JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BUSINESS AND ECONOMICS
UNIVERSITY EXAMINATIONS: 2013/2014
SCS 310: MULTIMEDIA AND GRAPHICS
BUSIA LEARNING CENTER

DATE: DECEMBER 2013 **TIME: 2 HOURS**

INSTRUCTIONS:

Answer ALL QUESTIONS IN SECTION A AND ANY TWO FROM SECTION B

SECTION A (COMPULSORY- 30 Marks)

Question One
   a) State the issues and challenges that should be addressed in multimedia systems   {12 marks}

Supporting multimedia applications over a computer network renders the application ***distributed***. This will involve many special computing techniques -- discussed later.

Multimedia systems may have to render a variety of media at the same instant -- a distinction from normal applications. There is a temporal relationship between many forms of media (***e.g.*** Video and Audio. There 2 are forms of problems here

- Sequencing within the media -- ***playing frames in correct order/time frame in video***
- ***Synchronisation*** -- inter-media scheduling (***e.g.*** Video and Audio). Lip synchronisation is clearly important for humans to watch playback of video and audio and even animation and audio. Ever tried watching an out of (lip) sync film for a long time?

The key issues multimedia systems need to deal with here are:

- How to represent and store temporal information.
- How to strictly maintain the temporal relationships on play back/retrieval
- What process are involved in the above.

Data has to represented *digitally* so many initial source of data needs to be *digitise* -- translated from analog source to digital representation. The will involve scanning (graphics, still images), sampling (audio/video) although digital cameras now exist for direct scene to digital capture of images and video.

The data is *large* several Mb easily for audio and video -- therefore storage, transfer (bandwidth) and processing overheads are high. Data compression techniques very common.

b) Outline the areas of hypermedia application   {4 marks}

- *There are a number of fields where multimedia could be of use. Examples are:-*
  - *Business*
  - *Education*
  - *Entertainment*
  - *Home*
  - *Public Places*

  – *Digital video editing and production systems.*

  – *Electronic newspapers/magazines.*

  – *World Wide Web.*

  – *On-line reference works: e.g. encyclopedia, games, etc.*

  – *Home shopping.*

  – *Interactive TV.*

  – *Multimedia courseware.*

  – *Video conferencing.*

  – *Video-on-demand.*

  – *Interactive movies.*

c) Using appropriate examples , explain multimedia Authoring tools   {6 marks}

d) *Use to merge multimedia elements (text, audio, graphic, animation, video) into a project.*

e) *Designed to manage individual multimedia elements and provide user interaction (if required).*

Examples of open source authoring tools

*• **Virtual Dub**: A video capture/processing utility for 32-bit Windows platforms, licensed under the GNU GPL.*

http://www.virtualdub.org/

http://virtualdub.sourceforge.net/

*• **Audacity**: Audacity is a free, easy-to-use audio editor and recorder for Windows, Mac OS X, GNU/Linux and other operating systems.*

http://audacity.sourceforge.net/

*• **KompoZer**: A complete web authoring system that combines web file management and easy-to-use WYSIWYG web page editing. Designed to be extremely easy to use.*

http://www.kompozer.net/

f) Define data stream and explain some of the most common transmission modes
{8 marks}

Transmission modes can be divided into two fundamental categories:

 Serial — one bit is sent at a time; Serial transmission is further categorized according to timing of transmissions

 Parallel — multiple bits are sent at the same time

Question Two

a) Discuss the five components of multimedia illustrating what relevance each brings in communicating {10 marks}

Text

A broad term for something that contains words to express something.

Text is the most basic element of multimedia.

A good choice of words could help convey the intended message to the users (keywords).

Used in contents, menus, navigational buttons

Graphic

Two-dimensional figure or illustration

Could be produced manually (by drawing, painting,carving, etc.) or by computer graphics technology.

Used in multimedia to show more clearly what a particular information is all about (diagrams, picture).

Audio

Produced by vibration, as perceived by the sense of hearing.

In multimedia, audio could come in the form of speech, sound effects and also music score.

Animation

The illusion of motion created by the consecutive display of images of static elements.

