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## **Lab Reflection: Experience with GitHub and Jupyter Notebook**

In this lab session, I was introduced to two essential tools that are widely used in programming, data science, and software development: GitHub and Jupyter Notebook. The purpose of the lab was to help understand how version control systems work and how interactive computing environments can be used to write, test, and document code efficiently. Before this lab, I had limited experience with these platforms. I did not fully understand how developers manage their projects or collaborate with others online. Through hands-on practice, I created a GitHub account, set up a repository, accessed Jupyter Notebook, and performed basic coding operations. This experience not only strengthened my technical skills but also gave me insight into real-world programming workflows.

The first major task in the lab was creating an account on GitHub. After registering, I explored the dashboard and became familiar with its layout; including repositories, profile settings, and navigation tabs. Then created a new repository, which serves as a storage space for project files. While creating the repository, I learned how to give it a meaningful name, add a short description, and initialize it with a README file. The README file acts as an introduction to the project and explains its purpose.

Once the repository was created, I practiced making changes to files and committing those changes. This introduced me to the concept of version control. I learned that each "commit" represents a saved version of the project at a specific point in time. Writing clear and descriptive commit messages is important because it documents what changes were made and why. I also learned the difference between saving changes locally and pushing them to the repository online. At first, I assumed that simply saving a file would automatically update the online repository. However, I realized that changes must be committed and pushed for them to appear on GitHub. This process helped me understand how developers track progress, fix mistakes, and maintain organized records of their work.

After completing the GitHub portion, I moved on to working with Jupyter Notebook. I accessed the Jupyter Notebook through an online environment and created a new Python notebook. The interface was different from traditional coding environments because it allows users to write code in separate cells and execute them individually. This structure makes it easier to test small sections of code without running the entire program.

In the notebook, I practiced writing basic Python commands, including print statements and simple arithmetic operations. Also, experimented with variables and observed how outputs are displayed directly beneath the code cell. One of the most useful features I discovered was the ability to use Markdown cells to write formatted text alongside code. This allows users to explain their logic, describe results, or add headings as well as notes within the same document. I learned that this feature is especially valuable in data science and research, where explaining the process is just as important as producing results.

During the lab, I encountered a few challenges. One issue was accidentally running cells out of order, which caused errors because some variables were not defined yet. This helped me understand that Jupyter Notebook executes cells independently and not necessarily in sequence unless the user runs them in order. I solved this problem by restarting the kernel and selecting the option to run all cells from top to bottom. This ensured that the notebook executed in the correct sequence.

Another challenge involved understanding how GitHub and Jupyter Notebook work together. After completing my notebook, I needed to upload it to my GitHub repository. I initially found the process slightly confusing but after carefully following the instructions. I successfully uploaded the file and committed it. This step reinforced the idea that GitHub is used to store and manage projects while Jupyter Notebook is used to create and test them. Seeing both tools work together gave me a clearer understanding of how programmers document and share their work.

Overall, this lab introduced me to the practical side of programming tools. I learned that version control is essential for organization and collaboration. Without it, managing changes in a project could become confusing and inefficient. I also gained a better appreciation for interactive computing environments which make coding more flexible and user-friendly.

In conclusion, this lab provided valuable hands-on experience with GitHub and Jupyter Notebook. I have learned how to create and manage a repository, make commits, and understand the importance of version control in software development. Additionally, I gained experience using Jupyter Notebook to write, execute, and document Python code in an interactive format. Although I faced minor challenges, such as understanding commit procedures and running cells in the correct order. To overcome these obstacles strengthened my technical skills and confidence. This lab has laid a strong foundation for future coursework in programming and data analysis. I now feel more prepared to use these tools in academic projects and professional settings. By understanding their importance in modern computing environments.

