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MMS

Chapter-1 (1 Q)

Multimedia

(multimedia computing)

Imp 1) Define multimedia? ~~Define multimedia System~~

Ans: Multimedia is the combination of two or more media such as text, graphics, audio, and video which makes user easy to navigate interact and communicate.

→ It is the use of computers to present text, graphics, audio, video & animation in an integrated format.

→ Multimedia means ~~an~~ integration of ~~compute~~ continuous media (eg. audio, video) and discrete media (eg. text, graphics, images) through which digital information can be conveyed to the user in appropriate way.

→ Multimedia is an interactive media and provides multiple ways to represent information to the user in a powerful manner.

→ It provides an interaction between users and digital information.

→ It is a medium of communication.

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Imp 2) Define multimedia system.

Ans: (A multimedia system is a system capable of processing multimedia data and applications

→ It is characterized by the generation, storage, processing and manipulation of multimedia information.)

→ Multimedia systems are systems that can store, retrieve, and process various types of media, such as text, graphics, image, full motion ~~video~~ video, audio, and animation.

→ It allows users to create, process, share, and display information in a broad variety of formats.

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Q) What is multimedia in terms of media combination and independence?

13) Explain the main properties of multimedia. {Characteristics}

Ans: The four key properties of multimedia are:-

i) Combination of media
ii) Independence
iii) Computer supported integration
iv) Communication systems

i) Combination of media

⇒ According to the defination of multimedia system, a multimedia system combines both continuous and discrete media.

→ A simple text processing program with incorporated images should not be considered as a multimedia application. It means that, support of one type of media doesnot constitute multimedia.

ii) Independence / (Independent media)

→ In the multimedia system different media should be independent from each other whereas there should be inherently tight connection between different media to work together.

→ Example: A computer controlled video recorder stores audio and video information, but there is an inherently tight connection between the two types of media. Both media are coupled together through the common storage medium of the tape.

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iii) Computer supported integration

→ The different independent media are combined in arbitary forms to work together as a system with the support of computers.
i.e computer is idle tools for media combination.

→ The system should be capable of computer-controlled media processing.

→ Moreover, the system should be programmable by a system programmer or even a user.

iv) Communication Systems

→ Communication capable multimedia system must be approached.

→ A reason for this is that most of today's computers are interconnected; considering multimedia functions from only the local processing viewpoint would be a restriction, if not a step back.

→ Multimedia information cannot only be created, processed, presented and stored, but also distributed above the single computer's boundary.

→ This makes the multimedia application much popular and useful in distributed environment.

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11 4) Explain the building blocks of multimedia system with example. {and block diagram}

or

Explain different types of media used in multimedia
{components, elements}

Ans: The major components of multimedia are text, audio, video, graphics and animation.

-> These elements work together to present knowledge in a clear and understandable manner.

-> They are explained below:-

i) Text

-> The most popular method of presenting information is through text.

-> Text content is the most common type of media used throughout multimedia systems and applications.

-> Text is commonly used in multimedia for names, headlines, menus and so on.

-> The text can be in variety of fonts and sizes.

-> MS word, Notepad and word Pad are the most widely used applications for displaying text files.

-> The text files may have extensions such as .txt, .docx etc.

ii) Graphics

-> Graphics are the heart of any multimedia presentation.

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→ Graphics refers to non-textual information such as images, digital art, drawings, outlines, etc.
→ They make the multimedia application attractive.
→ In many cases, people donot like reading large amount of textual matter on the screen. Therefore, graphics are used more often than text to explain ~~the~~ a concept, present background information, etc.
→ The extension of Graphics file may be .jpeg, .gif, .tiff, etc.

iii) Audio
→ A multimedia application may require the use of speech, music and sound effects. These are called audio or sound element of multimedia.
→ Audio is the most important ~~part of~~ component of multimedia because it increases the concept's understanding/clarity and enhance interaction.
→ Audio are of analog and digital types.
↳ Analog audio refers to the original sound signal.
↳ Digital audio is the technology of representing audio in digital form.
→ Common audio formats include MP3, WMA, and RealAudio.
→ The programs that are used to play audio are windows Media Player, VLC Media Player, etc.

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iv) Video

→ The term video refers to the moving picture, accompanied by sound.

→ The video part of a multimedia application conveys a great deal of information in a short period of time.

→ Hence it is the most effective means of communication.

→ In multimedia applications, digital video is useful for displaying real-life things.

→ The extensions used by video files may be .mp4, .mkv etc.

