

ASSIGNMENT NO. 1.

Q 1. Explain BMP file format.

→ One of the most commonly used graphics file format used by windows is a bitmap file format. Windows bitmap file format that allows windows to display bitmap on any type of display device. Bitmap specifies pixel colour in a form independent of the method used by a display to represent colour. The default extension for bitmap file format is BMP.

Q. 2. BMP file format is broadly divided into how many parts and explain each of them?

→ a. Each Bitmap file contains:

a) Bitmap file header:

Bitmap file header contains information about the type, size and layout of a device, independent bitmap file.

The header is defined as bitmap file header structure, it is given as:

i) WORD of bf Type.

ii) DWORD bf size

iii) WORD bf Reserved 1

iv) WORD bf Reserved 2

v) DWORD bf OFF bits :

b) Bitmap info:

following the overall file header comes under the information which defines the dimensions and colour information, Bitmap.

Bitmap info Header

RGB Quad.

BMI Header

BMI color [i];

consists of an array of BYTE values representing consecutive rows, or scan lines of the bitmap. Each scan line consists of consecutive bytes representing the no. of bytes representing a scan line depends on the color format & the width in the pixel of the bitmap.

Q.3. Give advantages and disadvantages of BMP file formats.

→ Advantages:

- Simple file format.
- Supported by windows based program.
- Device independent file format, i.e it works with any hardware configuration that windows may operate with.

Disadvantages:

- BMP files are restricted to the windows and OSR operating platform.
- File size with this format is quite larger.
- Does not support to share multiple image information.

Q.4. Give applications of BMP file format.

→ They are mainly used in older graphical users interfaces in their built in graphics sub-system.

Q.5. Given starting and end index with memory requirement of each field in BMP file structure.

Sl no.	Info Header file	Memory requirement	start	End
1.	File type.	2	0	1
2.	File size.	4	2	5
3.	Reserved	2	6	7
4.	Reserved.	2	8	9
5.	Offset	4	10	13
6.	Size of info header	4	14	17
7.	Width of image	4	18	21
8.	Height of image	2	22	25
9.	No. of planes	2	26	27
10.	No. of bits / pixels	4	28	29
11.	Type of compression	4	30	33
12.	Image size in byte	4	34	37
13.	Horizontal Resolution	4	38	41
14.	Vertical Resolution	4	42	45
15.	Colour Index	4	46	49
16.	Imp colour.	4	50	53

Q.6. Which all operating system does not support this file format?

→ Linux, Solaris, Macintosh.

Q.7. Explain the flow of program.

-
- Start
 - Open BMP file in read mode.
 - Read BMP file header information
 - Display the BMP file header information.
 - Read the bitmap info header.

- vi) ^{Display} Read the bitmap info header.
vii) stop.

Q. 8. Which function is used in MATLAB to display file information?

→ `info = imfinfo(filename)`

It returns a structure whose field contains information about an image in a graphics file, file name.

The file must be in the current folder or in a folder on the MATLAB path. The format of the file is inferred from its contents.

`info = imfinfo(filename, font)` additionally looks for a filename, filename font. If MATLAB cannot find a file named filename.

`info = imfinfo(URL)` return info about the image at the specific internet resources, URL.

Q. 9. Which are different image file format & explain them?

→ JPEG (JPEG file interchange format)

JFIF (Exchange image file format)

TIFF (. Tagged image file format)

GIF (. Graphics ^{interchange} image format)

BMP (windows Bitmap)

PNG (Portable network Graphics)

PPM (Portable pixmap file format)

PGM (Portable Graymap file format)

PBM (Portable Bitmap file format)

PAM (Portable Arbitrary format)

Plcorn;

It is a very popular technique in medical. This file format containing image data and also metadata such as patient details, equipment acquisition details.

Q.10 What are different types of Arithmetic operators?

→ The basic Arithmetic operators:

i) Addition of image.

Two images can be added indirectly names as given by

$$g(x, y) = f_1(x, y) + f_2(x, y)$$

ii) Image Subtraction.

Two images can be subtracted as:

$$g(x, y) = f_1(x, y) - f_2(x, y)$$

iii) Image Multiplication.

Two images can be multiplied as.

$$g(x, y) = f_1(x, y) * f_2(x, y)$$

Q.11. What are different applications of Arithmetic operations?

→ i) To create double exposure.

ii) To increase the brightness of an image.

Q.12. What are different types of logical operators?

→ The different types of logical operations are:

i) AND / NAND.

The operators NAND & AND take images as inputs and produces one output image.

ii) OR / NOR

iii) XOR / XNOR

iv) INVERT / Logical NOT.

Q.13

What are practical application of logical operation?

→

i) Computation of intersection of image.

ii) Design of filter masks.

iii) OR is used as the union operator of two images.

iv) OR can be used as managing operator.

v) Change detection.

vi) Making feature clean to the operator.

Q.14.

What are practical (operation) application of geometric?

→

i) The image can be seen in all direction.

ii) The proper alignment can be done.

iii) Each and every part of image can be seen in geometric operation.

Q.15.

Explain Offline transform.

→

The transform that maps the pixel at the co-ordinates (x, y) to a new co-ordinate position is given as a pair of transformation equation. In this transform, straight lines are preserved and parallel lines remain unchanged. It is described mathematically as:

$$x' = T_x(x, y)$$

$$y' = T_y(x, y)$$

T_x & T_y are expressed as polynomial. The linear equation given as offline transform:

$$x' = a_0x + a_1y + a_2$$

$$y' = b_0x + b_1y + b_2$$

This form is expressed as:

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = \begin{bmatrix} a_0 & a_1 & a_2 \\ b_0 & b_1 & b_2 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

The offline transform is a compact way to represent all transform. The given equation represents all transformation.

Q.16. Define Statistical operation.

→ Statistical operation can be applied to an image to get discrete result such as manipulation of brightness and contrast, some of the very statistical operations include mean, median & mid range. These measures are useful in image processing.

i) Mean

Mean is the average of all value in the sample and denoted as \bar{x} .

$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n} = \frac{1}{n} \sum_{i=1}^n x_i$$

Sometimes data is associated with weight,

$$\mu = \frac{1}{n} \sum_{i=0}^{n-1} x_i$$

ii) Median

Median is the value where the given x_i is divided in two halves and if the no. of pixels is even then median is average of middle number and if