In multimedia, animation is used to further enhance / enriched the experience of the user to further understand the information conveyed to them.

Animation

Is the technology of capturing, recording, processing, transmitting, and reconstructing moving pictures.

Video is more towards photo realistic image sequence / live recording as in comparison to animation.

Video also takes a lot of storage space. So plan carefully before you are going to use it.

a) Discuss five big application areas of multimedia today   {10 marks}
b) *There are a number of fields where multimedia could be of use. Examples are:-*
    a. *Business*
    b. *Education*
    c. *Entertainment*
    d. *Home*
    e. *Public Places*
    − *Digital video editing and production systems.*

    − *Electronic newspapers/magazines.*

- *World Wide Web.*

- *On-line reference works: e.g. encyclopedia, games, etc.*

- *Home shopping.*

- *Interactive TV.*

- *Multimedia courseware.*

- *Video conferencing.*

- *Video-on-demand.*

- *Interactive movies.*

Question Three

a) Explain three types of frames in MPEG organizations   {6 marks}

There are 3 different types of frames in the MPEG standard
 - Intraframes (I-frames)
-Predicate frames (P-frames)
 -Bidirectially-interpolated frames (B-frames)
I-frames are essentially the MPEG equivalent of Keyframes - these frames have all the data necessary to recreate themselves, i.e. you don't need to reference another frame to render an I-frame. P-frames reference the previous I or P frame and store the changes in picture. B-frames are meant to be very low-bitrate frames, so they reference both past and future frames.

b) Give a brief description of the term MIDI   {2 marks}

MIDI short for Musical Instrument Digital Interface is a technical standard that describes a protocol, digital interface and connectors that allows a wide variety of electronic musical instruments, computers and other related devices to connect and communicate with one another. A single MIDI link can carry up to sixteen channels of information, each of which can be routed to a separate device.

c) Discuss the MIDI devices   {12 marks}

Connectors:-The cables terminate in a 180° five-pin DIN connector. Standard applications use only three of the five conductors: a ground wire, and a balanced pair of conductors that carry a +5 volt signal.This connector configuration can only carry messages in one direction, so a second cable is necessary for two-way communication.Some proprietary applications, such as phantom-powered footswitch controllers, use the spare pins for direct current (DC) power transmission.

Management devices: - Each device in a daisy chain adds delay to the system. This is avoided with a MIDI thru box, which contains several outputs that provide an exact copy of the box's input signal. A MIDI merger is able to combine the input from multiple devices into a single stream, and allows multiple controllers to be connected to a single device

Interfaces: - A computer MIDI interface's main function is to match clock speeds between the MIDI device and the computer.[56] Some computer sound cards include a standard MIDI connector, whereas others connect by any of various means that include the D-subminiature DA-15 game port, USB, FireWire, Ethernet or a proprietary connection.

Controllers:- There are two types of MIDI controllers: performance controllers that generate notes and are used to perform music,[59] and controllers which may not send notes, but transmit other types of real-time events

Instruments:- A MIDI instrument contains ports to send and receive MIDI signals, a CPU to process those signals, an interface that allows user programming, audio circuitry to generate sound, and controllers. The operating system and factory sounds are often stored in a Read-only memory (ROM) unit

Synthesizers:- Synthesizers may employ any of a variety of sound generation techniques. They may include an integrated keyboard, or may exist as "sound modules" or "expanders" that generate sounds when triggered by an external controller. Sound modules are typically designed to be mounted in a 19-inch rack

Samplers:- A sampler can record and digitize audio, store it in random-access memory (RAM), and play it back. Samplers typically allow a user to edit a sample and save it to a hard disk, apply effects to it, and shape it with the same tools that synthesizers use. They also may be available in either keyboard or rack-mounted form

Question Four

a) Using examples , discuss the requirements of multimedia (hardware and software) required for multimedia systems   {10 marks}

b) Outline the advanced Multimedia coding standards   {10 marks}

Question Five

a) Discuss the various animation tools and their functions   {8 marks}

b) Explain three common ways to display animation   {6 marks}

c) There are many ways of acquiring digital images that can be used in development of multimedia applications. Highlight some of these ways   {6 marks}