TUGAS 1 METODE NUMERIK

Tujuan/Objectives:

1. Mahasiswa dapat mengaplikasikan finite difference 2 dimensi untuk mendeteksi tepian objek yang ada di dalam gambar./Students can apply 2D finite difference for detecting the edges of objects in given image.
2. Mahasiswa dapat mengimplementasikannya di dalam suatu program yang mereka bangun sendiri./Students can create edge detection program by themselves.

Aturan/Rule:

SETIAP MAHASISWA DILARANG MEMBERIKAN JAWABAN/PROGRAM YANG MEREKA BUAT KEPADA MAHASISWA LAIN. PELANGGARAN TERHADAP ATURAN INI MERUPAKAN PELANGGARAN MORAL TERHADAP PROSES BELAJAR YANG DIPERTANGGUNGJAWABKAN DI HADAPAN TUHAN YANG MAHA ESA.

STUDENTS ARE PROHIBITED TO SHARE THEIR WORKS TO OTHER STUDENTS. STUDENTS WHO VIOLATE THIS RULE IGNORE THE LEARNING PROCESS AND MUST RESPONSIBLE DIRECTLY TO GOD.

Steps:

1. Students download the given image attached with this document.
2. Students decide to use particular programming languages (languages recommendation C++, C, Phyton).
3. Students use image processing library such as OpenCV.
4. Change the pixel from RGB to Grayscale.
5. Change the pixel from Grayscale to Black and White (optional step).
6. For each pixel (except the boundary pixels) do
    1. Central difference based on x axis and call it as dx.
    2. Central difference based on y axis and call it as dy.
    3. Calculate the **L2 norm** (you may google this term) of dx and dy.
7. If a pixel has big norm value of its central difference then the corresponding pixel can be considered as an edge. (edge is a pixel which has big difference compared to its neighbor pixels)
8. Students write the report showing their codes and the resulting edge detection image in grayscale or black and white colors.