The overview of this assignment :

This program focuses on processing a handwritten drawing image by converting it into grayscale and applying thresholding techniques. First, the image is smoothed using a Gaussian blur to reduce noise and uneven lighting. This step helps make the handwriting clearer and ensures that the following segmentation process works more accurately.

Single-level Otsu thresholding is used as the main method to separate the handwritten characters from the background. Since the drawing was made using a single writing instrument, this method is suitable because it represents all strokes under one intensity level. After thresholding, a morphological operation is applied to remove small unwanted noise and improve the overall shape of the characters.

To better understand the image characteristics, multi-level Otsu and K-means clustering are included for comparison. Multi-level Otsu highlights different tonal regions and helps visualize intensity variations, while K-means tends to split the strokes into multiple levels, resulting in over-segmentation. These comparisons clearly show that single-level Otsu provides the most appropriate and consistent result for extracting handwritten characters.