

All the code is based on Python using Jupyter Notebook.

Steps followed to run the code.

1. Open the anaconda command line and create a virtual environment with the below command:  
conda create -n cs688 python = 3.7

```
(base) C:\Users\johns>conda create -n cs688 python=3.7
Retrieving notices: ...working... done
Channels:
 - defaults
Platform: win-64
Collecting package metadata (repodata.json): done
Solving environment: done
```

2. Activate the cs688.

```
(base) C:\Users\johns>conda activate cs688
```

3. Open the Jupyter Notebook by the below command.

```
(cs688) C:\Users\johns>jupyter notebook
```

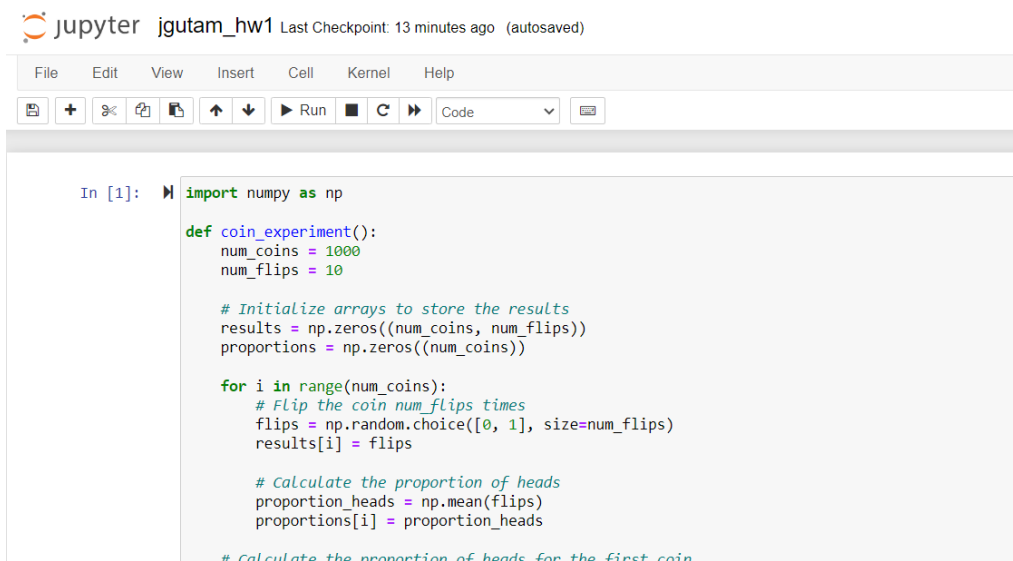
4. Installed the below packages in the cs688 virtual environment of the 'johns' folder.

Notebook, numpy, matplotlib, scipy, scikit-image, ortools, opencv-python

5. Now run the Jupyter Notebook command as below.

```
(cs688) C:\Users\johns>jupyter notebook
```

6. Notebook will be open in the browser. Run the Python code in the .ipynb file to replicate the results in the report.



The screenshot shows the Jupyter Notebook interface in a web browser. The top bar indicates the notebook is named 'jgutam\_hw1' and was last checkpointed 13 minutes ago. Below the top bar is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, and Help. Under the 'Cell' menu, there are icons for running, saving, and other cell actions, along with a dropdown menu currently set to 'Code'. The main area of the notebook displays a code cell with the following Python code:

```
In [1]: import numpy as np

def coin_experiment():
    num_coins = 1000
    num_flips = 10

    # Initialize arrays to store the results
    results = np.zeros((num_coins, num_flips))
    proportions = np.zeros((num_coins))

    for i in range(num_coins):
        # Flip the coin num_flips times
        flips = np.random.choice([0, 1], size=num_flips)
        results[i] = flips

    # Calculate the proportion of heads
    proportion_heads = np.mean(flips)
    proportions[i] = proportion_heads

    # Calculate the proportion of heads for the first coin
```