SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

First Year, Second Semester Examination – 2018

IT 2002 /HNDIT1210 - Graphic and Multimedia

Marking Scheme

Q1.

i. What is multimedia? (02 marks)

Multimedia is a combination of text, graphic, sound, animation, and video that is delivered interactively to the user by electronic or digitally manipulated means.

ii. Briefly explain about two (02) multimedia elements (04 marks)

(02 marks *2 = 04 marks)

1. Text

- 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, navigation
- characters that are used to create words, sentences, and paragraphs.

2. graphics

- A digital representation of non-text information, such as a drawing, chart, or photograph.

3. 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

4. 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

5. Video

- 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

iii. Based on the multimedia elements in the world "Auditory" and "visual" modalities are regularly used. Write two channels for each modality. (04 marks)
(02 marks * 2 = 04)

Modality	**Channels for**
Auditory	Noises, speech , music
Visual	Words, pictures, movies

iv. Write four characteristics of multimedia system (04 marks)

(01 * 04 =04)

a. It must be *computer controlled*.
b. Multimedia systems are *integrated*.
c. The information they handle must be represented *digitally*.
d. The interface to the final presentation of media is usually *interactive*.

v. Shane is a HNDIT student. He wants to create a short film about Kandy. He plans to include history , beauty and Facilities of Kandy. Once he creates it, he hopes to upload this video in to his "You Tube channel".

Writ six (06) components he needs to complete this short film (06 marks)

(01*06 = 06 marks)

- **Capture devices** -- Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, tactile sensors, VR devices. Digitising/Sampling Hardware
- **Storage Devices** -- Hard disks, CD-ROMs, Jaz/Zip drives, DVD, *etc*
- **Communication Networks** -- Ethernet, Token Ring, FDDI, ATM, Intranets, Internets.

- **Computer Systems** -- Multimedia Desktop machines, Workstations, MPEG/VIDEO/DSP Hardware
- **Display Devices** -- CD-quality speakers, HDTV,SVGA, Hi-Res monitors, Colour printers *etc*

(Total Marks 20)

Q2.

i. Write two features of multimedia system (02 marks)

(1+1 = 2)

Any two from below and have to explain here mention two features for ii question

- **Very High Processing Power**
  - needed to deal with large data processing and real time delivery of media. Special hardware commonplace.
- **Multimedia Capable File System**
  - needed to deliver real-time media -- *e.g.* Video/Audio Streaming. Special Hardware/Software needed *e.g* RAID technology.
- **Data Representations/File Formats that support multimedia**
  - Data representations/file formats should be easy to handle yet allow for compression/decompression in real-time.
- **Efficient and High I/O**
  - input and output to the file subsystem needs to be efficient and fast. Needs to allow for real-time recording as well as playback of data. *e.g.* Direct to Disk recording systems.
- **Special Operating System**
  - to allow access to file system and process data efficiently and quickly. Needs to support direct transfers to disk, real-time scheduling, fast interrupt processing, I/O streaming *etc.*
- **Storage and Memory**
  - large storage units (of the order of 50 -100 Gb or more) and large memory (50 - 100 Mb or more). Large Caches also required and frequently of Level 2 and 3 hierarchy for efficient management.
- **Network Support**
  - Client-server systems common as distributed systems common.
- **Software Tools**

  user friendly tools needed to handle media, design and develop applications, deliver media

ii. Briefly explain the above two features (04 marks)
(2*2=4)

iii. Explain about "linear" and "non-linear" multimedia products (04 marks)
(02 * 2= 04)

Linear

- A Multimedia Project is identified as Linear when:
  - It is not interactive
  - User have no control over the content that is being showed to them.

Example:
- A movie
- A non-interactive lecture / demo show

Non – Linear

- A Multimedia Project is identified as Non-Linear when:
  - It is interactive
  - Users have control over the content that is being showed to them.
  - Users are given navigational control

Example:
- Games
- Courseware
- Interactive CD

i. Briefly explain raster image and vector image (04 marks)
(02+02 =04)

Vector image

Draw type image or object oriented image

Represented in geometric form (mathematical instruction) to create straight line, oval, curve and sphere.

