UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2022 – 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 **two (02) hours**.
- The medium of instruction and questions is English.
- This paper has **4 questions** and **14 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.
- *All Rights Reserved.*

Questions Answered

Indicate by a cross (✕), (e.g. ✕) the numbers of the questions answered.

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

1

1) (a) How can multimedia be used in ebusiness? Explain briefly using **five (05)** examples.

(10 marks)

ANSWER IN THIS BOX

2D based Advertisements – eg posters, logos

3D/ Animation based Advertisements

Video based Advertisements

Embed Chatbox for live and offline chatting facility - Pass text messages

Audio based chat

Video conference/video call facility

Send or share video/audio, animations, graphics via email

Allow social media application to share video/audio, animations, graphics

Prepare video based demonstrations or manual to give more detail about product or

How to fix them.

Create cartoon to attract and promote the business items

Design and develop attractive web sites using multimedia (video, audio, graphics, animations)

Design user interfaces of web applications to attractive the people based on the type of the

business

Text based search Items

Image based search Items

Image tagging

360 angle rotate

Zoom in and zoom out (using script)

Image gallery and image albums

Used in UX/UI design

Game based ebusiness

Web casting

(b) Describe any **three (03)** skills required for multimedia projects.

(09 marks)

ANSWER IN THIS BOX

Graphic Design
Graphic design is the process of visual communication and problem-solving through the use of typography, space, image and color. the term "graphic design" is used interchangeably with "visual communication" or "communication design".

Graphic designers create and combine symbols, images and text to form visual representations of ideas and messages. They use typography, visual arts and page layout techniques to create both digital and printed designs.

Web Design
Web design is the process of creating websites. It involves the selection, design and implementation of web content, web pages, web graphics and other web elements. Web design is a multifaceted profession that includes the ability to conceptualize, plan, design, and implement the creation of a website.

Web designers are responsible for the look and feel of a website, including the layout, color scheme, and graphics. They also need to be familiar with current web standards and best practices. Web designers use a variety of tools and software to create and maintain websites, including HTML, CSS, JavaScript, and Adobe Photoshop.

Animation
Animation is a form of multimedia that can be used to enhance presentations, explain processes or procedures, or to tell a story. Animation can be used to capture and hold the attention of your audience, and to help them understand what you are trying to communicate.

Animation can be used to explain complex concepts, show how something works, or to illustrate a point. Animation can also be used to create engaging and entertaining content, such as cartoons or short films.

3D Modelling
3D modelling is the process of creating a three-dimensional representation of an object or scene. 3D models are used in a variety of applications, including animation, video games, product design, and visual effects. 3D modelling is a complex skill that requires a good understanding of geometry, form, and function.

Motion Graphics
Motion graphics is the process of creating animated graphics and video elements. It's a growing field in multimedia, and it's used in a variety of applications, from simple animated logos to complex animated infographics. Motion graphics can be used to enhance live video, create animated characters, or create visual effects.

Motion graphics requires a combination of artistic and technical skills.

Video Editing
Video editing is the process of manipulating video footage to create a finished product. This can include adding effects, transitions, titles and audio.

Video editing is a complex process, and it can take a lot of time and effort to create a finished product. it's important to have good organizational skills to keep track of your footage and be able to find what you're looking for quickly.

Audio Editing

Audio editing is the process of modifying audio files to improve their quality or to create a new file. Audio editing can be used to fix errors in a recording, to create a new file from multiple files, or to add effects to a file.

Sound Effects
Sound effects are important in multimedia projects because they can add depth and realism to a project. you might want to add the sound of engines revving up, tires squealing and people cheering. These sound effects can help make your project feel more real and engaging for your audience.

Foley
Foley is the art of creating sound effects for film, television and video games. It's a skill that's needed by sound designers, editors and composers to help bring a project to life. Foley artists use their ears to create the sounds of footsteps, punches, gunshots, door slams and other effects that you hear in movies and on TV.

Music Composition
Music composition is the process of creating music. This can be done by singing, playing an instrument or by using computer software. Music composition is a form of art and can be used in many different ways. It can be used to express feelings, to tell a story or to create a specific mood.

(c) Explain Briefly **three (03)** Primary Multimedia delivery methods.

