

001:
BASIC MULTIMEDIA CONCEPTS

INTRODUCTION TO MULTIMEDIA:- GRAPHICS AND IMAGES

TuK



Bachelor Information Technology/Communications and Computing
Networks Year 4 Semester 1

MULTIMEDIA APPLICATIONS / SYSTEMS AND APPLICATIONS

SUBJECT CODE: ECCI/ECII 4102

OVERVIEW

- 1. Lecture Introduction & Attendance Registration**
- 2. Lecture Aims & Objectives**
- 3. Lecture 1 Outline**
- 4. Recommended Chapter from Recommended Reading List**
- 5. Lecture 1 Topic**
- 7. Q&A**

LECTURE AIMS & OBJECTIVES

- 1) To introduce students to Multimedia text, graphic, sound, video & animation theories.
- 2) To equip students with the knowledge to develop and use multimedia text, graphics, sound, video, animation skills
- 3) To develop students' expertise in the use of Multimedia text, graphics, sound, video & animation tools and techniques
 - 4) To design multimedia text, graphics, sound, video &animation applications
- 5) To implement the design, and maintain the implemented multimedia text, graphics, sound, video & animation systems while also supporting users
- 6) To enable graduates to find a wide variety of career opportunities in information technology related areas in both private and public sectors

BASIC MULTIMEDIA CONCEPTS

INTRODUCTION TO MULTIMEDIA

TEXT,

GRAPHICS,

SOUND,

VIDEO

&

ANIMATION IN A SINGLE
APPLICATION

RECOMMENDED CHAPTER FROM RECOMMENDED READING LIST

Chapter 1-3 from

**“Multimedia Foundations: Core Concepts for Digital Design” Costello;
Vic, Focal Press, 2016**

**“Multimedia: Making It Work” Vaughan; Tay,McGraw-Hill Education,
9th Edition, 2014**

**“Multimedia-based Instructional Design: Computer-Based Training;
Web-Based Training; Distance Broadcast Training;
Performance-Based Solutions”, Lee; William W, Owens; Diana L,
Pfeiffer, 2004**

INTRODUCTION MULTIMEDIA: BASIC MULTIMEDIA CONCEPTS, TEXT, GRAPHICS, SOUND, VIDEO & ANIMATION IN A SINGLE APPLICATION

GRAPHICS

DEFINITION:-

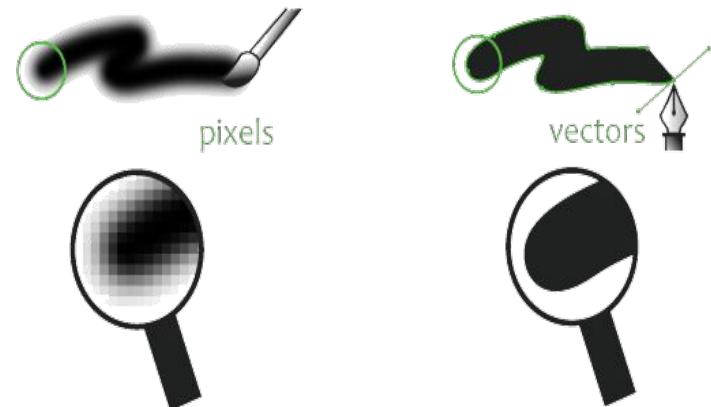
- Format constructed by **composition of primitive objects** (e.g. lines / polygons /circles / curves / arcs)
- Generated by a **graphics editor program**
- Files take up **less storage** (unlike images) & are **editable/revisable** (unlike images)
- Each object is stored **as an equation** and contains a number of **parameters/attributes** e.g. start and end coordinates; shape, size, fill colour, border colour etc.

