Philadelphia University
Faculty of Engineering

Marking Scheme

Examination Paper

BSc CE

Topics in Computer and Software Engineering (630593)

Second Exam | First semester | Date: 22/12/2010

Section 1

Weighting 15% of the module total

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The presented exam questions are organized to overcome course material through 4 questions.
The *all questions* are compulsory requested to be answered.

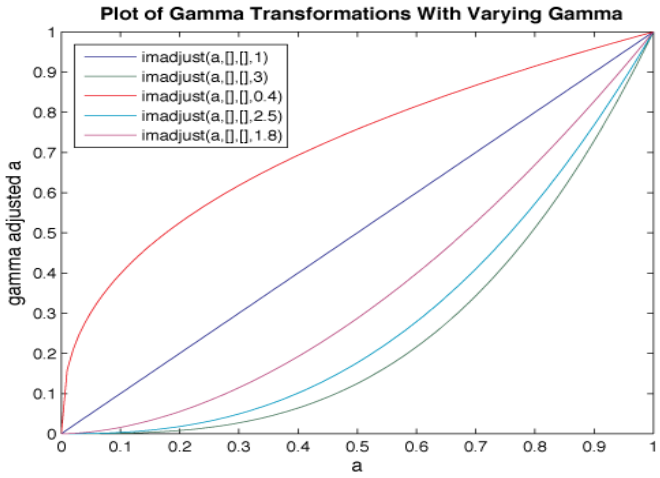
Marking Assignments

Question 1 This question is attributed with 5 marks if answered properly; the answers are as following:

Question 1.a ***(1.5 marks)***

With Gamma Transformations, you can curve the grayscale components either to brighten the intensity (when gamma is less than one) or darken the intensity (when gamma is greater than one). f is the input image, gamma controls the curve, and [low_in high_in] and [low_out high_out] are used for clipping. Values below low_in are clipped to low_out and values above high_in are clipped to high_out. We use [] for both [low_in high_in] and [low_out high_out]. This means that the full range of the input is mapped to the full range of the output.

Question 1.b ***(1.5 marks)***



Question 1.c ***(2 marks)***

The MATLAB code that created these three images is:

```
I=imread('tire.tif');
J=imadjust(I,[],[],1);
J2=imadjust(I,[],[],3);
J3=imadjust(I,[],[],0.4);
imshow(J);
figure,imshow(J2);
figure,imshow(J3);
```

Original (and gamma=1)	gamma=3	gamma=0.4
		

Question 2: This question is attributed with 3 marks if answered properly.
The complete code for this question as the following:

```
f = imread('pout.tif');
h = imhist(f);
h1 = h(1:10:256);
horiz = 1:10:256;
bar(horiz,h1);                                                    (1.5 marks)
xlabel('Intesity Level','fontsize',12);
ylabel('Count of Pixels','fontsize',12);
title('Image Histogram');
axis([0 255 0 1500]);
set(gca,'xtick',[0:50:255]);
set(gca,'ytick',[0:200:1500]);                                    (1.5 marks)
```

Question 3: This question is attributed with 2 marks if answered properly, the answer is as following:

1. Zero padding (or some value) method: fill outside the Image with zeros.
2. Border replication method: the value of any pixel outside the image is determined by replicating the value from the nearest border pixel.
3. Circular method.
4. Symmetric method.

Question 4: This question is attributed with 5 marks if answered properly, the answers are as following:
The complete code for this question as the following:

```
function g1 = myfilter(f, w)
%MYFILTER Performs spatial correlation
% check that w is 3x3
      [m,n]=size (w);
      if m~=3 | n~=3
          error ('Filter must be 3x3')
      end                                                         (1 mark)
%get size of f
      [x,y]=size(f);
%create padded f (called g)
      g=zeros(x+2, y+2);
      for i=1:x
          for j=1:y
              g(i+1,j+1)=f(i,j);
          end
      end                                                         (1.5 marks)
%cycle through the array and apply the filter
      for i=1:x
          for j=1:y
              g1(i,j)=g(i,j)*w(1,1)+g(i+1,j)*w(2,1)+g(i+2,j)*w(3,1) ...
              + g(i,j+1)*w(1,2)+g(i+1,j+1)*w(2,2)+g(i+2,j+1)*w(3,2)...
              + g(i,j+2)*w(1,3)+g(i+1,j+2)*w(2,3)+g(i+2,j+2)*w(3,3);
          end
      end                                                         (1.5 marks)
%Convert to uint
        g1=uint8(g1);
%function using in matlab interactive code:
      %>> w=[1/9 1/9 1/9; 1/9 1/9 1/9; 1/9 1/9 1/9];
      %>> f=imread('pout.tif');
      %>> g=myfilter(f,w);                                        (1 mark)
```