→ VLC media player, MX Player etc are used to play/display videos.

v) Animation

→ Computer animation is the process of modifying images in such a way that the sequence of images appears to be moving.

→ A presentation can also be made lighter and more appealing by using animation.

→ In multimedia applications, the animation is unique and quite popular.

→ Animation plays a number of frames per second to give the user the feeling of motion.

→ The extensions of animation & the programs used in displaying animations are the same as in video.

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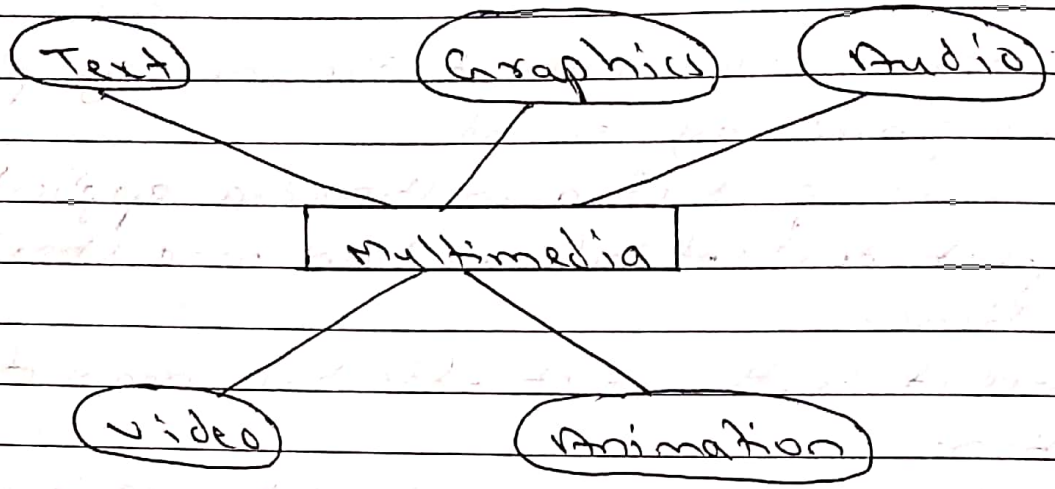

Fig: Block diagram of elements of multimedia.

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Q5) Explain the different application areas of multimedia.

or

Explain the implementation areas of multimedia.

Ans: The application areas of multimedia are:-

i) Electronic messaging

→ multimedia system allows for attachment as well as creation of audio, video, fancy texts in an email to better understand the subjects and contents of the email.

ii) Entertainment

→ multimedia is heavily used in the entertainment industry.

→ Movies, ads, short clips are now being created using special effects and animations, like VFX.

→ Multimedia is also used for gaming purposes which are distributed online or through CDs.

→ These games also integrated various multimedia features.

→ People can ~~the~~ pass time using some multimedia tools like listening songs, watching movies, playing video games, etc.

iii) Ecommerce/Business

→ Business sector also uses multimedia to perform business activities.

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→ They use multimedia for launching their new products, advertising purposes in the market in an eye catching way.
→ They makes ad-films, animation ads, etc using multimedia.
→ furthermore, business sector uses multimedia to perform statistics in form of pie charts and bar graphs about the current financial situation of their business.
→ These multimedia diagrams may reflect the business's profits/loss, expenses, manpower, etc.

iii) Engineering
→ Engineering sector also uses multimedia for demonstrating their construction projects, new engineering ideas, etc.
→ Digital audio workstations are used by sound engineer to manipulate pitches of sound.
→ Software engineers may use multimedia in computer simulations for anything from entertainment, training through simulations, etc.

iv) Medicine
→ Multimedia is increasingly used by doctors to get trained by simply watching a surgery being done on a virtual platform.
→ Simulation technology is used to develop human anatomy and study how it gets affected by

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different illness and then accordingly develop medicines and other remedial measures.

→ Furthermore, the other applications of multimedia in medicine allow patients to ~~contact~~ consult a doctor online to get medical consultation and treatment for their sickness.

vi) Education

→ Through the use of multimedia it is now feasible to create interactive educational materials, like books, PDF's, videos, PowerPoint Presentations etc along with one touch access to websites like wikipedia and encyclopedia.

→ Through virtual classrooms, teachers, and students can benefit the opportunity to learn, interact and exchange informative ideas without stepping outside and sit for hours inside a classroom.

→ Helps students visualize different concepts or procedures more easily.

vii) Technology & Science

→ In the sphere of science and technology, multimedia has a wide range of applications.

