Week 5: CI/CD Automation with Azure DevOps

Objective

1. To automate monthly personal expense analysis using Azure DevOps.
2. Load expense data from CSV.
3. Calculate total monthly spend and category-wise breakdown.
4. Trigger an alert if spending exceeds ₹10,000.
5. Automate the entire flow using Azure DevOps pipeline.

Pre-requisites

Before you begin, ensure you have:

- **Azure DevOps Account** and access to create projects
- **SSH Key** or **Personal Access Token (PAT)** configured
- Tools Installed:
    - Git
    - Python 3.x
    - VS Code or any IDE

Your Local Project Folder Must Contain:

- `week1/expenses.csv` → The input data
- `week2/alert.py` → Python script
- `azure-pipelines.yml` → Azure DevOps pipeline file

Step-by-Step Execution

Step 1: Create Python Script & YAML File Locally

alert.py

```
import pandas as pd
import os

df = pd.read_csv('week1/expenses.csv')
df['amount'] = df['amount'].replace('[\$,]', '',
regex=True).astype(float)
df['date'] = pd.to_datetime(df['date'])
df['month'] = df['date'].dt.to_period('M')

monthly_summary = df.groupby(['month',
'category'])['amount'].sum().unstack().fillna(0)

os.makedirs('output', exist_ok=True)
monthly_summary.to_csv('output/monthly_summary.csv')

total = df['amount'].sum()
if total > 10000:
    print(f"⚠️ Alert: Total monthly spending is ₹{total:.2f}, which
exceeds ₹10,000.")
else:
    print(f"✅ Total monthly spending is ₹{total:.2f}.")
```

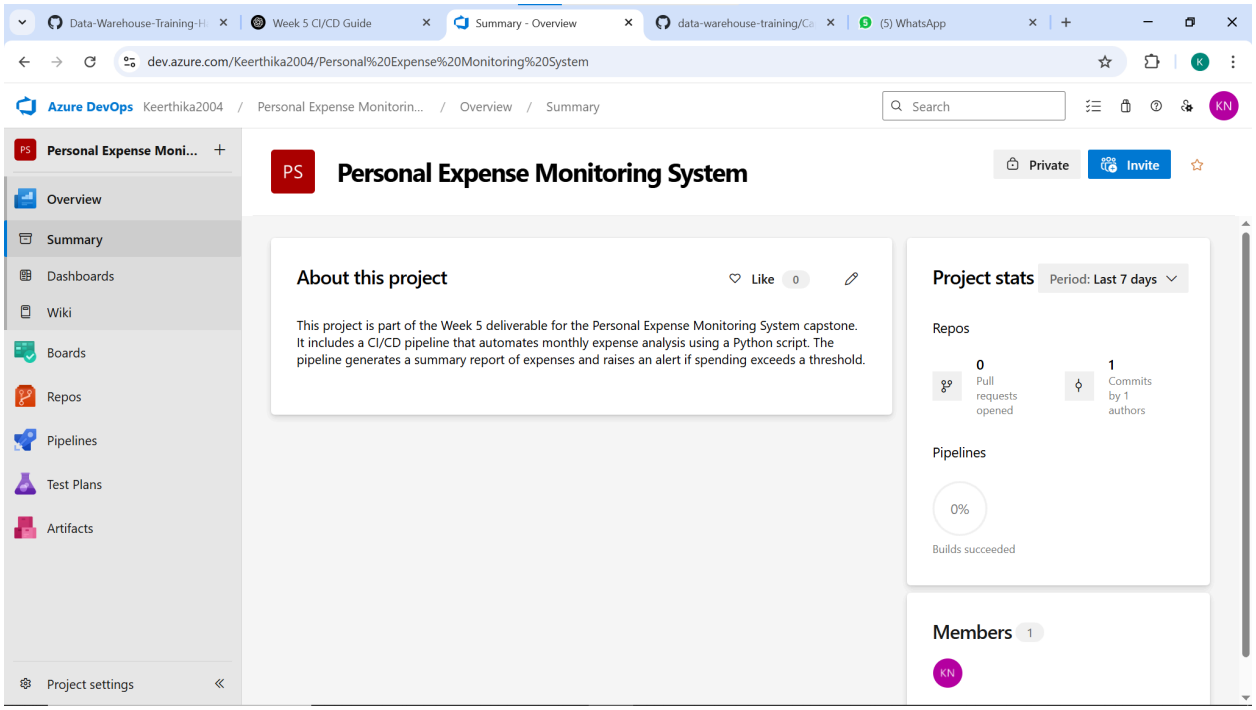
azure-pipelines.yml

```
trigger:
  schedule:
    - cron: "0 0 1 * *"  # Runs on the 1st of every month
      displayName: Monthly Expense Report
      branches:
        include:
          - main

pool:
```

```
  vmImage: 'ubuntu-latest'

steps:
  - task: UsePythonVersion@0
    inputs:
      versionSpec: '3.x'

  - script: |
      pip install pandas
      python week2/alert.py
    displayName: 'Run Expense Alert Script'

  - task: PublishBuildArtifacts@1
    inputs:
      PathtoPublish: 'output/monthly_summary.csv'
      ArtifactName: 'MonthlyReport'
      publishLocation: 'Container'
```

