

Higher National Diploma in Information Technology

Second Year, Second Semester Examination-2016

HNDIT2414: Computer Graphics and Animation

Instructions for Candidates:

No. of. Questions : 06

Answer five (05) questions only

No. of. Pages : 03

(Graph sheets will be provided)

Time : Three hours

Question 01

1. Briefly explain the functions and uses of Data Gloves. (2 marks)
2. Write a short description to explain the following terms:
 - a) Persistence
 - b) Aspect Ratio
 - c) Resolution (3 marks)
3. Describe the Flat Panel Display and briefly explain the two types of Flat Panel Displays with examples. (4 marks)
4. Explain the two basic techniques used in Color Cathode-Ray Tube (CRT) Monitors to produce color displays. (5 marks)
5. Draw and explain the architectures of Raster Scan System and Random Scan System in detail. (6 marks)

(Total 20 marks)

Question 02

1. Define the terms 'Computer Graphics' and 'Computer Animation'. (2 marks)
2. Briefly explain how computer graphics used in the following applications.
 - a) Simulation
 - b) Films/Video creations (3 marks)
3. Briefly explain the differences between Resolution and Quantization and explain the effect, if you reduce the resolution and quantization. (4 marks)
4. Explain the differences between the Grayscale Images and Color Images. (5 marks)
5. Explain the CMY Color Model and HSV Color Model in detail. (6 marks)

(Total 20 marks)

Question 03

1. Briefly explain the differences between Cel Animation and Path Animation. (2 marks)
2. Briefly explain three important roles of a multimedia programmer. (3 marks)
3. Discuss any four principles of animations with suitable examples. (4 Marks)
4. a) Briefly explain the three different levels of computer animation with examples.
b) Explain the two basic approaches to build a multimedia project. (5 Marks)
5. Explain how to create a simple Shape Tween (30 fps) in Adobe Flash or Macromedia Flash. (6 Marks)

(Total 20 marks)

Question 04

1. Describe how video is generated and stored in computer. (2 marks)
2. Briefly explain why the quality and size of a sound file is affected by the factors Sample rate and Bit rate. (3 marks)
3. Briefly explain the four basic properties which affect the quality of video. (4 marks)
4. Calculate the file size of a true color two minute uncompressed video clip with the resolution of 800 x 600 pixels and frame rate of 30 frames per second. (5 marks)
5. a) Discuss the importance of compression in multimedia and explain the main three strategies used for compressing video.
b) Explain the advantages of Digital video compared to Analog video. (6 marks)

(Total 20 marks)

Question 05

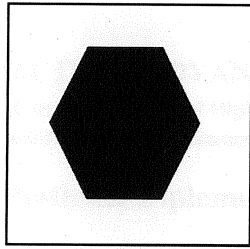
1. What is an output primitive? Give two examples for output primitives. (2 marks)
2. Briefly explain the Scan-Line Polygon Fill algorithm. (3 marks)
3. What are homogeneous co-ordinates and what are its merits and demerits as related to computer graphics? (4 marks)
4. Compare Cohen-Sutherland line clipping algorithm and Liang- Barsky line clipping algorithm. (5 marks)
5. Consider a line with the end points (20, 10) to (30, 18).
By using the Bresenham's line drawing algorithm, tabulate the successive pixel position and draw the resulting graph. (6 marks)

(Total 20 marks)

Question 06

1. Define what Projection is and briefly explain the two types of Projections. (2 marks)
2. Briefly explain the 3D rotation matrices for around x, y, z axes. (3 marks)
3. Rotate a triangle A(0,0) , B(2,2) , C(4,2) about the origin and about P(-2,-2) by an angle of 45° . (4 marks)
4. Complete the following C/C++ program code to draw the given display in OpenGL at the center of the screen for MS Windows.

Display:



Code:

```
#include <windows.h>
#include <GL/glut.h>
void initGL() {
    glClearColor(1.0f, 1.0f, 1.0f, 1.0f);
}
```

```
void display() {
```

```
..... ← Missing Code
.....
.....
}
```

```
int main(int argc, char** argv) {
    glutInit(&argc, argv);
    glutCreateWindow("CGA_TEST");
    glutInitWindowSize(320, 320);
    glutInitWindowPosition(50, 50);
    glutDisplayFunc(display);
    initGL();
    glutMainLoop();
    return 0;
}
```

(5 marks)

5. Explain the Line Drawing Algorithms using Digital Differential Analyzer (DDA) Algorithm in detail. (6 marks)

(Total 20 marks)