(06 marks)

ANSWER IN THIS BOX

1. CD- ROM
2. DVDs
3. Web pages

CD- ROM:

• Usually multimedia projects need a large amount of digital memory. Therefore, they are often stored on CD-ROM. Limited Capacity

Requirements: CD- Drive, plugins (eg. Media player) off line

DVDs:

Requirements: DVD- Drive, plugins (eg. Media player) off line, Limited capacity

• Multimedia includes web pages in HTML or XML on WWW and can include rich media created by various tools using plugins.

Requirements – Internet connection, Web browser with a device (computer, mobile phone)

Online real time

2) a) "Discrete roles might be needed for a multimedia production team.". Briefly describe how IT can be used to perform the following:

    I.   Project Manager
    II.   Multimedia Designer
    III. Video Specialist

(09 marks)

ANSWER IN THIS BOX

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.

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.

(b)   Briefly describe the HSB and HSL models in a nutshell.

(06 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.

The HSB Model (More details)

In this model, a colour can be represented by the hue it carries, how much saturated it is and the brightness it has.
HSB model in Sketch
The H(ue) parameter takes value from 0 to 360, whereas the S(aturation) and B(rightness) parameters take value from 0 to 100.
The Hue lies on the circumference of the cone and this is why it takes value from 0º to 360º. The saturation lies along the radius of the base whereas the Brightness or Value lies along with the height of the cone.

Saturation is 0 at the centre of the base and goes up to 100 at the circumference.
Brightness is 0 at the tip of the cone and goes up to 100 at the centre of the base.

(c) Describe the formula used to determine audio file size.

(06 marks)

<u>**ANSWER IN THIS BOX**</u>

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)

(d) Using the above formular (in question 2, (c)), Calculate the audio file sizes in Megabytes (MB) based on the given values. Duration is two minutes and CD-quality audio (at 16-bit bit depth) at a sample rate of 44.1 kHz.

(04 marks)

<u>**ANSWER IN THIS BOX**</u>

audio file size = bit depth * sample rate * duration of audio * number of channels

audio file size = 16 bits/sample * 44.1 kHz (or samples/sec) * 2 minutes * 2 channels

audio file size = 16 bits/sample * 44,100 samples/sec * 120 seconds * 2 channels

audio file size = 169,344,000 bits

audio file size = 169,344,000 bits * (1 byte / 8 bits) * (1 Megabyte / 1,000,000 bytes)

audio file size = 21.17 MB (Megabytes)

7

3) (a) Describe the following in detail.

I MPEG2   II MPEG4   III MPEG7

(06 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 audio-visual multimedia
sequences

(b) Briefly describe the following TV and video broadcasting standards.

    I PAL   II CSCAM   III NTSC

(09 marks)

ANSWER IN THIS BOX

PAL (Phase Alternate Line)

PAL is a TV standard originally invented by German scientists and uses 625 horizontal lines at a field rate of 50 fields per second (or 25 frames per second). It is used in Australia, New Zealand, United Kingdom, and Europe.

☐ Scans 625 lines per frame, 25 frames per second
☐ Interlaced, each frame is divided into 2 fields, 312.5 lines/field
☐ For color representation, PAL uses YUV (YCbCr) color model
☐ In PAL, 5.5 MHz is allocated to Y, 1.8 MHz each to U and V

SECAM (Sequential Color with Memory)

SECAM uses the same bandwidth as PAL but transmits the color information sequentially. It is used in France, East Europe, etc. SECAM (System Electronic Pour Couleur Avec Memoire) is very similar to PAL. It specifies the same number of scan lines and frames per second. SECAM also uses 625 scan lines per frame, at 25 frames per second; it is the broadcast standard for France, Russia, and parts of Africa and Eastern Europe.

SECAM and PAL are similar, differing slightly in their color-coding scheme. In SECAM U and V, signals are modulated using separate color subcarriers at 4.25 MHz and 4.41 MHz, respectively. They are sent in alternate lines – that is, only one of the U or V signals will be sent on each scan line.

NTSC (National Television Standards Committee)

The NTSC TV standard is mostly used in North America and Japan. NTSC is a black-and-white and color compatible 525-line system that scans a nominal 30 interlaced television picture frames per second. Used in USA, Canada, and Japan.

