



*Philadelphia University*  
*Faculty of Engineering*

**Marking Scheme**

Examination Paper

BSc CE

**Topics in Computer and Software Engineering (630593)**

First Exam

First semester

Date: 24/11/2010

Section 1

Weighting 15% of the module total

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## Marking Scheme

### Topics in Computer and Software Engineering (630593)

The presented exam questions are organized to overcome course material through 5 questions.  
The *all questions* are compulsory requested to be answered.

#### Marking Assignments

**Question 1:** This question is attributed with 3 marks if answered properly, the answers are as following:

1. MRI Technology is an application of ----- band.
  - a) EM Spectrum
  - b) Acoustic
  - c) Ultrasonic
  - d) Electronic
2. The image type that must contain a colormap array is called -----.
  - a) True color
  - b) Binary
  - c) Indexed
  - d) Grayscale
3. Computer vision defined as a discipline in which -----
  - a) both the input and output of a process are images.
  - b) the input of a process is an image description and the output is image
  - c) both the input and output of a process are descriptions.
  - d) the input of a process is an image and the output is an image description.

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

#### Question 2.a

The matrix that represents a binary image has two 8-connected objects and five 4-connected objects.

#### Question 2.b

- ❖ D4 distance (city block distance) is defined by:  $D4(p, q) = |x-s| + |y-t|$
- ❖ D8 distance (chess board distance) is defined by:  $D8(p, q) = \max(|x-s|, |y-t|)$ .

**Question 3:** This question is attributed with 3 marks if answered properly.

The complete code for this question as the following:

```
function F = GetBinary(I, lowlimit, highlimit)
%GETBINARY(I,LOWLIMIT,HIGHLIMIT) accepts a gray image I,
%the function finds all image' pixels that are in the
%domain [lowlimit , highlimit] and returns a binary matrix F
%that is of the same size as I,
%where 1 for pixels satisfying the domain condition and 0 otherwise
[M, N] = size(I);
F = logical(zeros(M,N));
for x=1:M
    for y=1:N
        if I(x,y)>= lowlimit & I(x,y)<= highlimit
            F(x,y) = 1;
        else
            F(x,y) =0;
        end
    end
end
end
```

(1 mark)

(2 marks)

**Question 4:** This question is attributed with 2 marks if answered properly.

The complete code for this question as the following:

```
function s = imenhance1(f)
[M N] = size(f);
%preallocating array for image
s = uint8(zeros(M,N));
s=uint8((f-64)/128 *255);
imshow(s), figure, imshow(f);
```

(1 mark)

(1 mark)

**Question 5:** This question is attributed with 4 marks if answered properly.

The complete code for this question as the following:

```
function g = imnegative (f)
%write a matlab function that accepts a gray or binary image
%and returns the negative of that image
% using the following equations
% for uint8 image data g = 255-f;
%for logical image data g = 1-f
[M N]=size (f);
%preallocating the output arrays
if (islogical(f)==true)
    g= logical (zeros (M,N));%if the image is a Binary image
else
    g = uint8 (zeros (M,N));%if the image is a Gray image
end
for x =1 : M
    for y =1 : N
        if (islogical(f(x,y))==true)
            g(x,y)= 1-f(x,y);
        else
            g(x,y)=255-f(x,y);
        end
    end
end
end
```

(1 mark)

(1 mark)

(2 marks)