

**An-Najah National University**  
**Department of Computer Engineering**  
**Digital Image Processing - 10636318**  
**Second Semester 2022/2023**  
**OpenCV Project – Part 1**

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Take a picture (input image) for anything with your smartphone and write a program to perform the following:

1. Read the input image
2. Convert the image into gray-scale
3. Show the histogram of the image
4. Modify the brightness of the image using gamma correction with a random gamma value. Use the following two methods:
  1. Using look-up table
  2. By modifying each pixel individually (without look-up table)
5. Compare between the execution time of both methods
6. Show the histogram after processing (both methods should have the same histogram)

Submit your source code and a PDF file that contains: the color input image, the gray-scale image, the histogram before and after processing of both methods and the execution time of both methods. Write the code segment for each part above. Please consider the following regulations:

- Each student should perform the assignment individually
- You can use only C, C++ or Python with OpenCV to implement the assignment.
- Resources:  
[https://docs.opencv.org/3.4/d3/dc1/tutorial\\_basic\\_linear\\_transform.html](https://docs.opencv.org/3.4/d3/dc1/tutorial_basic_linear_transform.html)
- **Deadline:** 15.03.2023