**Aim:** To Perform Gray Level slicing with and without background

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**Theory:** Thresholding is a simple but effective image processing technique that is widely used in computer vision and image analysis applications. The basic idea behind thresholding is to segment an image into foreground and background regions based on the intensity values of the pixels in the image

**Clipping and Thresholding:**

Clipping is considered as the special scenario of contrast stretching. It is the case in which the parameters are α = γ = 0. Clipping is more advantageous for reduction of noise in input signals of range [a, b].

Threshold of an image is selected by means of its histogram. Let us take the image shown in the following figure.



(b) consists of two peaks i.e., background and object. At the abscissa of histogram minimum (D1) the threshold is selected. This selected threshold (D1) can separate background and object to convert the image into its respective binary form. The thresholding transformations are shown in figure



**Intensity Level Slicing:**

The images which consist of grey levels in between intensity at background and other objects require to reduce the intensity of the object. This process of changing intensity level is done with the help of intensity level slicing. They are expressed as

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The histogram of input image and its respective intensity level slicing is shown in the figure

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When an image is uniformly quantized then, the nth most significant bit can be extracted and displayed. Let, u = k1 2^B-1 + k2 2^B-2 +……………..+ k^B-1 2 + kB Then, the output is expressed as



# Grey Level Slicing without background:

Grey level slicing is an image processing technique used to enhance the contrast of an image by selectively enhancing a range of pixel intensities. The basic idea behind grey level slicing is to set all pixel values within a specific intensity range to a maximum value, while leaving all other pixel values unchanged

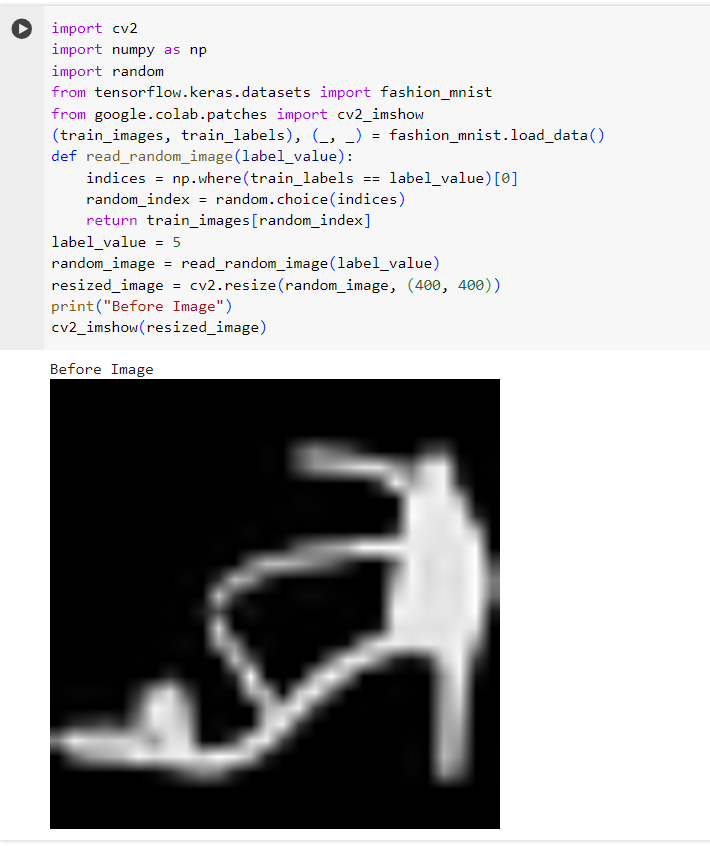
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**Lab Assignments to complete in this session**

