CSE423: Computer Graphics
Lab Assignment 1

Important Instructions for the Assignment:

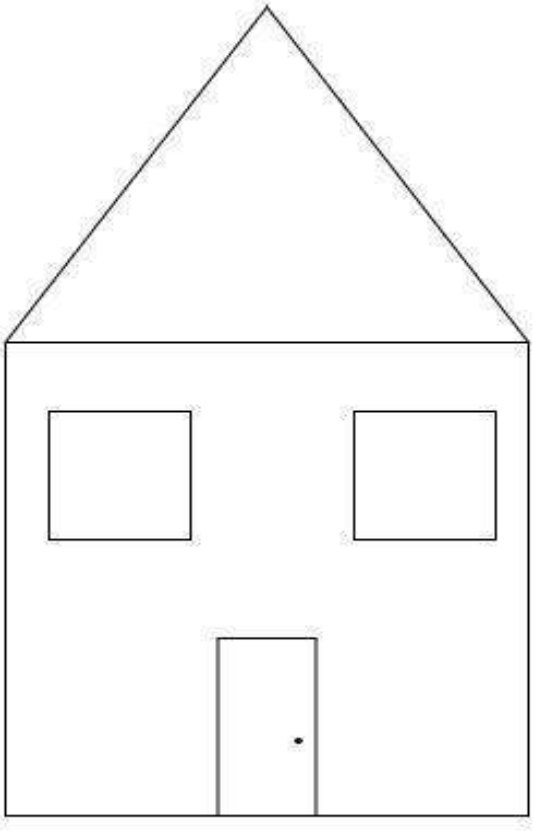
- Before starting this assignment, please ensure that you have installed the mentioned **OpenGL libraries** in your System.
- The skeleton code is provided for completing the tasks or you can design your own.
- For submission, paste your source code along with the screenshots of the output in a single doc file and submit it in the classroom.
- You have to submit it in the classroom. Please follow the submission instructions carefully. Failure to follow will be subject to 20% to 50% marks penalty.
- The deadline for submission is to be strictly maintained. **Late submission will not be accepted.**
- **You must attend the lab viva for each assignment otherwise you won't get any lab marks for that assignment.**
- **Any form of plagiarism will automatically cancel your assignment.** Please refrain from such activities.

Task 1: Drawing Pixels

You are supposed to draw **50 pixels** (coordinate points). For this, you need to generate **100 random** values (50 x - coordinates and 50 y - coordinates). You do not need to join any pixels for this task.

Task 2: House Building

You have to draw a **House** using the base primitives: points, lines, or triangles. You can use **ONLY** ***GL_POINTS***, ***GL_LINES*** or ***GL_TRIANGLES*** for designing this house. A diagram has been provided as an example. **You can modify the house design to your liking.**