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GRAPHICS

DEFINITION:-

- Used for data visualization, illustrations, modelling applications etc.
- Input devices include trackball, graphics tablets etc.
- Graphic standards include:- openGL.....
- 2 types of graphics:-
 - Raster (Bitmap Images)
 - Vector



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GRAPHICS

RENDER AND DISPLAY

- Computers can display fonts and images using 2 methods:-
 - Point-to-point math
 - Point to point math paths image remain smooth at any size.
 - Pixels
- If an image is magnified the larger the display the more jagged the pixel

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GRAPHICS

RENDER AND DISPLAY

Raster (aka bitmap image)

- Composed of pixels each of a different colour / shade
- Individual pixels make up grid paths.
- Edges become jagged when magnified

Bitmap Image:



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GRAPHICS

RENDER AND DISPLAY

Raster (aka bitmap image)

- Jagged appearance can be partially overcome using "anti-aliasing".
- Anti-aliasing is the application of subtle transitions in the pixels along the edges of images to minimize the jagged effect

Bitmap Image:



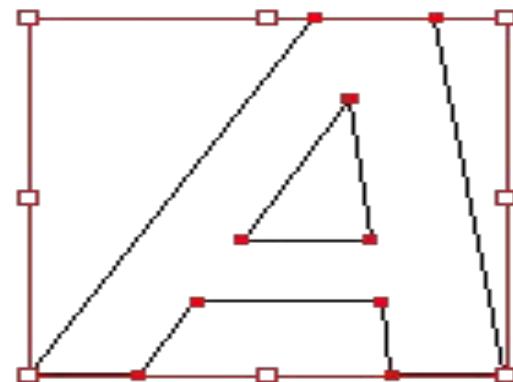
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GRAPHICS

RENDER AND DISPLAY

Vector

- Composed of paths
- Uses mathematical relationships between points and the paths connecting them to describe an image.



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GRAPHICS

PURPOSE:-

- **Different graphic methods serve different purposes**

	BITMAP GRAPHICS	VECTOR GRAPHICS
DISPLAY SPEED	x	
IMAGE QUALITY	x	
MEMORY USAGE		x
EASE OF EDITING		x
DISPLAY INDEPENDENCE		x

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GRAPHICS

IMAGE RESOLUTION

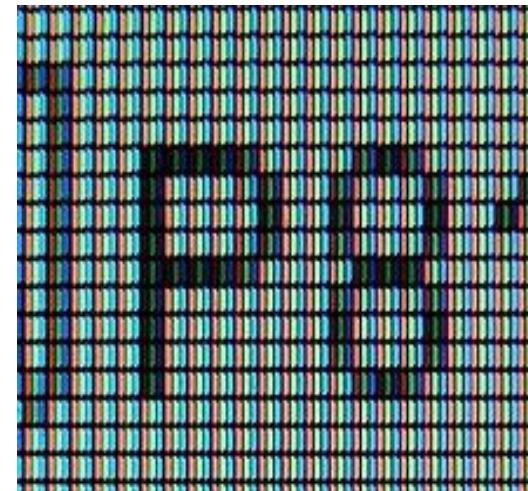
- Refers to the **numbers of pixels in a digital image**
- Higher resolution (**1600 x 1200**) yields **better quality** than lower (**640 x 480**)

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IMAGES

DEFINITION:-

- Consist of **pixels**(pictures elements in digital images)
- Resolution for screen H/W is measured in **ppi** (pixels per inch)
- Resolution for print is measured in **dpi (dots per inch)**
- **Still uncompressed pictures** are represented as a **bitmap**



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IMAGES

DEFINITION:-

- Stored at:-
 - **1 bit pp** (black or white)
 - **8 bits pp** (grey scale colour map)
 - **24 bit pp** (true colour)
- Simplest image type, consisting of **on and off bits** only for **storage and carriage of info.**
- A 640 by 480 monochrome image **requires 38.4 kilobytes storage** ($640 \times 480 / 8$)
- **Pictures containing only simple graphics and text** are used by fax machines

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IMAGES

DEFINITION

- Modern high digital camera 10+ megapixels = **29 MB** uncompressed
- Compression is normally applied

8 BIT COLOUR

- Offers great **savings in space** (unlike 24-bit images) **i.e.** a 640x480 8-bit color image requires only 300kB of storage (without compression) compared to 921.6kB color image
- Uses the concept of **lookup tables** to **store** colour information (**CLUT**)