→ It can communicate audio, films, and other multimedia documents in a variety of formats.

→ Only multimedia can make live broadcasting from one location to another possible.

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III 6) Explain global structure of multimedia system.

Ans: The below figure shows schematically the main fields of multimedia system.

→ The basic idea of the figure is to express the interactions among the components through spatial proximity.

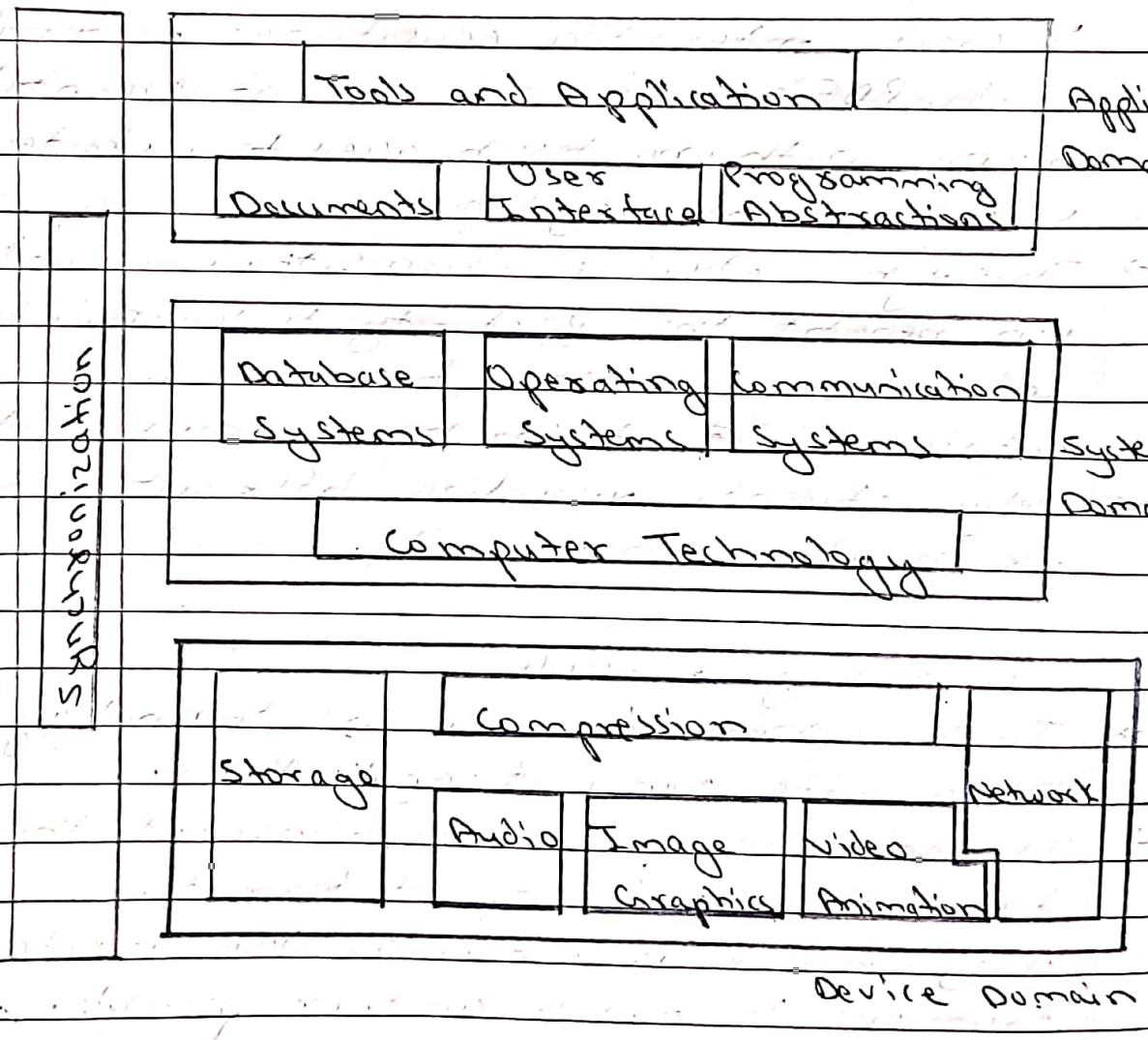

fig: Global Structure of multimedia system

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→ The following areas can be distinguished:-
i) Device Domain
ii) System Domain
iii) Application Domain
iv) Cross Domain

a) Device Domain
→ (basic concepts and skill for processing various multimedia elements and for handling physical device.)
→ It deals with interaction between multimedia application and multimedia devices such as AGP (Accelerated Graphics Port) card, sound card etc.
→ Basic concepts for the processing of digital audio and video data are based on digital signal processing.
→ Different methods for the processing of image, graphics, and animation are described.
→ The audio techniques section includes music MIDI (Musical Instrument Digital Interface) and speech processing.

b) System Domain
→ (including all supports for using the functions of the device domain, e.g. database system, operating system and communication system (networking))
→ The interface between the device domain and the system domain is specified by the computer

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technology.