E.g. instruction:

Line startcoord = "x.0 y.0"
endcoord = "x.20 y.20"

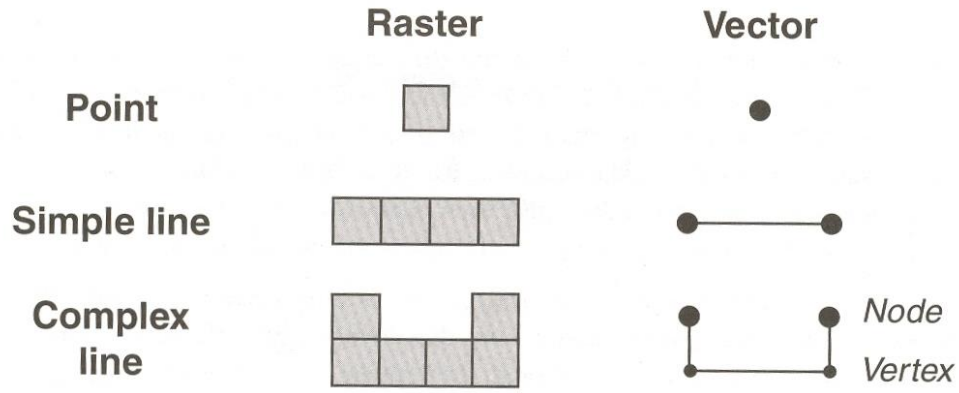
Vector graphics (also called geometric modeling or object-oriented graphics) is the use of geometrical primitives such as points, lines, curves, and polygons, which are all based upon mathematical equations to represent images in computer graphics.

Raster image

- Representing image in dot form known as pixel or bit
- Arrange in simple matrix
- For monochrome monitor, needs a matrix dimension.
- The depth needed to view color image such as 4, 8, 16, 24 bit
- A raster graphics image or bitmap, is a data structure representing a generally rectangular grid of pixels, or points of color, viewable via a monitor, paper, or other display medium.

- Raster graphics are technically characterized by the width and height of the image in pixels and by the number of bits per pixel (a color depth, which determines the number of colors it can represent).

iv. Draw raster and vector data structure for following objects (06 marks)
((01+01)*03 =06)



(Total Marks 20)

Q3.

i. Name two multimedia products (02 marks)
(1*2=02)
Any two from below and have to explain selected two product in question II also

- **Briefing Products**
  Small, straightforward, linear products used to present information quickly and concisely.
  Characteristic of briefing product:
  a. Short Development Cycle
  b. Limited Number of Presentations
  c. Usage of text to present information with limited use of graphic, audio and video.
  d. Have few navigational controls. (mouse click and button press to move from one page to another)
  e. Content and the format are suitable for the audience and fulfill the purpose of the presentation.

- **Reference Products**
  Often used for answering specific questions or for general browsing of information. (stored on CD/ DVD ROM)
  Characteristic of reference product:
  a. Used by wide range of user (small – adult)
  b. Have navigational menu, book marking, searching, printing utility
- **Database Products**

Similar to reference product in a sense that large amount of information are made available to the end user.

Focus on storing and accessing the actual data (multimedia data such as text, graphic, audio, animation and video)

- **Education and Training Products**

  Similar to textbook or training manuals but have added media such as audio, animation and video.

  Make up a significant share of the multimedia market ranging from pre-kindergarten to postgraduate offerings from technical to corporate training products.

- **Kiosk**

  A product which is usually stationed at public places and allow the user to find information interactively and also other types of transaction.

  Characteristics of Kiosk Products:-

  a. Limited target users and usage.
  b. User friendly and easily used by user.
  c. Fast response.

- **Entertainment and Games**

  Most popular

  Shipped in the form of Interactive CD / DVD ROM.

  Characteristics of E & G Products:-

  a. Immersive.
  b. Requires constant feedback and interaction with the user.
  c. Challenging and sometimes intriguing for user

  Enabled online play for more than one user experience

ii. Briefly explain the above mention two products (04 marks)

(02 + 02 = 04)

Any two from question I

iii. What are the four main typeface categories? (04 marks)

(01*4 =04)

- Serif
- Sans Serif
- Script
- Decorative/Ornamental

iv. Write four general rules you have to follow when you insert text in to multimedia project.

(01*4 = 04) (04 marks)

✓ Avoid using more than **3** fonts on one page.

✓ Avoid using **2** fonts **from the same family close together.**

✓ Make sure you use consistent type sizes for longer publications (brochures, newsletters, etc.)

✓ Try to **manipulate fonts (stretch, space letters apart, etc.) or add styles to create visual interest instead of adding different fonts to a page**

v. Briefly explain about three typeface spacing types (06 marks)
(02*3 =06)

Leading

- The vertical spacing between lines of text.
- Pronounced "led-ding."
- In most software programs, it is referred to as line spacing.
- In Desktop Publishing, it is still referred to as leading because typesetters used long pieces of lead between the moveable type to create blank lines between the text.

Kerning

- **Kerning** is the process of adjusting the spacing between characters in a proportional font, usually to achieve a visually pleasing result.
- Horizontal spacing between pairs of letters
- Used to add or subtract space between pairs of letters to create a more visually appealing and readable text.
- BOOK – before kerning.

