COMPUTER GRAPHICS

LA – 2

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1.Program

```
#include
<GL/glut.h>  //
GLUT, include glu.h
and gl.h

// Global variable

GLfloat angle =
0.0f;  // Current
rotational angle of
the shapes

/* Initialize OpenGL
Graphics */

void initGL() {

// Set "clearing" or
background color


glClearColor(0.0f,
0.0f, 0.0f, 1.0f); //
Black and opaque


}
```

```
/* Called back
when there is no
other event to be
handled */

void idle() {

glutPostRedisplay();
// Post a re-paint
request to activate
display()

}

/* Handler for
window-repaint
event. Call back
when the window
first appears and
```

*whenever the window needs to be re-painted. */*

void display() {

glClear(GL_COLOR_BUFFER_BIT); // Clear the color buffer

glMatrixMode(GL_MODELVIEW); // To operate on Model-View matrix

glLoadIdentity…

[9:45 am, 09/01/2023] +91 96067 75338: glRotatef(angle, 0.0f, 0.0f, 1.0f); //

rotate by angle in degrees

glBegin(GL_TRIANGLES);

glColor3f(0.0f, 0.0f, 1.0f); // Blue

glVertex2f(-0.3f, -0.2f);

glVertex2f(0.3f, -0.2f);

glVertex2f(0.0f, 0.3f);

glEnd();

```
glPopMatrix();
// Restore the
model-view matrix



glPushMatrix();
// Save model-view
matrix setting

glTranslatef(0.6f, -
0.6f, 0.0f);    //
Translate

glRotatef(180.0f +
angle, 0.0f, 0.0f,
1.0f); // Rotate
180+angle degree

glBegin(GL_TRIANG
LES);
```

glColor3f(1.0f, 0.0f, 0.0f); // Red

glVertex2f(-0.3f, -0.2f);

glColor3f(0.0f, 1.0f, 0.0f); // Green

glVertex2f(0.3f, -0.2f);

glColor3f(0.0f, 0.0f, 1.0f); // Blue

glVertex2f(0.0f, 0.3f);

glEnd();

```
glPopMatrix();
// Restore the
model-view matrix



glPushMatrix();
// Save model-view
matrix setting

glTranslatef(0.5f,
0.4f, 0.0f);     //
Translate

glRotatef(angle,
0.0f, 0.0f, 1.0f); //
rotate by angle in
degrees

glBegin(GL_POLYG
ON);
```

```
glColor3f(1.0f, 1.0f, 0.0f); // Yellow

glVertex2f(-0.1f, -0.2f);

glVertex2f( 0.1f, -0.2f);

glVertex2f( 0.2f, 0.0f);

glVertex2f( 0.1f, 0.2f);

glVertex2f(-0.1f, 0.2f);

glVertex2f(-0.2f, 0.0f);

glEnd();
```

```
glPopMatrix();
// Restore the
model-view matrix



glutSwapBuffers();
// Double buffered -
swap the front and
back buffers



// Change the
rotational angle
after each display()

angle += 0.2f;

}
```

/ Handler for window re-size event. Called back when the window first appears and*

*whenever the window is re-sized with its new width and height */*

void reshape(GLsizei width, GLsizei height) { // GLsizei for non-negative integer

// Compute aspect ratio of the new window

if (height == 0)
height = 1;
// To prevent divide by 0

GLfloat aspect = (GLfloat)width / (GLfloat)height;

// Set the viewport to cover the new window

glViewport(0, 0, width, height);

```
// Set the aspect ratio of the clipping area to match the viewport

glMatrixMode(GL_PROJECTION);  // To operate on the Projection matrix

glLoadIdentity();

if (width >= height) {

// aspect >= 1, set the height from -1 to 1, with larger width

gluOrtho2D(-1.0 * aspect, 1.0 * aspect, -1.0, 1.0);
```

```
} else {

// aspect < 1, set
the width to -1 to 1,
with larger height

gluOrtho2D(-1.0,
1.0, -1.0 / aspect,
1.0 / aspect);

}

}



/* Main function:
GLUT runs as a
console application
starting at main()
*/
```

```
int main(int argc,
char** argv) {

glutInit(&argc,
argv);          //
Initialize GLUT

glutInitDisplayMod
e(GLUT_DOUBLE);
// Enable double
buffered mode

glutInitWindowSize(
640, 480);   // Set
the window's initial
width & height -
non-square

glutInitWindowPosi
tion(50, 50); //
Position the
```

window's initial top-left corner

glutCreateWindow("Animation via Idle Function"); // Create window with the given title

glutDisplayFunc(display); // Register callback handler for window re-paint event

glutReshapeFunc(reshape); // Register callback handler for window re-size event

glutIdleFunc(idle); // Register callback

handler if no other event

initGL();
// Our own OpenGL initialization

glutMainLoop();
// Enter the infinite event-processing loop

return 0;

