**Homework 3: Image Enhancement & Image Restoration**

**Report Template**

**Please keep the title of each section, and note that the questions listed in Part III should be retained.**

## **Part I. Implementation (5%):**

**Please provide screenshots of your code snippets, and explain your implementation.**

## **Part II. Results & Analysis (20%):**

**Please provide your observations and analysis for each of the following bullets.**

### **Task 1: Image Enhancement**

* Gamma Correction
  + Please show the original image alongside the results. Try at least 3 different gamma values and compare the results
  + Please provide your observations and analysis
* Histogram Equalization
  + Please show the original image alongside the results
  + Please provide your observations and analysis
* Compare the above two methods
  + Please provide your observations and analysis

#### **Bonus (5%)**

* Please explain the implementation of the used methods
* Please specify improvements in the image quality compared to the two enhancement methods mentioned above

### **Task 2: Image Restoration**

* Minimum Mean Square Error (Wiener) Filtering
  + For both test cases, please show the original image alongside the results and also specify the used parameters (length, angle, K)
  + Please provide your observations and analysis
* Constrained Least Squares Restoration
  + For both test cases, please show the original image alongside the results and also specify the used parameters (length, angle, gamma)
  + Please provide your observations and analysis
* Compare the above two methods on different test cases
  + Please provide your observations and analysis

#### **Bonus (5%)**

* Please explain the implementation of the used methods
* Please specify improvements in the image quality compared to the two restoration methods mentioned above

## **Part III. Answer the questions (5%):**

1. Please describe a problem you encountered and how you solved it.
2. What potential limitations might arise when using **Minimum Mean Square Error (Wiener) Filtering** for image restorations? Please suggest possible solutions to address them.
3. What potential limitations might arise when using **Constrained Least Squares Restoration** for image restorations? Please suggest possible solutions to address them.