→ To utilize the device domain, several system services are needed. Basically, three services exist i.e (i) ~~Database~~ Operating system
(ii) Database system
(iii) Communication system.

→ These services are mostly implemented in software.

i) The operating system serves as an interface between computer hardware/system and all the ~~other~~ other software components.
It provides the user with a programming and computational environment which should be easy to operate.

ii) The database system allows a structured access to data and a management of large databases.

iii) The communication system is responsible for data transmission according to the timing and reliability requirements of the networked multimedia application.

c) Application Domain

→ Provides functions to the user to develop and present multimedia projects.

→ This includes software tools, and multimedia projects development methodology.

→ The services of the system domain are offered to the application domain through proper programming abstractions.

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→ Another topic embedded in the application domain is document handling.

→ Many functions of document handling and other applications are accessible and presented to the user through a user interface.

d) Cross Domain

→ It turns out that some aspects, such as synchronization aspects, are difficult to locate in one or two components or domains.

→ The reason is that synchronization, ~~being~~ being the temporal relationship among various media, relates to many components across all domains.

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17) Explain different criteria that are used to classify media.

or

Explain different types of medium with reference to multimedia.

or

Media Aspect/Classification of Media/Criteria for the classification of medium

Ans: Medium is an element through which a message is communicated.

→ Medium is defined as means for distribution and presentation of information.

→ Examples of medium are text, graphics, audio, video and animations.

→ Media can be classified with respect to different criteria.

→ We classify media according to perception, representation, presentation, storage, transmission and information exchange.

→ It can be categorized as following sections.

i) The perception Medium
ii) The Representation Medium
iii) The Presentation Medium
iv) The Storage Medium
v) The Transmission Medium
vi) The Information Exchange Medium

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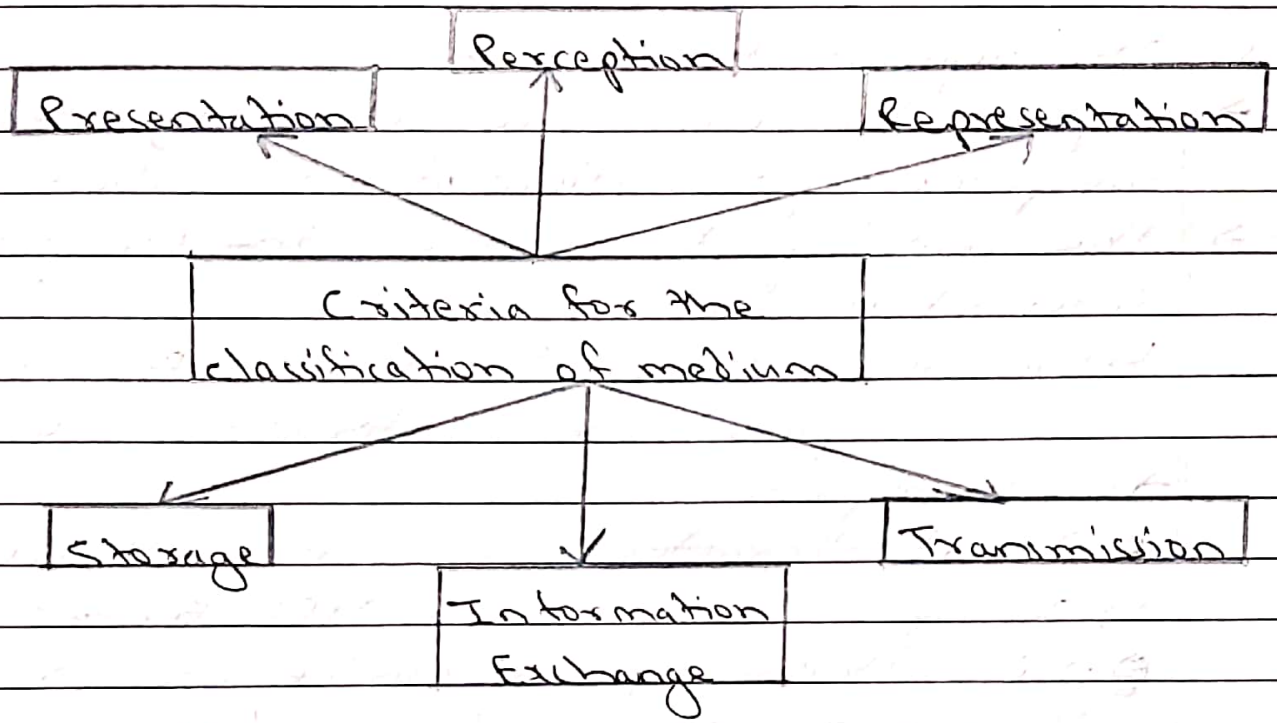