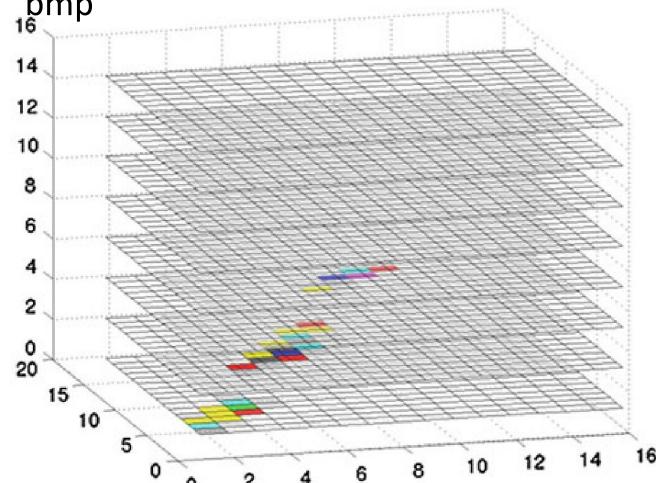
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IMAGES

8 BIT CLUT

- Refers to storing up only **the index or code value for each pixel** in a colour image
- Images store a **set of bytes** each with **an index** in a table of **3 byte values** specifying **24-bit colour** for a **pixel** from the CLUT index
- E.g. **001-orange**, 256- blue, storing **value 25** means go to **row 25**

3D Scatterplot of RGB colours in a bmp



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COLOUR LOOK UP TABLE

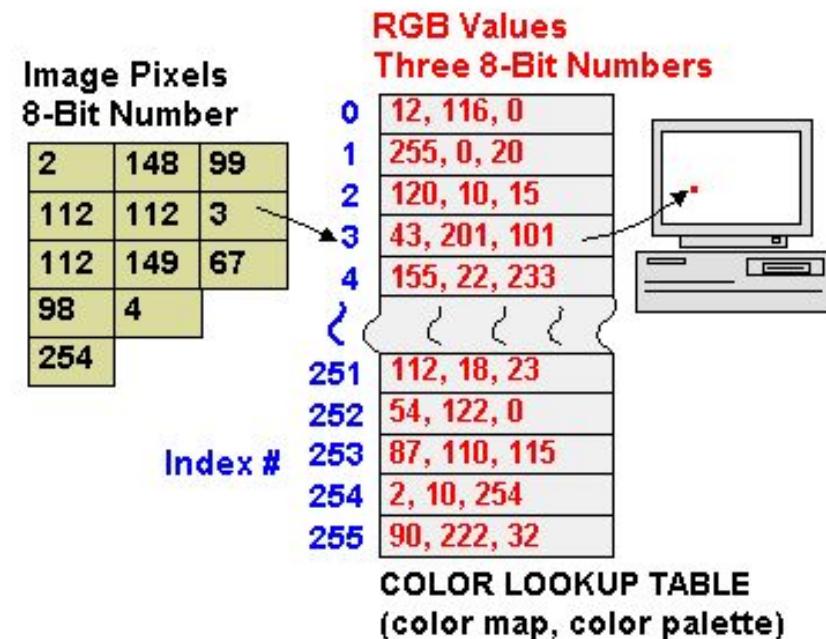
- CLUT **determines the 256 most frequently used colors** in an image
- It then creates a table storing information about the image and its colours.
- Colour info. for each pixel in the image is stored in one 8-bit number
- This single 8 bit number **indexes the 256-color lookup table** containing all the RGB values for the full image
- However in a 3D scatterplot **each pixel in the image will show all three RGB colors** (one 8-bit red, one 8-bit green and one 8-bit blue)

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IMAGES

8 BIT CLUT

- CLUT **determines the 256 most frequently used colors** in an image and creates a table stored with the image.
- Rather than **each pixel in the image having all three RGB colors** (one 8-bit red, one 8-bit green and one 8-bit blue), each pixel contains one 8-bit number
- This 8 bit number **indexes into the 256-color lookup table** containing the RGB values



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IMAGES

8 BIT CLUT

- Requires **careful choosing** of which colours to best represent the image
- Images displayed as **2D array of values** are stored in **row-column order** as a long **series of values**
- For 8 bt images, the image file stores in the **file header** info. on exactly **what 8-bit values for RGB** correspond to in **each index**.

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IMAGES

File Format Types

- |

IMAGE FILE FORMATS
BMP
GIF, JPG
EPS, PNG
PICT, PSD
TIF, TGA

QUESTION AND ANSWER SESSION

ANY

QUESTIONS

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