UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2020 – 3rd Year Examination – Semester 5

IT5405: Fundamentals of Multimedia

Structured Question Paper

(TWO HOURS)

To be completed by the candidate

BIT Examination Index No: .....

Important Instructions:

- The duration of the paper is **2 (two) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **11 pages**.
- **Answer all questions.** All questions **do not** carry **equal** marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.
- Calculators are **not** allowed.
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Questions Answered

Indicate by a cross (×), (e.g. [X]) the numbers of the questions answered.

	Question numbers				
To be completed by the candidate by marking a cross (×).	1	2	3	4	
To be completed by the examiners:					

Index No …….

1) (a) In an organization how is multimedia used to provide a better service. Explain briefly using **four (04)** examples.

(8 marks)

ANSWER IN THIS BOX

- Video – for product demonstration, marketing, as a teaching source,
- Video Conference online real time– conduct net meeting with subsidiaries (local and overseas to save time and traveling cost)
- CCTV camera: for security purpose
- To study the moving patterns and behavior- movement of the sport persons (eg cricketers' action)
- include presentations, training, marketing, advertising, product demos, databases, catalogs, instant messaging, and network communications.
- Voice mail and video conferencing are provided on many local and wide area networks (LAN and WAN) using distributed networks and Internet protocols.
- Animations
  - For demonstration
  - Cartoon
  - Advertisement

Note:

(open-ended question) and can be accepted any valid answer within the domain)

(b) Briefly explain virtual reality and its importance.

(05 marks)

ANSWER IN THIS BOX

- VR is an extension of multimedia-it uses the basic multimedia elements of imagery, sound and animation.
- In VR, the cyberspace is made up of many thousands of geometric objects plotted in 3 dimensional space.
- VR deals with goggles, gloves and helmets and requires terrific computing power to be realistic.
- the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.

Importance:

Virtual reality is most commonly used in entertainment applications such as video games and 3D cinema.

In social sciences and psychology, virtual reality offers a cost-effective tool to study and replicate interactions in a controlled environment. It can be used as a form of therapeutic intervention.

Virtual reality programs are being used in the rehabilitation processes with elderly individuals that have been diagnosed with Alzheimer's disease. This gives these elderly patients the opportunity to simulate real experiences that they would not otherwise be able to experience due to their current state.

In medicine, simulated VR surgical environments were first developed in the 1990s

Immersive virtual reality technology with myoelectric and motion tracking control may represent a possible therapy option for treatment-resistant phantom limb pain.

In aviation, medicine, and the military, Virtual Reality training is an attractive alternative to live training with expensive equipment, dangerous situations, or sensitive technology.

Scientific and engineering data visualization has benefited for years from Virtual Reality, although recent innovation in display technology has generated interest in everything from molecular visualization to architecture to weather models.

Note:

(open-ended question) and can be accepted any valid answer within the domain)

(c) How can multimedia be used in marketing and advertising? Explain briefly using **three (03)** examples.

(06 marks)

ANSWER IN THIS BOX

- Product demonstration to promote, to show how to assemble,
- Graphics for 2D advertisements
- Audio file for demonstration
- Animation for simulation

(d) Briefly explain the role of the **three (03)** members of the multimedia team.

(06 marks)

ANSWER IN THIS BOX

- Executive producer, Producer/ Project Manager, Creative Director/ Multimedia Designer, Art Director/ Visual Designer, Artist,
- Interface Designer, Game Designer, Subject Matter Expert, Instructional Designer, Scriptwriter, Animator, Sound Producer, Music
- Composer, Video Producer, Multimedia Programmer, HTML coder, Lawyer, Marketing Director

Role:
Project Manager :
• A project manager's role is at the center of the action.
• He/she is responsible for the overall development and implementation of a project as well as for day-to-day operations. • Has to take care of budgets, schedules, creative sessions, time sheets, team dynamics, etc with the project.

Multimedia Designer
• Graphic designers deal with the visuals.
• Instructional designers make sure that the subject matter is clear and properly presented.
• Interface designers devise the navigation pathways and content maps.
• Information Designers structure the contents, determine user pathways and feedback, and select suitable presentation media.