Fig: Classification of Medium/Media

i) The Perception Medium

→ Perception media help humans to sense their environment.

→ The central question is: How do humans perceive information in a computer environment?

↳ ~~The answer is that the perception of~~

↳ The answer is through seeing and hearing.

- Seeing: for the perception of information through seeing, the visual media such as text, image and video are used.
- Hearing: for the perception of information through hearing, auditory media such as music, noise, and speech are relevant.

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ii) The representation media

→ Representation media are defined by internal computer representations of information.

⇒ The central question is: How is the computer information coded?

↳ The answer is that the various formats are used to represent media information in computer.

→ For example:-

a) A text character is coded in ASCII code.

b) Image can be coded as JPEG format.

c) Audio/Video sequence can be coded in different TV standard formats (PAL, SECAM, NTSC) and stored in the computer using an MPEG format.

iii) The Presentation Medium

→ Presentation media refer to the tools and devices for the input and output of information.

→ The central question is: Through which medium is information delivered by the computer or introduced into the computer?

↳ The answer is:

- Output media: paper, screen and speaker
- Input media: keyboard, mouse, camera, microphone.

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iv) The Storage Medium

-> Storage media refer to a data carriers which enables storage of information.

-> The central question is: Where will the information be stored?

↳ The answer is hard disk, floppy disk, CD-ROM

v) The Transmission Medium

-> Transmission media are the different information carrier that enables continuous data transmission.

-> The central question is: Over what will the information be transmitted?

↳ The answer is that information is transmitted over networks, which use wire and cable transmission, such as coaxial cable and fiber optics.

vi) The Information Exchange Medium

-> The information exchange media includes all information carriers for transmission, i.e all storage and transmission media.

-> The central question is: Which information carriers will be used for information exchange between different places?

↳ The answer is combine use of storage and transmission media. E.g Electronic mailing system.

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3) What is data stream? (data flow)

→ In multimedia communication system data of discrete and continuous media are transmitted and information access takes place.

→ The transmitted information is divided into small individual unit known as packets.

→ Packets can carry information of either continuous or discrete media.

→ A sequence of individual packets transmitted in a time dependent fashion is called a data stream.

4) Explain data stream characteristics for continuous media.

Ans: Characteristics of continuous media can be classified according to:

① Time interval between a complete transmission of packets (Periodicity)

i) Strongly Periodic data stream transmission

ii) Weakly Periodic data stream transmission

iii) Aperiodic data stream transmission.

2) Packet amount based characteristics

i) Strongly Regular data stream

ii) Weakly regular data stream

iii) Irregular data stream

3) Contiguous packets – i) Continuous data stream

ii) Discrete data stream

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i) Time interval based characteristics

a) Strongly periodic → time interval between two consecutive packets is constant.

b) Weakly periodic → time interval between two consecutive packets is not constant.

c) Aperiodic → sequence of the time interval between packets is neither strongly or weakly periodic.

ii) Packet amount based characteristics

a) Strongly regular → data size of all packets is constant.

b) Weakly regular → data size of the packets changes periodically.

c) Irregular → data size of the packets is neither constant nor changing periodically.

iii) Contiguous packets based characteristics

a) Continuous data stream

↳ packets are transmitted without intermediate gap

b) Discrete data stream

↳ gap exists among the packets

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10) Explain representation value and representation space.

Representation value

→ How to represent different media?

→ It can be represented as:-

- Discrete representation value → text
- Continuous representation value → electromagnetic waves

Representation Space

→ determines surrounding where media are represented.

1) Visual representation space (paper, screen)

2) Acoustic representation space (speaker, stereo)

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