

EE 4065 – Embedded Digital Image Processing

Homework 2

Due: November 21, 2025. 23:59 pm

- Form a GitHub repository for the course with your course partner. Do not share it with your friends.
- You will post your homework documents (report, codes, results) via this repository for grading.

Q1-) (20 points) This question is on histogram formation.

- a- Form a C function on the microcontroller to calculate histogram of a given grayscale image.
- b- Form a grayscale image of your choice with appropriate size on PC. Store it as a header file. Then, add this header file to your new project. Calculate its histogram. Show histogram entries (at least some of them) on STM32Cube IDE.

Q2-) (30 points) This question is on histogram equalization.

- a- Derive the histogram equalization method by pencil and paper. Post your result here by taking the photo of your derivation on the paper.
- b- Form a C function on the microcontroller to apply histogram equalization on a given grayscale image.
- c- Use the grayscale image formed in the previous question. Apply histogram equalization to it. Calculate its histogram. Show histogram entries (at least some of them) on STM32Cube IDE.

Q3-) (30 points) This question is on 2D convolution and filtering.

- a- Form a C function on the microcontroller to apply 2D convolution on a given grayscale image.
- b- Use the grayscale image formed in the previous question. Apply low pass filtering to it. Show filtered image entries (at least some of them) on STM32Cube IDE.
- c- Use the grayscale image formed in the previous question. Apply high pass filtering to it. Show filtered image entries (at least some of them) on STM32Cube IDE.

Q4-) (20 points) This question is on median filtering.

- a- Form a C function on the microcontroller to apply median filtering on a given grayscale image.
- b- Use the grayscale image formed in the previous question. Apply median filtering to it. Show filtered image entries (at least some of them) on STM32Cube IDE.