Philadelphia University
Faculty of IT

Marking Scheme

Exam Paper

BSc CS

Digital Image Processing (0750474)

First exam Second semester Date: 21/03/2012

Section 1

Weighting 20% of the module total

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Marking Scheme

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The presented exam questions are organized to overcome course material through 6 questions.
The *all questions* are compulsory requested to be answered.

Marking Assignments

Question 1 This question is attributed with 4 marks if answered properly; the answers are as following:

1. Imaging Radar Technology is an application of --------- band.
   - **a)** Radio waves
   - **b)** Gamma Rays
   - **c)** Ultra Violet
   - **d)** Micro Waves
2. One f the following functions is not an IPT (image processing toolbox) function used to convert images.
   - **a)** dither ()
   - **b)** rgb2gray ()
   - **c)** gray2rgb ()
   - **d)** ind2gray ()
3. The colormap array of the indexed image is always of class
   - **a)** uint8
   - **b)** uint16
   - **c)** double
   - **d)** logical
4. By default, Matlab stores most data in arrays of class
   - **a)** uint8
   - **b)** uint16
   - **c)** double
   - **d)** logical

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

- Radiation from Electromagnetic Spectrum
- Acoustic
- Ultrasonic
- Electronic (in the form of electron beams used in electron microscopy)
- Computer (synthetic images used for modeling and visualization)

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

Image Type	Data Classes	Range	Number of matrices
1. Intensity (Grayscale images)	uint8 uint16 double	0-255 0-65535 0-1	1
2. Binary Image	logical	0 or 1	1
3. Indexed Image	Index image (uint8, uint16,double) Color mapped image (double)	As in intensity images	2
4. RGB Images	uint8 uint16 double	As in intensity images	3

Question 4: This question is attributed with 3 marks if answered properly, the answers are as following:
The complete code for this question as the following:

```
RGB = imread('peppers.png');                    (1 mark)
red = RGB(:,:,1);
green = RGB(:,:,2);
blue = RGB(:,:,3);                              (1 mark)
imshow(red), figure ,
imshow(green),figure
imshow(blue), figure,
imshow (RGB);                                   (1 mark)
```

Question 5: This question is attributed with 3 marks if answered properly, the answers are as following:
The complete code for this question as the following:

```
function [q] = imblend(p1,p2,br)
%IMBLEND Computes the blended version of two grayscale input images
%[Q]=IMBLEND(P1,P2,BR) Computes  Q blended image
%using the equation Q(I,J)=BR*P1(I,J)+(1-BR)*P2(I,J)
%using low-level processing
%X: Mixing proportion or blending ratio, which determine the influences
[M N d] = size(p1);
q = uint8(zeros(M,N));                          (1.5 mark)
for x= 1:M
    for y=1:N
        q(x,y)=uint8(br*p1(x,y)+(1-br)*p2(x,y));
    end
end
image(q),figure, image(p1), figure, image(p2)   (1.5 mark)
```

Question 6: This question is attributed with 5 marks if answered properly, the answers are as following:
The complete code for this sub question as the following:

```
A=imread('cameraman.tif');  % Read in 1st image
B=imread('pout.tif'); % Read in 2nd image              (1 mark)
A1 = A(1:200,1:200);
B1 = B(end-199:end,end-199:end);                       (1.5 mark)
subplot(1,3,1), imshow(A); title('1st image') % Display 1st image
subplot(1,3,2), imshow(B); title('2nd image') % Display 2nd image
Output = imsubtract(A1, B1);                           (1.5 mark)
subplot(1,3,3), imshow(Output);
title('subtract images') % subtract images             (1 mark)
```