**Name : Ali Azhar**

**Roll Number : SU92-BSAIM-S24-026**

**Section : 4A**

**“Documentation of Task 5”**

**Image Processing**

**1. Introduction**

This project is about working with pictures using Python.  
It shows how we can change, improve, and find things in an image.

**2. Opening the Image**

First, the program loads the picture named **cats\_dogs.webp** and shows it on the screen.

**3. Grayscale Image**

The color picture is changed into **black and white**.  
This makes it easier to work with the image.

**4. Zoom In and Zoom Out**

The picture is made **bigger (zoom in)** and **smaller (zoom out)** using scaling.  
It helps to see small details or make the image fit better.

**5. Log Transformation**

This step makes the **dark parts of the image brighter** so we can see them clearly.

**6. Histogram Equalization**

This improves the **contrast** of the image.  
It makes the image look more clear and balanced.

**7. Color Changing**

The image is changed into other color forms like **HSV** and **LAB**.  
These are useful for finding colors or objects in pictures.

**8. Mask and Image Matching**

A **mask** is made to cover or show certain parts of the image.  
The program also tries to **match two images** and align them properly.

**9. Background Subtraction**

This removes the **background** and keeps only the main object in the image.

**10. Running Average**

This is used to make a smooth background from many pictures or frames.

**11. Foreground Extraction**

This step takes out the **main object** (like a cat or dog) from the background using the **GrabCut** method.

**12. Feature Detection**

The program finds:

* **Lines**
* **Circles**
* **Corners**  
  in the image.  
  It helps in understanding the shapes inside the picture.

**13. Edge Detection**

Edges mean the outer lines of objects.  
This helps in finding the shapes clearly.

**14. Conclusion**

This program shows many ways to work with pictures —  
like changing color, removing background, and finding shapes.  
It helps in learning how computers can “see” images.