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ICS2311

COMPUTER GRAPHICS CAT

1. What is computer graphics?

Computer graphics is a branch of computer science that deals with drawing images using computers.

What are the application areas of computer graphics?

* Computer games
* Visualization computer simulations
* Preparation of publications
* Special effects in movies

1. Computer graphics primitives

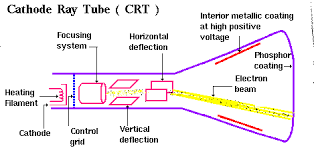
Lines

Polygons

Rectangles

Curves

1. The working mechanism of a color CRT monitor



A CRT monitor contains multiple electron guns which are located at the end of the neck (the narrow end) of the monitor. These guns produce millions of tiny red, green and blue phosphor electrons that glow when they are struck by an electron beam that travels across the screen to create a visible image.

The electrons (which are the negative charges), come from an oxide coated element called the cathode, which is the negative terminal. The cathode is heated to produce the required stream of electrons which are then attracted to the positively charged screen.

On the screen of the CRT, the image is created by causing the phosphor coating on the inside of the CRT to glow with different intensities when bombarded by a stream of electrons creating visible images on the screen.

1. The general structure of an OpenGL program

#include <GL/gl.h>

#include <GL/glut.h>

#include <GL/glu.h>

#include <iostream>

#include<whateveryouneed.h>

using namespace std;

void setup()

{

/\* Here we have the Vertex variables , Vertices coordinates, binding , textures, buffering\*/

}

void display()

{

/\*glClear(---)

/\*These are only statements and no arguments are passed here\*/

/\*glFlush(---)

}

int main(int argc, char \*argv[])

{

glutInit(&argc, argv); //Intilaising the GLUT library

glutInitDisplayMode(GLUT\_RGB | GLUT\_DEPTH | GLUT\_DOUBLE); //decscrbing the type of the window you want

glutInitWindowSize(300, 300); // Initializing the size of the window

glutCreateWindow(" Hello Theredisplay"); // creating a window that matches the display mode you requested in the function

glutInitContextVersion(4, 3);

glutInitContextProfile(GLUT\_CORE\_PROFILE);

setup();

glutDisplayFunc(display);

/\*sets up the display callback, which is the routine GLUT will call when it thinks the contents of the window need to be updated\*/

glutMainLoop();

/\* This is an infinite loop that works with the window and operating systems to process user input

and other operations\*/

}

1. The use of various OpenGL libraries
2. GL

It is a graphics library used for 2-D and 3-D drawing primitives and operations.

1. GLUT

GLUT Library for writing OpenGL programs and mostly dealing with the user interface. It implements a simple windowing application programming interface (API) for OpenGL and makes it considerably easier to learn about and explore OpenGL Programming.

1. GLU

GLU is a Library which contains a set of functions to create texture mipmaps from a base image, map coordinates between screen and object space, and draw quadric surfaces and NURBS.

1. GLUI

It is window-system independent and it relies on GLUT to handle all system-dependent issues, such as window, keyboard, joystick and mouse management.

1. The working mechanism of a raster scan controller

Raster Scan Controllers are a type of graphics monitor which employ CRT.

In a raster scan controller, electron beams sweep across the screen, from top to bottom covering one row at a time. Stored intensity values are restored from frame buffer and painted on screen taking one row at a time. Each screen point is referred to as pixels.

In a raster scan controller refreshing is done at done at a rate of 60-80 frames per second. Refresh rates are also sometimes described in units of cycles per second / Hertz (Hz). At the end of each scan line, electron beam begins to display next scan line after returning to left side of screen. The return to the left of screen after refresh of each scan line is known as *horizontal retrace* of electron beam. At the end of each frame electron beam returns to top left corner and begins the next frame.