Step 2: Create Azure DevOps Project

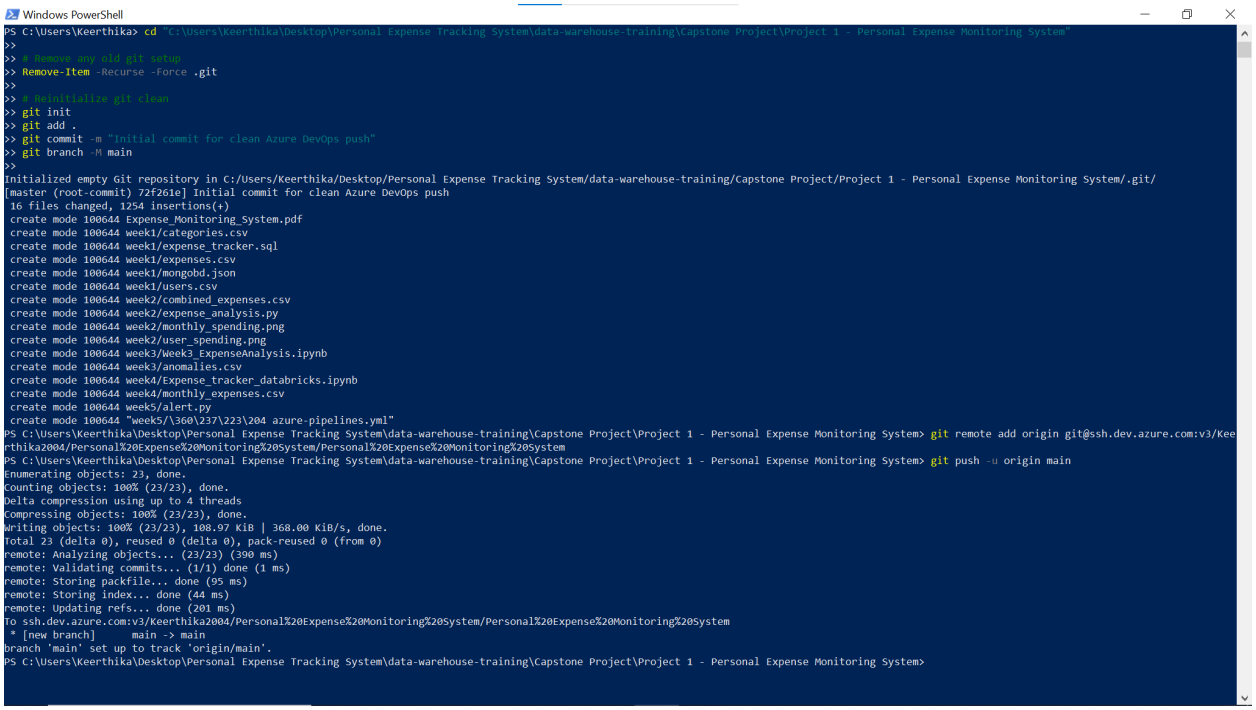
1. Go to https://dev.azure.com
2. Click **New Project**
3. Name: `Personal Expense Monitoring System`
4. Set visibility to **Private** or **Public**
5. Click **Create**