☐ 525 scan lines per frame, 30 frames per second (or be exact, 29.97 fps, 33.37 sec/frame)
☐ Interlaced, each frame is divided into 2 fields, 262.5 lines/field
☐ 20 lines reserved for control information at the beginning of each field

So a maximum of 485 lines of visible data.

| TV system	Frame rate (fps)	Number of scan lines	Total channel width (MHz)	Bandwidth allocation (MHz)		
				Y	I or U	Q or V
NTSC	29.97	525	6.0	4.2	1.6	0.6
PAL	25	625	8.0	5.5	1.8	1.8
SECAM	25	625	8.0	6.0	2.0	2.0

(c) Briefly explain Anti Aliasing (in image processing) using a suitable illustration.

(05 marks)

ANSWER IN THIS BOX

Aliased text is composed of "Jaggies" which appear rough to the readers eyes.
• Anti-aliasing refers to the elimination of those "Jaggies", making the text look smoother and easily readable.
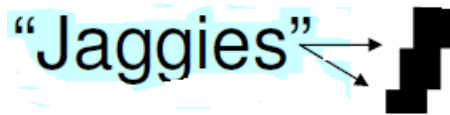
These pixelated edges are called "jaggies." They cause low resolution in computer graphics and are the main reason your game seems to have a shimmering texture or staircase effect.

10

(d) Briefly explain Kerning Vs Tracking (with respect to the display of characters) using a suitable illustration.
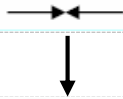
(05 marks)

ANSWER IN THIS BOX

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.

Unkerned :-

Kerned :-

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

11

4) (a) Briefly explain what are **Vector Fonts**.

(09 marks)

ANSWER IN THIS BOX

PostScript and TrueType are both vector font description languages – they use mathematical curves to describe the font images
• PostScript developed by Adobe uses Bezier curves.
• TrueType developed jointly by Apple and Microsoft uses quadratic curves.

A scalable font made of point-to-point line segments. Like vector-based images, vector fonts are easily scaled but lack the hints and mathematically defined curves of outline fonts, such as Adobe Type 1 and TrueType.

(b) Briefly explain the following, with respect to a digital camera.

I. Aperture size   II. Shutter speed   III. F-stop

(06 marks)

ANSWER IN THIS BOX

Aperture size:

Aperture is **defined by the size of the opening through which light can enter the camera**. Aperture sizes range from the widest (f/1.4) to the smallest (f/32). Between them are additional "stops" of f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, and f/22.

Shutter speed:

Shutter speed is exactly what it sounds like: It's the speed at which the camera's shutter closes. A fast shutter speed creates a shorter exposure — the amount of light the camera takes in — and a slow shutter speed gives the photographer a longer exposure.

F-stop:

F-stop is the term used to denote aperture measurements on your camera. The aperture controls the amount of light entering the camera lens, measured in f-stops. Along with shutter speed and ISO (sensitivity to light), the aperture is the third fundamental component that makes up the exposure triangle in photography.

(c) Give a brief explanation of symbols and icons (in graphics) using examples.

(05 marks)

ANSWER IN THIS BOX

Symbols are concentrated text in the form of stand-alone graphic constructs, which convey meaningful messages.

• eg:- ☺(smiling face), ☎(telephone)

• Icons are symbols representing processes common to the GUIs of many operating systems (examples shown below).

Recyclebin :-   Folder/Directory :-

(d) Write down the steps to tween a shape using the given images ("Cat to Bird") as shown below.

(05 marks)

 + = "Cat to Bird"
Animation

ANSWER IN THIS BOX

1. Select a layer name to make it the current layer, and select a keyframe where you want to start the animation

2. Draw or place a shape or an element on the stage. To yield a best results use only one item (a simple drawing object or broken apart group object, bitmap, instance or text block)

3. Choose Window > Properties and on the Properties inspector, select shape from the Tween pop-up menu

4. Create the second keyframe after the desired number of frames after the first keyframe

4. On the second key frame;

   o change the shape , color or position to give deferent shape than the original shape at frame one

   o delete the element and place a new artwork

   Create the "Cat to Bird" tween shape using the given images

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