HW 1

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1 Homework Assignment 1

1.1 A. Set up SSH authentication between your computer and your GitHub account

- **Steps:**
  1. Generated SSH key using:
     ```
     ssh-keygen -t ed25519 -C "your_email@example.com"
     ```
  2. Added the public key to GitHub under **Settings > SSH and GPG Keys**.
  3. Verified the connection using:
     ```
     ssh -T git@github.com
     ```
  4. Confirmed this worked by getting the message:

     ```
     Hi nmkjk64! You've successfully authenticated, but GitHub does not provide shell access.
     ```

- **Obstacles:**
  - Encountered `Permission denied (publickey)` error.
  - Resolved by adding the key to the SSH agent:
    ```
    ssh-add ~/.ssh/id_ed25519
    ```

1.2 B. Install Quarto onto your computer following the instructions of Get Started

- **Steps:**
  1. Downloaded Quarto from Quarto.org.
  2. Installed TinyTeX to render PDFs:
     `quarto install tinytex`
  3. Verified the installation:
     `quarto check`
- **Obstacles:**
  - Initially, Quarto could not render a test PDF. This was resolved by installing TinyTeX.

1.3 C. Pick a tool of your choice and reproduce the example of a line plot on a polar axis

- **Tool:** Python in Terminal
- **Steps:**
  1. Wrote the following Python code to create a polar line plot:

```python
import numpy as np
import matplotlib.pyplot as plt

theta = np.linspace(0, 2 * np.pi, 100)
r = 1 + np.sin(4 * theta)

fig, ax = plt.subplots(subplot_kw={'projection': 'polar'})
ax.plot(theta, r)

ax.set_title("Line Plot on Polar Axis")
plt.savefig("hw1_plot.pdf", format="pdf")  # Save the plot as PDF

plt.show()
```

  2. Saved the code as `hw1.py` and ran it:
     `python hw1.py`
  3. Verified that the plot was successfully saved as `hw1_plot.pdf` using the `plt.savefig()` function.
- **Obstacles:**

- Encountered no significant issues.
- Initially thought the plot had to be rendered through Quarto but resolved this by using `plt.savefig()` in Matplotlib.

1.4 D. Render the homework into a PDF file and create a GitHub release

- **Steps:**
  1. Rendered the `.qmd` file into a PDF:

     ```
     quarto render hw1.qmd --to pdf
     ```
  2. Verified that `hw1.pdf` was created.
  3. Created a GitHub release and uploaded the PDF:
     - Attached `hw1.pdf`.
     - Attached `hw1_plot.pdf`.