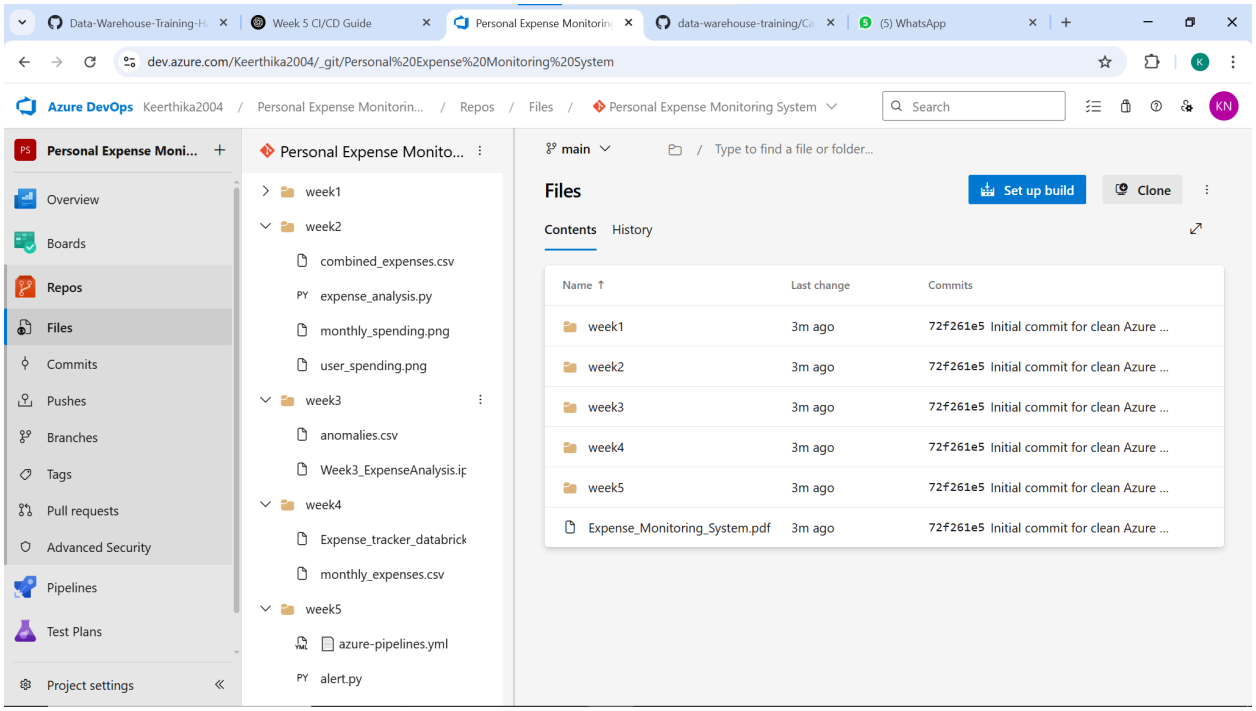


Step 3: Push Local Code to Azure Repo (SSH)

```
cd "C:\path\to\your\project\Personal Expense Monitoring System"

git init
git add .
git commit -m "Initial commit for Week 5 CI/CD"
git branch -M main
git remote add origin
git@ssh.dev.azure.com:v3/YOUR_ORG_NAME/YOUR_PROJECT/YOUR_PROJECT
git push -u origin main
```

Replace `YOUR_ORG_NAME` and `YOUR_PROJECT` with your actual values.