Tracking

- Adjusting the overall spacing of a group of letters is called *tracking* or *letter spacing*. (Kerning adjusts the space between individual letter forms)
- Horizontal spacing between all of characters in a large block of text.
- Makes a block of text seem more open or more dense.
- Examples

(Total Marks 20)

Q4.

i. What is an image file format? (02 marks)

Image file formats are standard way of organizing and storing of image files.
Image files are composed of either pixels or vector (geometric) data.
The pixels that compose an image are ordered as a grid (columns and rows)
Each pixel consists of numbers representing magnitudes of brightness and color.

ii. Briefly explain "lossless" and " lossy" compression (04 marks)
(02+02=04)
Lossless

- Algorithms reduce file size without losing image quality, though they are not compressed into as small a file as a lossy compression file.
- When image quality is valued above file size, lossless algorithms are typically chosen.

- because it lets you recreate the original file exactly.
- All lossless compression is based on the idea of breaking a file into a "smaller" form for transmission or storage and then putting it back together on the other end so it can be used again.

Lossy

- This algorithms take advantage of the inherent limitations of the human eye and discard invisible information.
- Most lossy compression algorithms allow for variable quality levels (compression) and as these levels are increased,
- File size is reduced.
- At the highest compression levels, image deterioration becomes noticeable as "compression artifacting".
- **Lossy compression** works very differently.

iii. Expand the following abbreviations (04 marks)

(01*4=04)

a. GIF → Graphics Interchange format
b. EPS → encapsulated postscript
c. PNG → Portable network graphics
d. JPEG → Joints photographic experts group

iv. Write four advantages of file archiving (04 marks)

(01*4 =04)

- take less time to transmit by modem than do uncompressed files.
- East to uploading and downloading online files.
- Self-extracting archives are useful for delivering projects on disks in compressed form.
- Some compression applications allow you to compress, split and store large files on several floppy disks or Zip disks; the segments of these files are then automatically rejoined during installation.
- Provide an encryption or security feature, so that people who have access to disks containing private archive files cannot read them without authorization. This helps hide classified data.

v. What is color theory in multimedia system? Briefly explain about “Hue” in color wheel (06 marks)

(03+03=06)

Color Theory is a set of principles used to create harmonious color combinations. Color relationships can be visually represented with a color wheel

Hue

- Hues denote qualities that can be differentiated by color words such as red, yellow, green, blue or purple

- The three primary hues in light are red, green, and blue. Thus, that is why televisions, computer monitors, and other full-range, electronic color visual displays

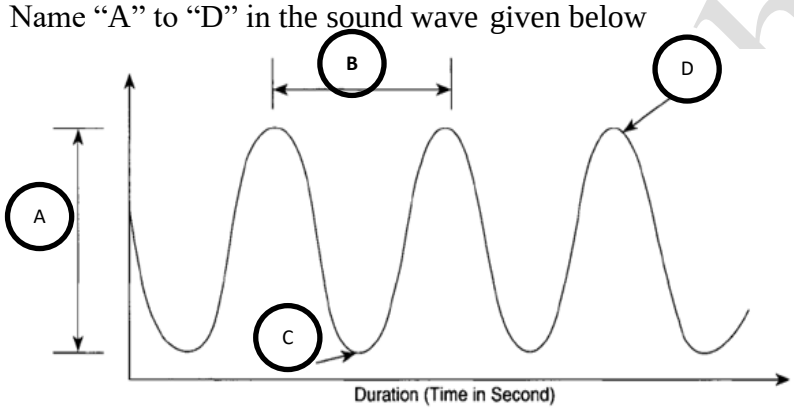
(Total Marks 20)

Q5.

i. What it meant by "Audio" ? (02 marks)

- Audio is a key component of the communication.
- Presence of sound greatly enhances the effect of mostly graphics presentation.
  - Especially in a video or with animation
- Sound is the brain's interpretation of electrical impulses being sent by inner ear through the nervous system

ii. Name "A" to "D" in the sound wave given below (04 marks)



(01*4 = 04)

A. Amplitude
B. period
C. trough
D. crest

iii. What it meant MIDI audio and write two main requirement for making a MIDI audio file (04 marks)

(02 +02 =04)

MIDI is a shorthand representation of music stored in numeric form. MIDI data is device dependent.Small in size, easy to embedded in web pages.Length of a MIDI file can be changed without affecting the frequency of the music.Working with MIDI requires knowledge of music theory.