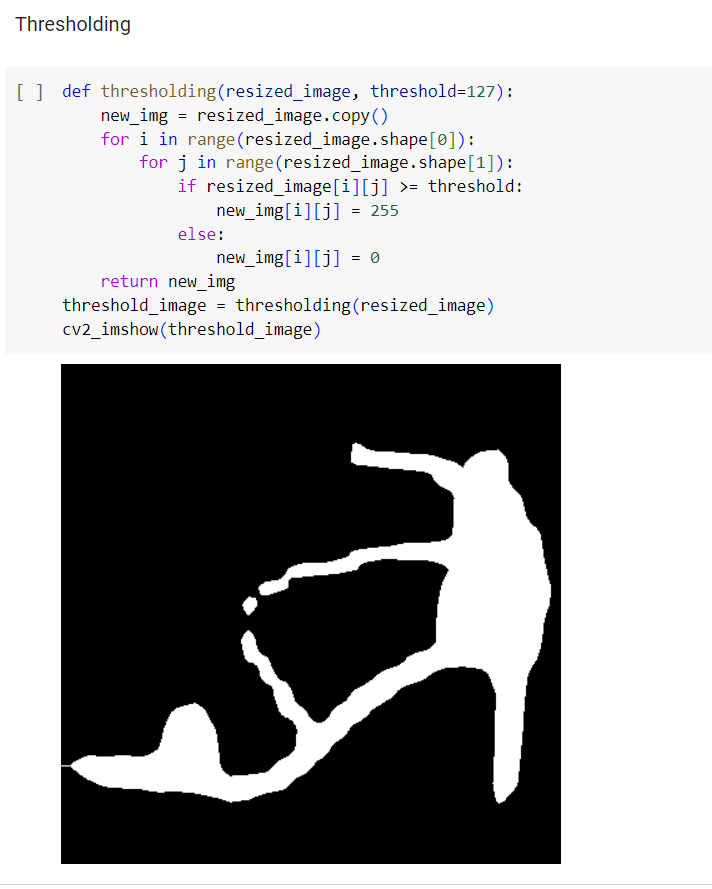
**Problem Statement:** Develop a Python program utilizing the OpenCV library to manipulate images from the Fashion MNIST digits dataset. The program should address the following tasks:

1. Read random image(s) from the MNIST fashion dataset.
2. **Dataset Link:** [Fashion MNIST Github](https://github.com/zalandoresearch/fashion-mnist)
3. Display the before & after image(s) used in the task below.
4. Perform image negative transformation.
5. Perform image thresholding operation at various threshold level and write your observation.
6. Perform gray level slicing with and without background intensity slicing and write your observation.

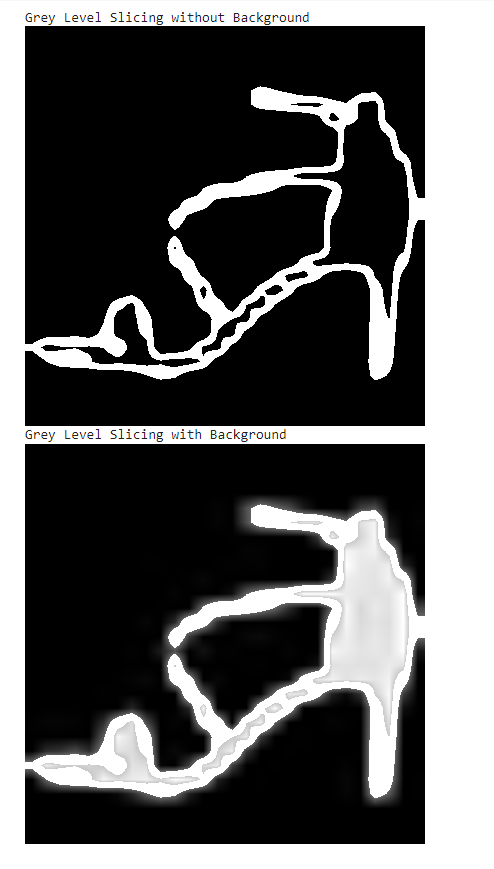
The solution to the operations performed must be produced by scratch coding without the use of built in OpenCV methods.

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