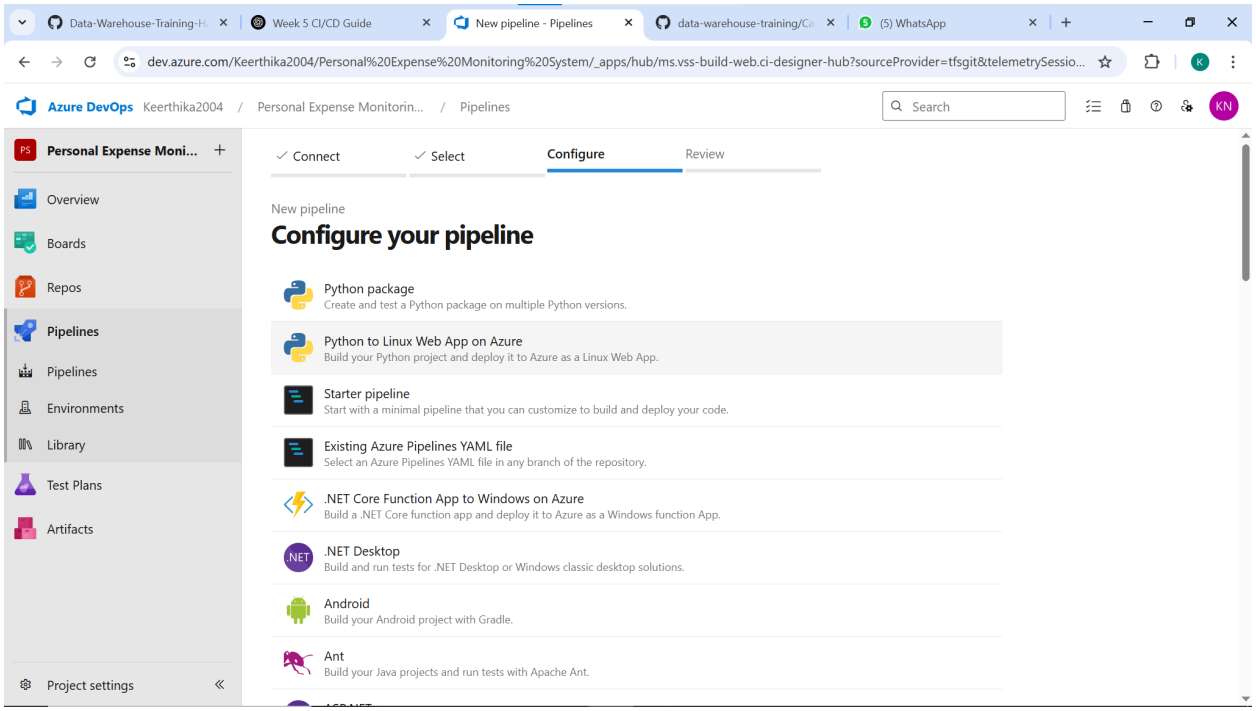


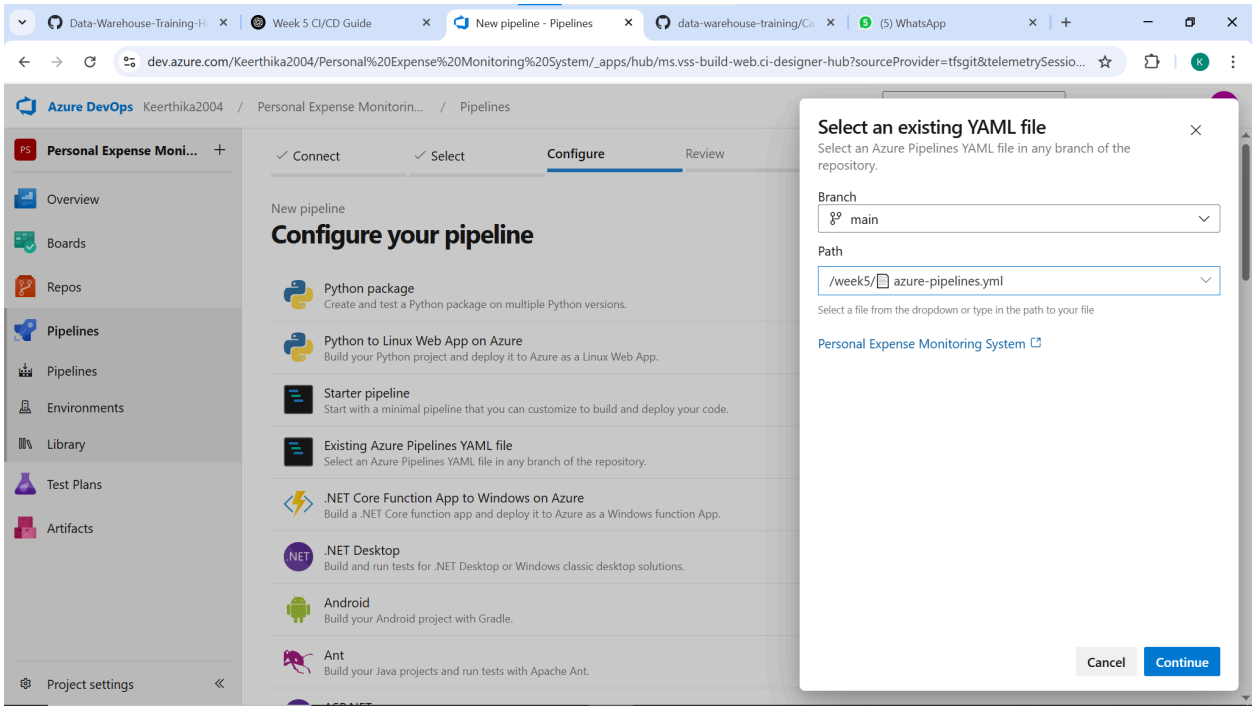
Step 4: Configure and Run the Pipeline

1. Go to **Pipelines → New Pipeline**
2. Choose:

- Source: **Azure Repos Git**
- Repository: Your project repo
- YAML file: *Existing Azure Pipelines YAML*

