National University of Computer and Emerging Sciences, Lahore Campus

Course:	**Fundamentals of Computer Vision**	**Course Code:**	CS-495
Program:	BS(Computer Science)	**Semester:**	Fall 2016
Duration:	60 Minutes	**Total Marks:**	50
Paper Date:	21-Sep-16	**Weight**	15%
Section:	A/ B	**Pages:**	3 pages (6 sides)

Name: --

Registration No: ---------------------------

Section: --------------

Problem 1: Short answers   (20 marks)

A. Suppose you want to enhance details of an image in a specific direction. Which filter will you use?
   Difference filter

   _____

B. ***Computer vision*** is imaging applications where the output images are for computer use.

C. ***Image Processing*** is imaging applications where the output images are for human consumption

D. What rays are used in Positron emission tomography?
   _____gama_____
   —

E. Give seven components of electromagnetic spectrum (list them in order of their increasing frequency).

7. gamma	5. UV	2. microwave
6. x_rays	4. visible rays	1. radio waves
	3. infra red	

8. Give three applications of Acoustic Imaging
1) Mineral & Oil Exploration
2) Medicines/ultra sound
3) Sonar system in submarines

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9. Suppose you are given with the following mask. Can you guess anything about it? Also tell whether it is linear or non linear and uniform or non uniform. (marks 6)

-3	5	5
-3	0	5
-3	-3	-3

__Linear and non uniform__

__Enhance edges and darkens the image__

**Problem 2**   **(5 marks)**

Suppose we want to reduce 10 bit information containing 1024 grey level values down to 8 possible values. Map the quantized gray level values to the high end of each range. Also briefly describe the procedure.

0001111111 use OR operator

Problem 3   **(15 marks)**

Suppose you are given with the following 80x80 colored Image 'A.jpg'. Write Matlab code to flip the half image as shown below. (Note: Arrow at the top represents the half of the image and is not part of image)

A.jpg

Resultant image
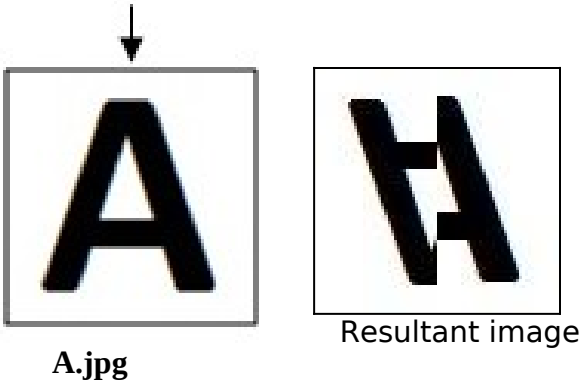
Solution:

```
function [ output_args ] = invertedHalf()
I = imread('A.jpg');
K = I;
[h,d,n]=size(I);
m=h;
for i=1:h
   K(m,1:d/2,:)=I(i,1:d/2,:);


   m = m-1;
end
imwrite(K,'k.jpg');
end
```

Problem 4 (10 marks)

Zoom the following image using k times zooming, horizontally it should be zoomed 3 times and vertically 2 times.

20	60	20
40	76	40

Answer:

20	33	46	60	46	33	20
30	42	55	68	55	42	30
40	52	64	76	64	52	40