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STEPS TO DOWNLOAD AND EX

EXECUTE THE ABOVE PROGRAM

Since GLUT depends on OpenGL and a number of other libraries, installing GL

UT will trigger the dependencies needed to install everything else. For distributions deri

ved from Debian such as Ubuntu, the installation command is

apt-get install freeglut

3-dev

To compile and link your program on Ubuntu 14 based distros you

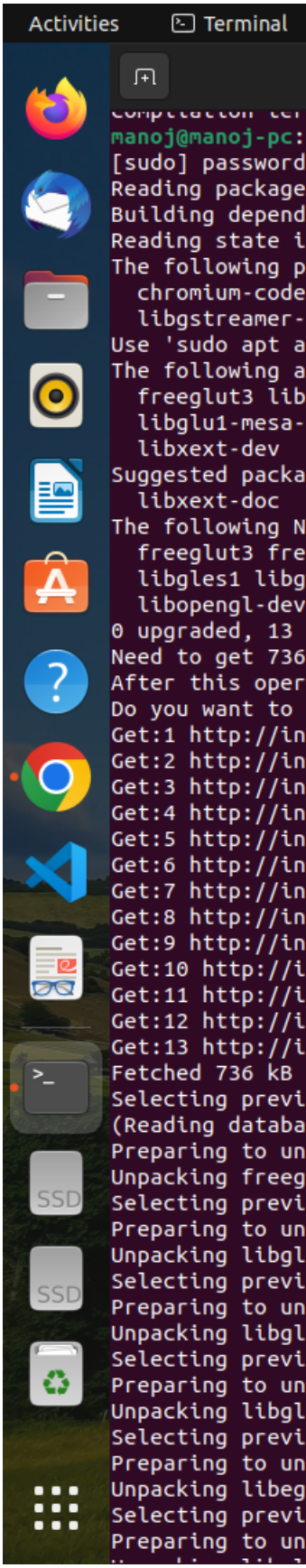
need to explicitly grab every library

gcc -o line line.c -lglut -lGLU -

lGL –lm

To Execute the program

./line


Activities
Terminal
manoj@manoj-pc:
[sudo] password
Reading package
Building depend
Reading state i
The following p
chromium-code
libgstreamer-
Use 'sudo apt a
The following a
freeglut3 lib
libglu1-mesa-
libxext-dev
Suggested packa
libxext-doc
The following N
freeglut3 fre
libgles1 libg
libopengl-dev
0 upgraded, 13
Need to get 736
After this oper
Do you want to
Get:1 http://in
Get:2 http://in
Get:3 http://in
Get:4 http://in
Get:5 http://in
Get:6 http://in
Get:7 http://in
Get:8 http://in
Get:9 http://in
Get:10 http://i
Get:11 http://i
Get:12 http://i
Get:13 http://i
Fetched 736 kB
Selecting previ
(Reading databa
Preparing to un
Unpacking freeg
Selecting previ
Preparing to un
Unpacking libgl
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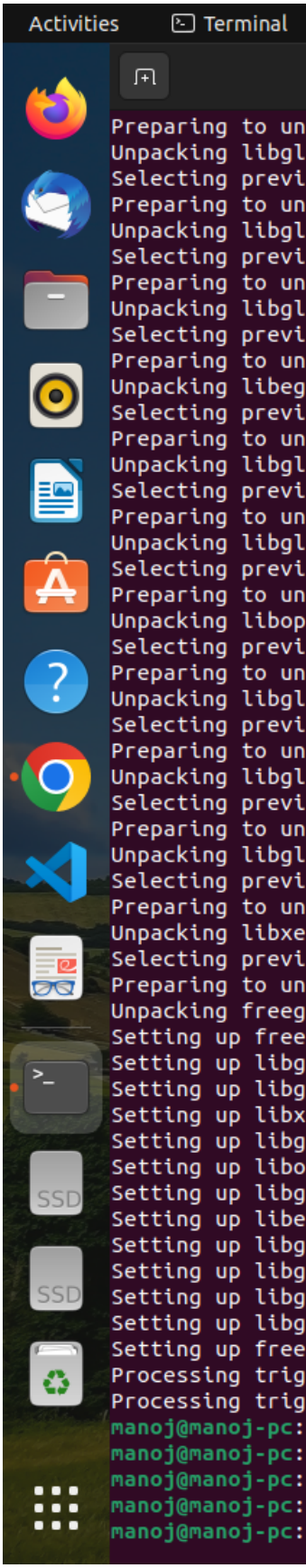
SSD
SSD


Activities
Terminal
Preparing to un
Unpacking libgl
Selecting previ
Preparing to un
Unpacking libgl
Selecting previ
Preparing to un
Unpacking libgl
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Selecting previ
Preparing to un
Unpacking libxe
Selecting previ
Preparing to un
Unpacking freeg
Setting up free
Setting up libg
Setting up libg
Setting up libx
Setting up libg
Setting up libo
Setting up libg
Setting up libe
Setting up libg
Setting up libg
Setting up libg
Setting up libg
Setting up free
Processing trig
Processing trig
manoj@manoj-pc:
manoj@manoj-pc:
manoj@manoj-pc:
manoj@manoj-pc:
manoj@manoj-pc:
SSD
SSD

THANK YOU