Interface Designer/ Writer
• Interface designer's work is transparent.
• The role of an interface designer is to create a software device that organizes the multimedia content that lets the user access or modify the content and that presents the content on the screen.

• Interface designer has to design a simple multimedia screen with much user friendliness by effectively using windows, backgrounds, icons and control panels.

Video Specialist

• Video specialist must understand the potentials and limitations of the medium, how they affect the video production itself, and how to get the most out of it.
• He/she is responsible for shooting and editing quality video.
• He/she is fully responsible for preparing the complete video files for the most efficient delivery on CD, DVD or the web.
• He/she has to deal with the entire team of videographers, sound technicians, lighting designers, set designers, script supervisors, etc.

Audio Specialist

• Audio specialists are those who make a multimedia program come alive, designing and producing music, voice-over narrations, and sound effects.
• They are responsible for locating and selecting suitable music and talent, scheduling recording sessions, and digitizing and editing recorded material into computer files.

Multimedia Programmer

• A multimedia programmer/ software engineer integrated all the multimedia elements of a project into a seamless whole using an authoring system or programming language.
• The most important skill a multimedia programmer can bring to a team is the ability to quickly learn and understand systems.

Website Producer

• The website producer puts together a coordinated set of pages for the www after a successful creation due to skills and teamwork.
• He/ she should have the knowledge and ability to perform in all of the different roles required to produce the site, whether graphics, editorial, html, audio, video, etc.

Note:
(open-ended question) and can be accepted any valid answer within the domain)

2) a) Briefly explain HSB and HSL models.

(08 marks)

ANSWER IN THIS BOX

• HSB-Hue, Saturation, Brightness
• HSL- Hue, Saturation, Lightness
• Hue or Color is specified as an angle from 0 to 360 degrees on a color wheel and saturation, brightness and lightness as percentages.
• Saturation is the intensity of a color. At 100% saturation, a color is pure. At 0% saturation, the color is white, black or gray.
• Lightness or brightness is the % of black or white that is mixed with a color. 100% - white, 0%- black, 50% pure color.

(b) Explain what is dithering and why it is necessary.

(05 marks)

ANSWER IN THIS BOX

• Suppose the colors of a 24-bit scanned image have to be reduced to an 8-bit, 256 color image.
• Dithering is the process where the color value of each pixel is changed to the closest matching color value in the target palette using a mathematical algorithm.

Necessary:
Dithering is used in computer graphics to create the illusion of **color** depth in images on systems with a limited **color** palette. In a **dithered** image, **colors** that are not available in the palette are approximated by a diffusion of colored pixels from within the available palette.

(C) Briefly explain the characteristics of the "MIDI" file.

(06 marks)

ANSWER IN THIS BOX

• Musical Instrument Digital Interface
• Not actual sound – shorthand representation of music in numeric form
• Device Dependent
• Not good to record human voice
• Completely editable
• Small file size (compared to Digital Audio)
• A number helps identify the musical instrument
• There are numbers from 0 – 127 (or 1 – 128)

(d) Write down the formula to calculate the size of the digital audio recording file.

(06 marks)

ANSWER IN THIS BOX

Size=sr*t*(res/8)*n
Size of Digital Audio Recording
• sr - sampling rate
• t - duration of recording (in s)
• res - (bit resolution / 8)
• n – stereo (=2) or mono (=1)

3) (a) Briefly explain the characteristics of the following MPEG files.

i. MPEG2 ii. MPEG4 iii. MPEG7 iv. MPEG21

(08 marks)

ANSWER IN THIS BOX

• MPEG2
– transparent sound recording for theaters
• MPEG4
– Speech compression, MIDI, text-to-speech, etc. all integrated to one standard
• MPEG7
– Standardizing Metadata for audiovisual multimedia sequences
• MPEG21
– Standardization from consumer's perspective particularly interoperability

(b) Briefly explain Serif and Sans Serif Fonts with suitable examples and illustrations.

