**Standard Operating Procedure (SOP): Connecting Google Colab to GitHub and Managing Files**

This SOP outlines the precise and updated process for setting up a GitHub repository, integrating it with Google Colab, and creating, editing, and committing files programmatically. The steps include creating a README file, creating a Jupyter Notebook, and committing all changes to GitHub.

**1. Create a GitHub Repository**

1. Log in to [GitHub](https://github.com/) and click on **"New Repository"**.
2. Fill in the details:
   * **Repository Name**: For example, colab-project.
   * **Description**: Add a brief description (optional).
   * **Do not check**: "Initialize this repository with a README."
3. Click **"Create Repository"** to finish.

**2. Set Up Google Colab**

**a. Log into Google Colab**

1. Open [Google Colab](https://colab.research.google.com/).
2. Log in with your Google account.
3. Create a new notebook:
   * Click **"File"** > **"New Notebook"**.
   * Rename it (e.g., GitHub\_Integration.ipynb).

**b. Mount Google Drive (Optional, but recommended for persistent storage)**

1. Run the following code to mount your Google Drive:
2. from google.colab import drive
3. drive.mount('/content/drive')
4. Authenticate your Google account when prompted.
5. Verify the mount by listing files:
6. !ls /content/drive/MyDrive

**3. Clone Your GitHub Repository**

1. Copy the HTTPS URL of your repository:
   * Go to your GitHub repository, click the green **"Code"** button, and copy the HTTPS link (e.g., https://github.com/your-username/colab-project.git).
2. Run the following command in Colab to clone the repository:
3. !git clone https://github.com/your-username/colab-project.git

Replace your-username with your GitHub username.

1. Navigate to the cloned repository:
2. %cd colab-project
3. Verify the repository structure:
4. !ls

You should see an empty folder if no files exist yet.

**4. Configure Git in Colab**

Set up your GitHub credentials so commits are linked to your account:

1. Run the following commands:
2. !git config --global user.name "Your Name"
3. !git config --global user.email "your\_email@example.com"

Replace "Your Name" and "your\_email@example.com" with your GitHub username and email.

1. Verify the configuration:
2. !git config --list

**5. Create and Edit Files**

**a. Create a README File**

1. Create a README file in the repository:
2. with open("README.md", "w") as file:
3. file.write("# Process for Connecting Google Colab to GitHub and Real-Life Use Cases\n\n")
4. file.write("This guide provides a comprehensive workflow to connect Google Colab to GitHub, make changes to files programmatically, and manage real-life tasks such as editing configuration files, Python scripts, and HTML files.\n")
5. Verify the file was created:
6. !cat README.md

**b. Create a Jupyter Notebook**

1. Programmatically create a Jupyter Notebook:
2. from nbformat import v4 as nbf
3. import nbformat
4. nb = nbf.new\_notebook()
5. nb.cells.append(nbf.new\_markdown\_cell("# Process for Connecting Google Colab to GitHub and Real-Life Use Cases"))
6. nb.cells.append(nbf.new\_markdown\_cell("This guide provides a comprehensive workflow to connect Google Colab to GitHub and manage files programmatically."))
7. with open("Colab\_to\_GitHub.ipynb", "w") as f:
8. nbformat.write(nb, f)
9. Verify the notebook was created:
10. !ls

**6. Stage, Commit, and Push Changes**

1. **Stage the Changes**:
2. !git add .
3. **Commit the Changes**:
4. !git commit -m "Initial commit with README and notebook"
5. **Push Changes to GitHub**:
6. !git push origin main
7. Authenticate with a Personal Access Token (PAT) if prompted:
   * Go to [GitHub Token Settings](https://github.com/settings/tokens).
   * Generate a token with the repo scope.
   * Use the token as your password during authentication.

**7. Verify Changes on GitHub**

1. Go to your GitHub repository in your browser.
2. Verify that the README.md and Colab\_to\_GitHub.ipynb files are present.
3. Open the files to ensure their content is correct.

**8. Summary Workflow**

1. Create a GitHub repository.
2. Clone the repository in Google Colab.
3. Configure Git with your credentials.
4. Create and edit files (e.g., README, Jupyter Notebook).
5. Stage, commit, and push changes to GitHub.
6. Verify changes on GitHub.

This process ensures seamless integration between Google Colab and GitHub while managing real-life programming tasks.