in an Agent

MODULE 8

1. Open the Jupyter Notebook file `using-action-tools/using-action-tools.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Implementing a Hierarchical Planning Strategy

MODULE 9

1. Open the Jupyter Notebook file `hierarchical-planning/hierarchical-planning.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Building an Agent with Rule-Based Reasoning

MODULE 10

1. Open the Jupyter Notebook file `rule-based-reasoning/rule-based-reasoning.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Evaluating the Robustness of an Agentic System

MODULE 11

1. Open the Jupyter Notebook file `evaluating-agentic-robustness/evaluating-agentic-robustness.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Building a Personal Assistant Agent

MODULE 12

1. Open the Jupyter Notebook file `building-personal-assistant/building-personal-assistant.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.

Implementing Error Recovery and Resilience

MODULE 13

1. Open the Jupyter Notebook file `implementing-error-recovery/implementing-error-recovery.ipynb` in the Jupyter Lab environment.

2. Follow the instructions in the notebook to complete the lab.