

Question	1	2	3	4	5	Total
Grade						100
MUDEK Criteria	3	4	3	4	4	



YILDIZ TECHNICAL UNIVERSITY

FACULTY OF EEE / DEPARTMENT OF BIOMEDICAL ENGINEERING 2022/2023 FALL

Name-Surname:	Student ID:			Signature:	
Course Name: BME4120 Biomedical Image Processing	Due Nov 16nd 2022			Take-Home	
Group :	Midterm 1	Midterm 2	Final	Homework	Excuse
Lecturer's Title, Full Name: Prof. Taylan Yetkin				Homework-2	

By signing above:

I testify to no copy-and-paste, paraphrase, over-quote, and screen-shot.

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QUESTIONS

Q1. Propose a set of intensity-slicing transformations capable of producing all the individual bit planes of an 8-bit monochrome image. (For example, a transformation function with the property $T(r) = 0$ for r in the range $[0, 127]$, and $T(r) = 255$ for r in the range $[128, 255]$ produces an image of the 4th bit plane in an 8-bit image.)

Q2. (a) What effect would setting to zero the half of lower-order bit planes have on the histogram of an image in general? **(b)** What would be the effect of the histogram if we set to zero the half of the higher-order bit planes instead?

Q3. Discuss the limiting effect of repeatedly applying a 3 x 3 lowpass filter to a digital image. You may ignore the border effects. Is this effect different from applying a 5 x 5 filter?

Q4. Write pseudocode algorithm whose input is a pair of vectors h and g of length 256 representing the brightness count at 256 brightness levels and whose output is a point transform $s = T(r)$ that will convert an image with histogram h into one with histogram approximately g . You should provide a way to do this even if h and g do not come from the same size images.

Q5. Compute the 2D Inverse Discrete Fourier Transform (IDFT), $w(x, y)$, of the discrete function

$$W(u, v) = \frac{1}{2} \left[\cos\left(2\pi \frac{u}{M}\right) + \cos\left(2\pi \frac{v}{N}\right) \right], \quad u = 0, \dots, M-1, \quad v = 0, \dots, N-1$$