

THE OPEN UNIVERSITY OF SRI LANKA

Faculty of Engineering Technology

Department of Electrical and Computer Engineering

Diploma in Information Systems & Technology

ECI3168 - Graphics and Interactive Multimedia Design

Final Examination – 2015/2016

(CLOSED BOOK)

Time Allowed: 2 hours



DATE : 1st December 2016

TIME : 09.30 a.m – 11.30 a.m

Answer ALL

Question 1 (25 marks)

1. Define the term “Digital Multimedia”. (5 marks)
2. Explain the difference between **Continuous** and **Discrete** media types by giving an example for each of the types. (5 marks)
3. An implementation of a set of multimedia kiosks has been proposed to exchange information between the farmers in rural areas and the agriculture department in Sri Lanka. Evaluate this proposal by Identifying its benefits and possible barriers. (5 marks)
4. Classify the following media items based on their time/space nature (**Continuous** and **Discrete**) and the origin (**Captured** and **Synthesized**). (10 marks)
 - a. A photograph of a billboard which contains text
 - b. A non-animated 3D model in an interactive multimedia application
 - c. A non-sample-based MIDI audio loop
 - d. A 3D model obtained using a 3D scanner
 - e. An audio recorded using a direct line-in cable from an electric guitar

Question 2 (25 marks)

1. Compare and contrast between the vector and raster graphics. (5 marks)
2. Explain the purpose of using image dithering. (5 marks)
3. Suggest particular file formats for the following scenarios: (5 marks)
 - a. An image captured using a camera, which may be post-processed by a professional photographer.
 - b. An image captured for storing in a digital photo album
 - c. A monochrome line art to be overlaid on the background image of a web page
 - d. An image which contains tiny text which is to be OCR.

- e. A Sequence of high quality images with full-range of transparency support, rendered using 3D animation software for the purpose of creating an animation.
4. A multimedia project requires a raster graphic with the following specification: (10 marks)
- **Size:** 1024x780; **Colors:** bi-tonal; **Transparency:** none; **Compression:** none.
File-header-size: 200 **ASCII** characters.

Calculate the size of the graphic file including both the image and header content, in kilobytes.

Question 3 (25 marks)

1. Briefly explain the phenomenon “**phi**”, in human visual perception. (5 marks)
2. Explain how cell-based animation technique can reduce the production time of generic animation projects. (5 marks)
3. List what image processing technique and the animation special effect are used to create the image morphing effect. (5 marks)
4. A 3D animation contains a scene of a Sumo player attacking another Sumo player on his face. The storyboard of the animation has mentioned the following facts about the scene.
 - a. The attack should be heavy and as critical as the other player falls down and hit on the floor.
 - b. The audience should be prepared for this extreme scene before the attack.
 - c. Make the audience thoroughly focuses to the two Sumo players while attacking.
 - d. Audience should feel the extreme mass and the softness of the body of the Sumo player when he hits on the floor.
 - e. Emphasize the expressions of the Sumo player when he gets attacked on his face.

Briefly explain how you achieve each of the above tasks using the principals of animation. (10 marks)

Question 4 (25 marks)

1. Give an example application for each of the following 3D rendering effects. (5 marks)
 - a. Lens Flare
 - b. Depth of Field
 - c. Subsurface scattering
 - d. Caustic effect
 - e. Volumetric sampling
2. Explain the different usage of ray-tracing and GPU-based polygonal rendering. (5 marks)
3. What is the task of a synchronization device in multimedia presentations? (5 marks)
4. Calculate the size of the video file having the following specification. Assume that the file is not compressed. (10 marks)
 - a. A **3D** video having VGA Resolution, 30 FPS, 24-bit Color resolution and 10 minutes of duration.
 - b. The video contains a stereo audio track with 16-bit per-channel resolution and 44.1 kHz of sample rate.