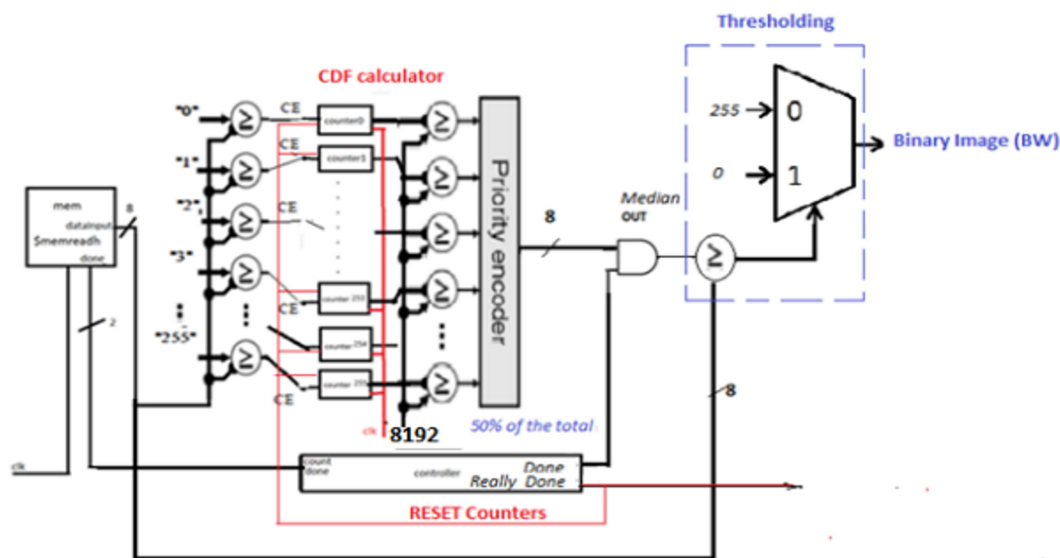


Midterm Report

Image banalization based on the histogram median value: Design and test the circuit for the Image size 128x128 (moon and clock)___ 40 points

1. Initialize memory with the input image. Images are 128x128 clock and moon (provided in the assignment)
2. After the first memory read the circuit accumulates cdf (HW 2 solution is provided) and the priority encode outputs median value.
3. When done, read the memory again and to compare each pixel with the median values and output the binary image.
4. When the memory is read out completely for the second time, the controller outputs Really Done for the testbench to finish
5. The testbench takes the output of the circuit



The first memory read: accumulate CDF (HW2 solution is provided). When Done =1, read the memory again, and compare every pixel with the median. Output 255 (1111 1111)-white pixel of the background, otherwise output 0 (0000 0000) for the black foreground. Priority encoder 256-to -8 which is HW 3. The solution will be published. When the second reading is over, The Controller outputs Really done to reset counters and finish outputting the binary image.

The testbench reads the output of the circuit and writes into the dat/txt file. Any format is OK.

The files are to be resized in Matlab and visualized.

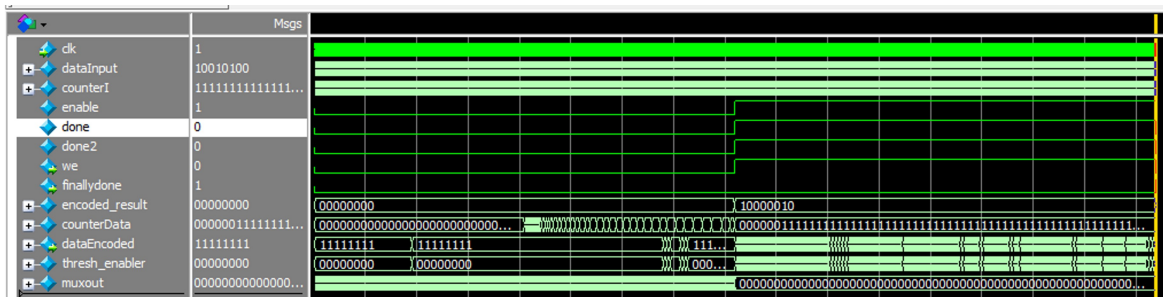
Submission: design files, output dat(txt) files, and the report which includes visualized in Matlab binary images.

Summary:

Image binarization is a digital image processing technique that converts a grayscale or color image into a binary image, where each pixel is either classified as part of the foreground or the background. The goal of binarization is to separate objects or regions of interest from the background, making subsequent image analysis tasks easier.

Regarding the process done, the circuit initially loads an 128x128 input image, and computes the cumulative distribution function (CDF) of pixel intensities within the image. We then compare each pixel to the calculated median value. Pixels below the median will be marked as white, while pixels above the median will be marked as black. Finally after processing all pixels, the output is stored in a file and MATHLAB is used to visualize the final result.

Testbench Results



Original Mathlab Results

Original Clock Image



Original Moon Image



Modified Image Binalization Results

Mod Image



Mod Image



*Circuit Code included inside zip file.