

Philadelphia University



Student Name:

Faculty of Engineering

Student Number:

Dept. of Computer Engineering
Second Exam, First Semester: 2010/2011

Course Title:	Topics in Computer and Software Engineering	Date:	22/12/2010
Course No:	630593	Time Allowed:	1 Hour
Lecturer:	Dr. Qadri Hamarsheh	No. Of Pages:	2

Information for candidates

1. This examination paper contains 4 questions totaling 15 marks
2. The marks for parts of questions are shown in round brackets.

Advices to candidates

1. You should attempt all questions.
2. You should write your answers clearly.

Basic notions: The aims of the questions in this part are to evaluate the required minimal student knowledge and skills. Answers in the pass category represent the minimum understanding of basic concepts: Intensity Transformation functions, Histograms and Spatial Filtering.

Question 1

(5 marks)

- a) Explain the Gamma Transformations Matlab function: (1.5 marks)

`g = imadjust(f, [low_in high_in], [low_out high_out], gamma)`

- b) Show the effect of the gamma transformation with gamma (0.4, 1, 1.8, 2.5 and 3) using plots (graphics). (1.5 marks)

- c) Write a Matlab script code to create and show three enhanced images with gamma transformations values (0.4, 1 and 3), assume that the input image file name is "tire.tif" (2 marks)

Question 2

(3 marks)

Write a Matlab script code to display the histogram of an image using a **bar** graph; reduce the resolution of the horizontal axis into 10 bands.

Add suitable horizontal and vertical axes, xtick and ytick for your graph.

Familiar and Unfamiliar Problems Solving: The aim of the questions in this part is to evaluate that the student has some basic knowledge of the key aspects of the lecture material and can attempt to solve familiar and unfamiliar problems of Intensity Transformation, Histograms, Spatial Filtering and programming these concepts using MATLAB.

Question 3

(2 marks)

List four methods to solve the boundary problem of an image, when convolution or correlation filtering modes are used.

Question 4

(5 marks)

Write a Matlab function; call it "**myfilter**" that performs spatial filtering using correlation, the function accepts an input image (call it **f**) and the filter mask **w** (assumed to be **3x3**) and it produces the enhanced image (call it **g1**), do the following in your code:

- a) The original image is padded with 0's.
- b) Check that **w** is 3x3.
- c) Cycle through the image array and apply the filter using low-level processing.
- d) Convert the filtered image to **uint8**.
- e) Apply this function in Matlab interactive mode to enhance the image "**pout.tif**" with the average filter.

Hint: don't use the `imfilter` Matlab IPT function.

GOOD LUCK