3. Specify:
   - Branch: `main`
   - Path: `/azure-pipelines.yml`
4. Click **Continue → Run**

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New pipeline
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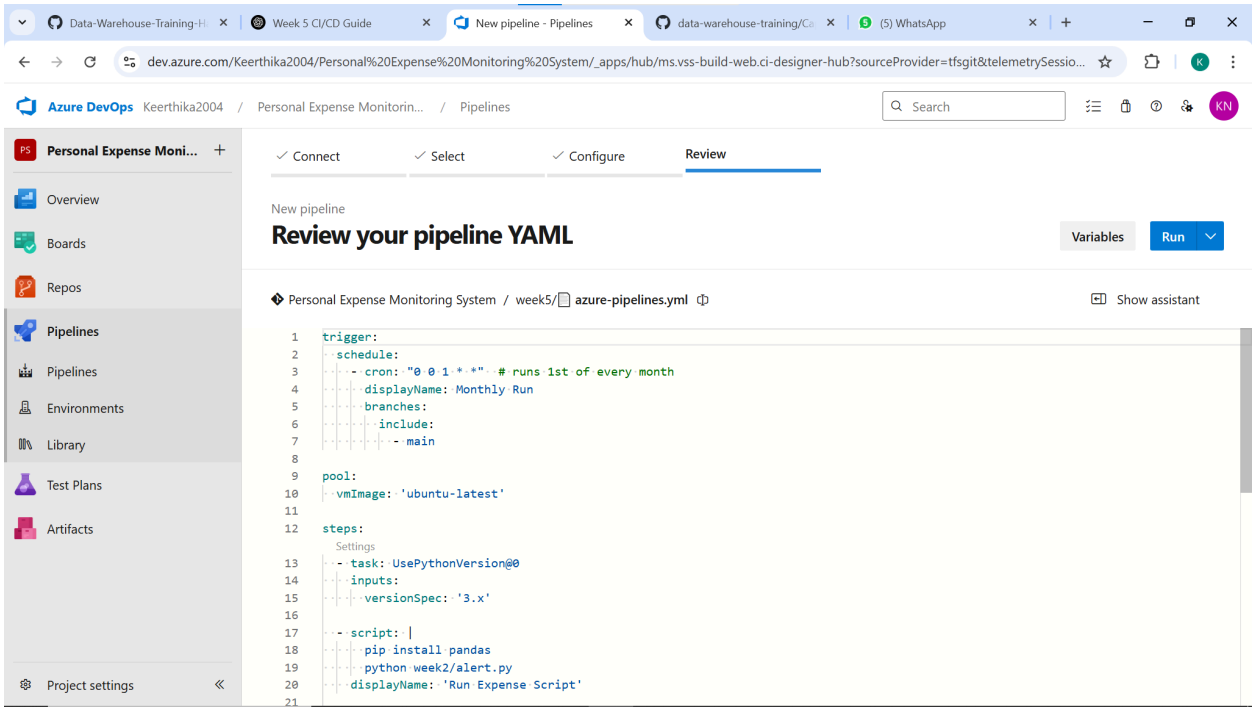
Python package
Create and test a Python package on multiple Python versions.
Python to Linux Web App on Azure
Build your Python project and deploy it to Azure as a Linux Web App.
Starter pipeline
Start with a minimal pipeline that you can customize to build and deploy your code.
Existing Azure Pipelines YAML file
Select an Azure Pipelines YAML file in any branch of the repository.
.NET Core Function App to Windows on Azure
Build a .NET Core function app and deploy it to Azure as a Windows function App.
.NET Desktop
Build and run tests for .NET Desktop or Windows classic desktop solutions.
Android
Build your Android project with Gradle.
Ant
Build your Java projects and run tests with Apache Ant.
Select an existing YAML file
Select an Azure Pipelines YAML file in any branch of the repository.