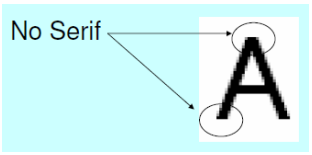
(05 marks)

ANSWER IN THIS BOX

- Serif – the decoration at the end of a letter
- Serif fonts have a decoration (eg. Times Roman, Courier, Monotype Corsiva, etc.)

Sans means without.

- Sans Serif means Without Serif/decoration.
- Sans Serif fonts include Arial, Lucida Sans, Helvetica, etc.



Serif Fonts
– New Century Schoolbook
– Times New Roman
– Monotype Corsiva
– Book Antiqua

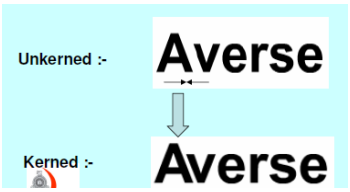
Sans Serif Fonts
– Arial
– Helvetica
– Verdana
– Impact

(c) Briefly explain what is kerning and how it differs from tracking using suitable examples and illustrations.

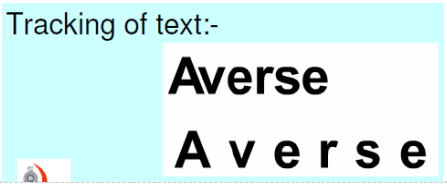
(06 marks)

ANSWER IN THIS BOX

Kerning
• Kerning is the spacing between character pairs.
• Observe the change in spacing between the character pair "Av" when kerning is applied to the word "Averse" below.
Kerned :-



Tracking changes the spacing in groups of letters (or entire words), unlike kerning which only works on pairs of characters.



(d) Briefly explain Run Length Encoding (RLE).

(06 marks)

ANSWER IN THIS BOX

• Many files, particularly image files, contains sequences of identical symbols.
– Eg. In an image, a section of many adjacent pixels may all be the same colour .
– Be encoded with the same bit pattern.
• RLE replaces sequence of identical bit patterns with
– one instance of the pattern
– Plus a number specifying how many times the pattern is to be repeated.
• Uses with BMP

4) (a) Fill the following table based on compression algorithms.

(08 marks)

ANSWER IN THIS BOX

Algorithm	Basic Concept	Compression Ratio	File Format
RLE (Run Length Encoding)	Compress Repetitive Data	~1.2	BMP
LZW (Lempel – Ziv-Welch)	Build treed Dictionary	~2.0	TIFF,GIF
DCT (Discrete Cosine Transformation)	Transform to series of Cosine functions	~100	JPEG,MPEG1/2
Colour Space Compression	Cut non-sensitive colour information	~2	JEPG (TV)
Wavelet	Transform to series of Wavelet function	~100	JPEG2000,MPEG4

(b) Briefly explain Tagged Image File Format (TIFF)

(05 marks)

ANSWER IN THIS BOX

Highly flexible
– Ability to handle various kinds of specialized image formats by using internal Tag
• over-24bit images (32, 36, 48, etc.)
• Alpha-channel (Transparency)
• Multiple Layers
• For Professionals
– Used in professional imaging industry
• Medical, Publishing, Photographers

(c) Briefly explain three types of Texture Nodes

(06 marks)

ANSWER IN THIS BOX

• 3 types
• **ImageTexture -** can map external JPEG or PNG image onto the shape. It's the most common.
• **MovieTexture** – can map an MPEG movie onto object (can also specify start/stop times).
• **PixelTexture** – creating an image to use with **ImageTexture.**

(d) Briefly discuss the Windows Meta File (WMF) and Enhanced Meta File.

(06 marks)

ANSWER IN THIS BOX

WMF (Windows Meta File)
– Line-based (No curve!)
• Designed for Microsoft Windows 3.1
• Limited feature, but widely used in office market
• EMF (Enhanced Meta File)
– Bézier curve-based
• Designed for Microsoft Windows 95
• Used for exchange of vector data internally between Windows applications

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