Ministry of Higher Education		**Second Semester (2024/2025)**
Higher Technological Institute (HTI)		**Assignment 1**
Computer Science Department		**Course Instructors:** **Dr. Hany M. Zamel**
Course Name: Image Processing		
Course Code: CSC 417		

Assignment

Question #1

Illustrate and explain the fundamental steps of a digital image processing system with a suitable diagram.

Question #2

A common measure of transmission for digital data is the baud rate, defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of a start bit, a byte (8 bits) of information, and a stop bit.

Using these facts, answer the following:

(a) **How many minutes** would it take to transmit a 1024×1024 image with 256 intensity levels using a 28.8K baud modem?

(b) **What would the time** be at 115.2K baud, a representative medium speed of a phone DSL (Digital Subscriber Line) connection?

Question #3

For the image shown, find a transformation function that will approximately equalize its histogram, and **draw the transformed image**. **Give the histogram** of the original image, the histogram of the processed image, and the transformation function (in a lookup table).

Assume that the processed images can only take integer values between 0 and 7 (including 0 and 7).

0	**1**	**1**	**3**	**4**
0	**2**	**3**	**4**	**4**
2	**3**	**4**	**4**	**5**
3	**4**	**4**	**5**	**6**
4	**4**	**5**	**6**	**7**

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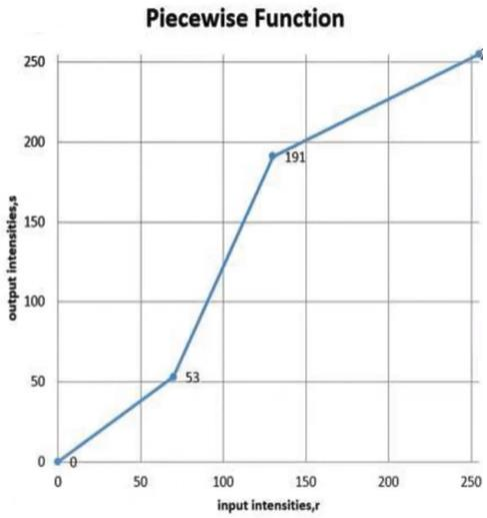
Question #4

Using the piecewise linear transformation function shown in the figure bellow. **Do contrast stretching** for the following input image A [4×4], where L = 256.

	r	s
0	0	0
1	70	53
2	130	191
3	255	255

$$S = \begin{cases} \alpha.r & 0 \le r \le r1 \\ \beta.(r-r1)+s1 & r1 \le r \le r2 \\ \gamma.(r-r2)+s2 & r2 \le r \le 25 \end{cases}$$



Input Image A [4×4]			
30	110	140	210
135	235	45	100
29	51	188	240
180	95	170	230