Branch
main
Path
/week5/ azure-pipelines.yml
Select a file from the dropdown or type in the path to your file
Personal Expense Monitoring System
Cancel
Continue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Run
Personal Expense Monitoring System / week5/ azure-pipelines.yml
Show assistant
trigger:
schedule:
- cron: "0 0 1 * *" # runs 1st of every month
displayName: Monthly Run
branches:
include:
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pool:
vmImage: 'ubuntu-latest'
steps:
Settings
- task: UsePythonVersion@0
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versionSpec: '3.x'
- script: |
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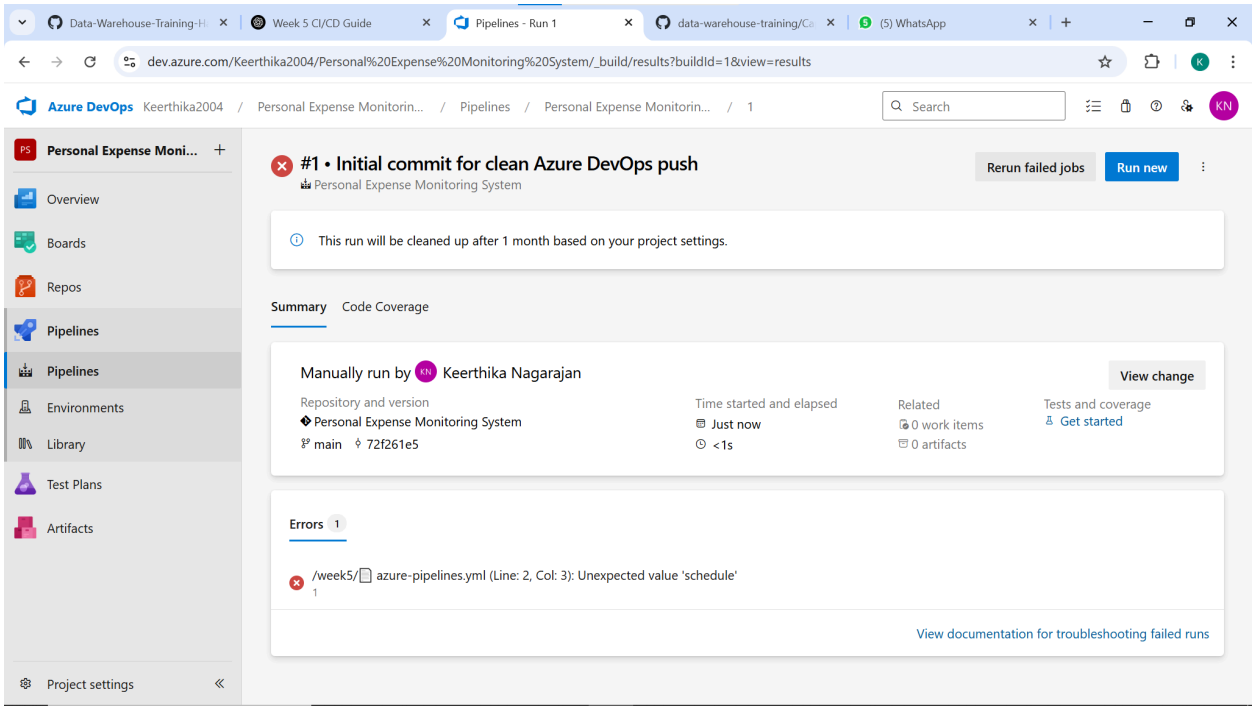
displayName: 'Run Expense Script'



Final Output

Once the pipeline runs:

- Python environment is set up
- Pandas is installed
- `alert.py` is executed
- `output/monthly_summary.csv` is generated
- If monthly spending > ₹10,000, alert is shown in logs

Example Output:

```
⚠️ Alert: Total monthly spending is ₹12,300.50, which exceeds ₹10,000.
```