Creating a MIDI score requires:

- Knowledge of music and some talent
- Ability to play a musical instrument
- Sequencer software (Smart Score)

- Sound synthesizer
- Built into PC board
- Add-on for MAC

iv. The 5 minute and 10 second stereo song has to be recorded in CD quality (Sampling frequency = 44100Hz (44.1 KHz) and sampling depth: 16 bit) how much disk space taken by song.
[hint : file size (bits) = sampling frequency (Hz) x sampling depth (bits) x length of sound(s) x channels] (04 marks)
File size = 44100*2*310*2 = 54,684,000bytes per second

v. Briefly explain three(03) animation principals (06 marks)
(02*03 =06)
Any three

- The "**squash and stretch**" principle define the method to give a sense of weight and flexibility to drawn objects. The most important aspect of this principle is the fact that an object's volume *does not* change when squashed or stretched.
- **Anticipation** is used to prepare the audience for an action, and to make the action appear more realistic. A dancer jumping off the floor has to bend his knees first;a golfer making a swing has to swing the ball back first
- **Straight ahead action and pose to pose** are two different approaches to the actual drawing process. "Straight ahead action" means drawing out a scene frame by frame from beginning to end. "pose to pose" involves starting with drawing a few, key frames, and then filling in the intervals
- **Follow through** is the termination part of an action.An example is in throwing a ball - the hand continues to move after the ball is released. In the movement of a complex object different parts of the object move at different times and different rates.
- **Overlapping** means to start a second action before the first action has completely finished. This keeps the interest of the viewer, since there is no dead time between actions.
- **Slow in & out**refers to the spacing of the frames in between positions. Rather than having a uniform velocity for an object, it is more appealing, and sometimes more realistic, to have the velocity vary at the extremes. Ex:- a bouncing ball moves faster as it approaches or leaves the ground and slower as it approaches leaves
- **Arcs**Most human and animal actions occur along an arched trajectory, and animation should reproduce these movements for greater realism. This can apply to a limb moving by rotating a joint, or a thrown object moving along a parabolic trajectory.
- Adding **secondary actions** to the main action gives a scene more life, and can help to support the main action. The important thing about secondary actions is that they emphasize, rather than take attention away from the main actionA person walking can simultaneously swing his arms or keep them in his pockets,
- **Exaggeration**is a representation of something in an excessive manner.Exaggeration does not mean just distorting the actions , but the animator must carefully choose which properties to exaggerate.

- **Appeal** in a cartoon character corresponds to what would be called charisma in an actor.The important thing is that the viewer feels the character is real and interesting.A scene or character should not be too simple (boring) or too complex

(Total Marks 20)

Q6.

i. What is computer graphics ? (02 marks)

Computer Graphics is the technology for presenting information.
Or
Computer Graphic: Any image that produced by graphic computer application from simple image to complex (fractal), refers to any computer device or program that makes a computer capable of displaying and manipulating pictures.

ii. Name four multimedia authoring tools (04 marks)
(01*04= 04 marks)

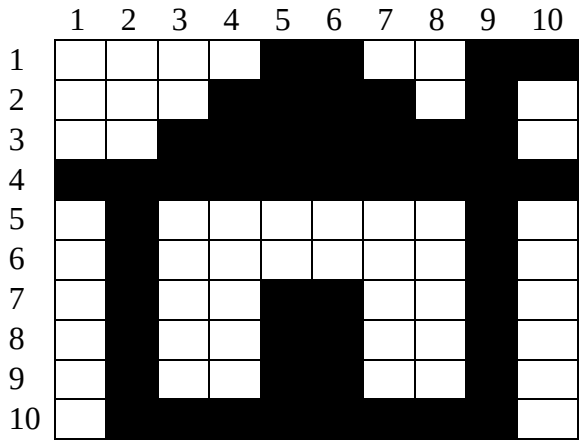
- Macromedia Flash
- Macromedia Director
- Lingo
- Authorware

iii. What are the different between " animation" and "video" (04 marks)
(02+02 =04)
Animation
Computer animation generally refers to any time sequence of visual changes in a scene.
Or
'Animating' is moving something which can't move itself.

Video

- Video is the technology of electronically capturing, recording, processing, storing, transmitting, and reconstructing a sequence of still images representing scenes in motion.
- A movie or other piece of material recorded on videotape

iv. Encode the following image using run length method using "0" for white and "1" for black
(10 marks)



(01*10=10)

Row 1: “0”, 4, 2, 2, 2

Row 2: “0”, 3, 4, 1, 1, 1

Row 3: “0”, 2, 7, 1

Row 4: “0”, 0, 10

Row 5: “0”, 1, 1, 6, 1, 1

Row 6: “0”, 1, 1, 6, 1, 1

Row 7: “0”, 1, 1, 2, 2, 2, 1, 1

Row 8: “0”, 1, 1, 2, 2, 2, 1, 1

Row 9: “0”, 1, 1, 2, 2, 2, 1, 1

Row 10: “0”, 1, 8, 1

(Total Marks 20)