# **Image Processing Tasks**

This repository contains code for performing image processing tasks, including convolution and image reconstruction from Fourier transform.

## **Dependencies**

- Python 3.x

- NumPy

- SciPy

- Matplotlib

## **Installation**

1. Clone this repository to your local machine or download the source code.

2. Make sure you have Python 3.x installed. If not, download and install it from the official Python website (https://www.python.org/).

3. Install the required dependencies using pip:

## **Task 1: Convolution**

1. Open the file in a Python IDE or text editor.

2. Modify the code to create an image of size 32x32 pixels with a unit impulse at location (16, 16) and zeros elsewhere.

3. Choose a kernel of your choice and update the code accordingly.

4. Run the code to perform convolution between the image and the kernel.

5. The resulting image will be displayed using Matplotlib.

## **Task 2: Image Reconstruction from Fourier Transform**

1. Open the file in a Python IDE or text editor.

2. Modify the code to load an input image of your choice or update the code to read an image from a file.

3. Compute the Fourier transform of the input image using SciPy's `fft2` function.

4. Choose one of the reconstruction methods (magnitude response only, phase response only, or both magnitude and phase responses) and update the code accordingly.

5. Perform the inverse Fourier transform using SciPy's `ifft2` function to obtain the reconstructed image.

6. The original image and the reconstructed image will be displayed using Matplotlib.

## **Results**

- For Task 1 (Convolution), the resulting image will show the effect of the chosen kernel on the input image.

- For Task 2 (Image Reconstruction from Fourier Transform), the reconstructed image will be displayed, showcasing the chosen reconstruction method.