Task 3: Student ID

Show your **Student ID** where each digit should be of **different colors.**

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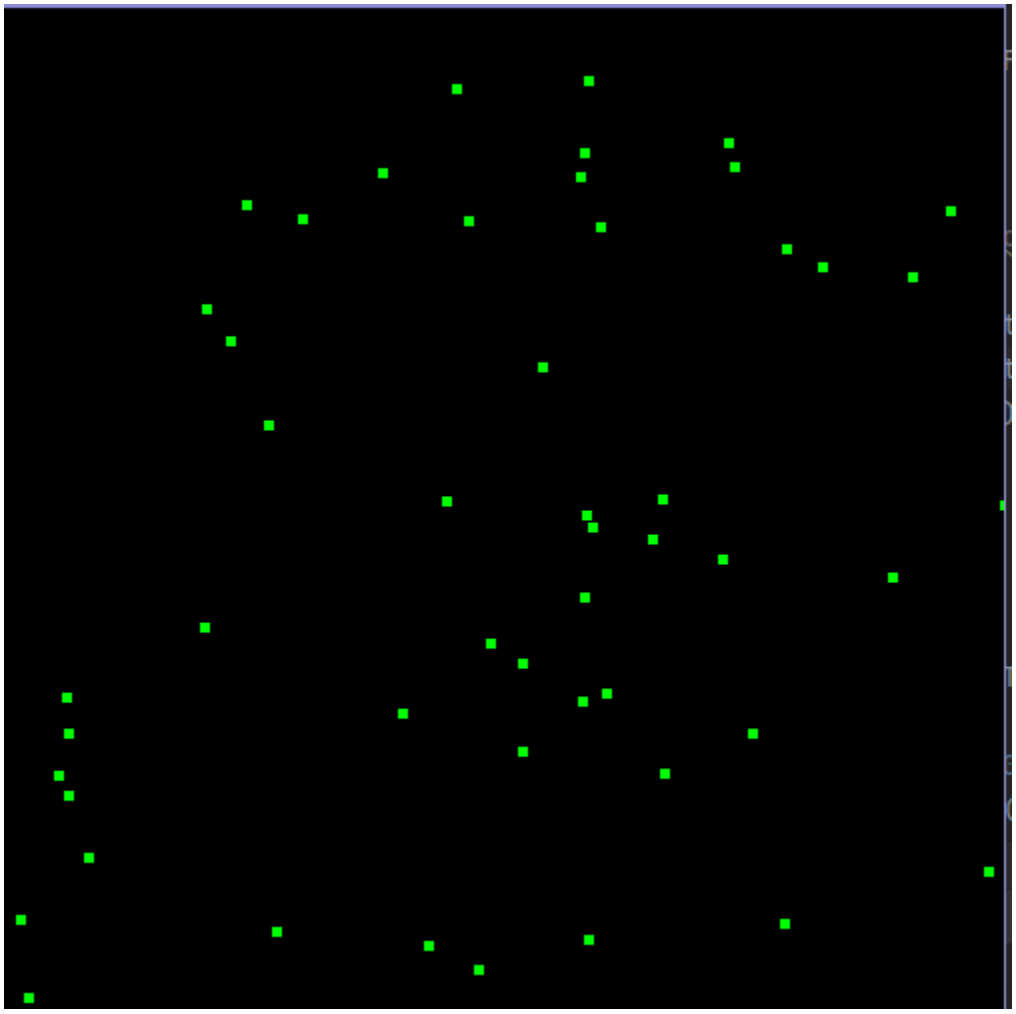
Task01:

```
import random

from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.GLU import *


def draw_points():
  glPointSize(5) #pixel size. by default 1 thake
  glBegin(GL_POINTS)
  for i in range(50):
      x=random.randint(0,500)
      y=random.randint(0,500)
      print(x,y)
      glVertex2f(x,y) #jekhane show korbe pixel
  glEnd()


def iterate():
  glViewport(0, 0, 500, 500)
  glMatrixMode(GL_PROJECTION)
  glLoadIdentity()
  glOrtho(0.0, 500, 0.0, 500, 0.0, 1.0)
  glMatrixMode (GL_MODELVIEW)
  glLoadIdentity()

def showScreen():
  glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT)
  glLoadIdentity()
  iterate()
  glColor3f(0.0, 1.0, 0.0) #konokichur color set (RGB)
```

```
  #call the draw methods here
  draw_points()
  glutSwapBuffers()



glutInit()
glutInitDisplayMode(GLUT_RGBA)
glutInitWindowSize(500, 500) #window size
glutInitWindowPosition(0, 0)
wind = glutCreateWindow(b"OpenGL Coding Practice") #window name
glutDisplayFunc(showScreen)

glutMainLoop()
```

Output:



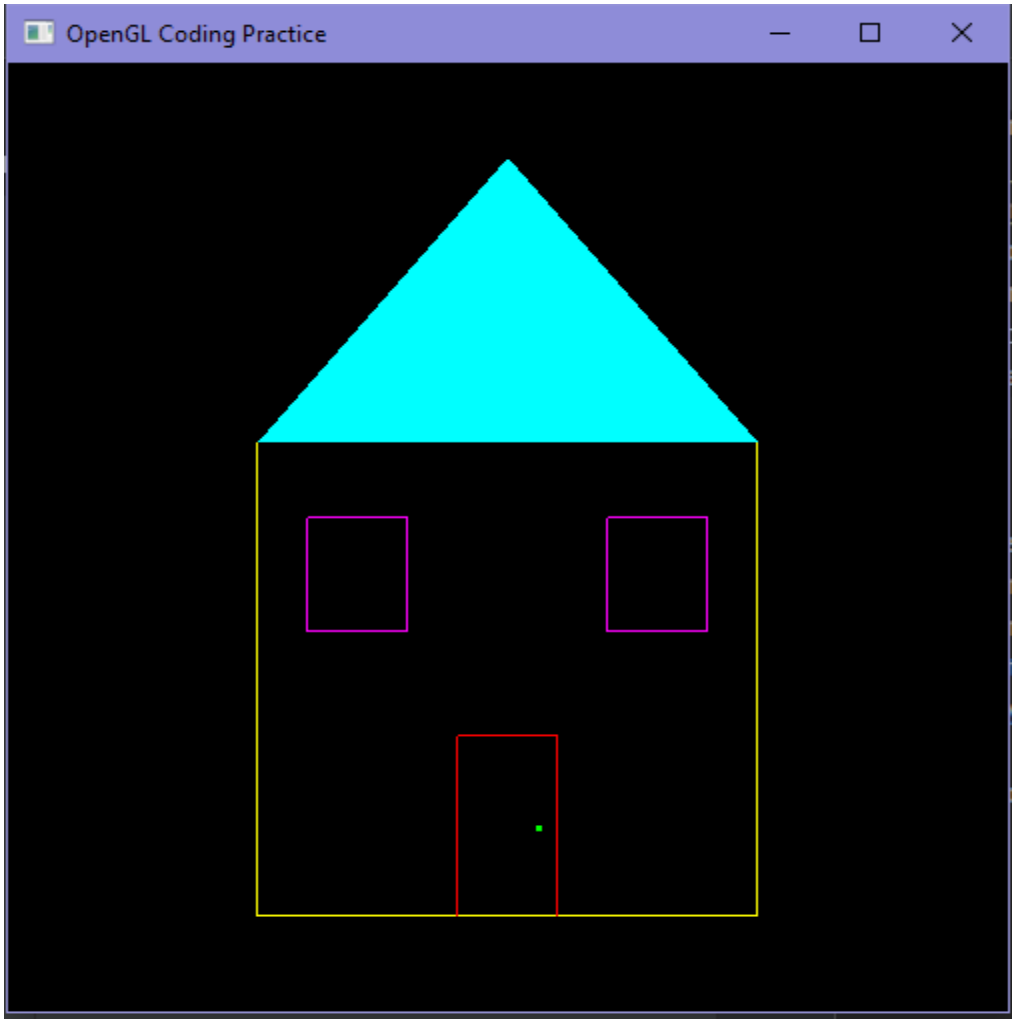
Task:02

```
from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.GLU import *


def draw_points(x, y):
  glPointSize(3) #pixel size. by default 1 thake
  glBegin(GL_POINTS)
  glVertex2f(x,y) #jekhane show korbe pixel
  glEnd()

def draw_triangle():
  glColor3f(0.0, 1.0, 1.0)  #do not know the name of the color!!
  glBegin(GL_TRIANGLES)
  glVertex2f(125,300)
  glVertex2f(375,300)
  glVertex2f(250,450)
  glEnd()

def draw_Lines():
  glBegin(GL_LINES)

#House's square shape's code & did not create the roof because the triangle is already the
roof!!!
  glColor3f(1.0, 1.0, 0.0)  #Yellow
  glVertex2f(125,300)
  glVertex2f(125,50)
  glVertex2f(375,300)
  glVertex2f(375,50)
  glVertex2f(125,50)
  glVertex2f(375,50)

#Door's code
  glColor3f(1.0, 0.0, 0.0)   #Red
  glVertex(225,145)
  glVertex2f(225,50)
  glVertex(275,145)
  glVertex2f(275,50)
  glVertex(225,145)
  glVertex2f(275,145)
```

```
#Left window's code
   glColor3f(1.0, 0.0, 1.0)  #Purple
   glVertex(150,260)
   glVertex2f(150,200)
   glVertex2f(200,260)
   glVertex2f(200,200)
   glVertex2f(150,260)
   glVertex2f(200,260)
   glVertex2f(150,200)
   glVertex2f(200,200)

#Right window's code
   glVertex(300,260)
   glVertex2f(300,200)
   glVertex2f(350,260)
   glVertex2f(350,200)
   glVertex2f(300,260)
   glVertex2f(350,260)
   glVertex2f(300,200)
   glVertex2f(350,200)
   glEnd()
def iterate():
   glViewport(0, 0, 500, 500)
   glMatrixMode(GL_PROJECTION)
   glLoadIdentity()
   glOrtho(0.0, 500, 0.0, 500, 0.0, 1.0)
   glMatrixMode (GL_MODELVIEW)
   glLoadIdentity()

def showScreen():
   glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT)
   glLoadIdentity()
   iterate()
   glColor3f(0.0, 1.0, 0.0) #konokichur color set (RGB)  ## I set every object's individual color
without
   ## the point.  So, the point's color is set from here as Green.....
   #glPointSize(40)
   draw_points(265, 96)   #Door's lock's code as a point!!
   draw_triangle()
   draw_Lines()
   glutSwapBuffers()


glutInit()
```

```
glutInitDisplayMode(GLUT_RGBA)
glutInitWindowSize(500, 500) #window size
glutInitWindowPosition(0, 0)
wind = glutCreateWindow(b"OpenGL Coding Practice") #window name
glutDisplayFunc(showScreen)

glutMainLoop()
```

Output:



Task03:

```
from OpenGL.GL import *
from OpenGL.GLUT import *
from OpenGL.GLU import *

def draw_zero(x1, y1,x2,y2):
  #glColor3f(0.0, 1.0, 0.0)
  glPointSize(5) #pixel size. by default 1 thake
  glBegin(GL_LINES)
  glVertex2f(x1,y1) #jekhane show korbe pixel
  glVertex2f(x2,y1)
  glVertex2f(x2,y1)
  glVertex2f(x2,y2)
  glVertex2f(x2,y2)
  glVertex2f(x1,y2)
  glVertex2f(x1,y1)
  glVertex2f(x1,y2)
  glEnd()
def draw_one(x1, y1,x2,y2):
  #glColor3f(1.0, 0.0, 1.0)
  glPointSize(5) #pixel size. by default 1 thake
  glBegin(GL_LINES)
  glVertex2f(x2,y1)
  glVertex2f(x2,y2)
  glEnd()
def draw_two(x1, y1,x2,y2):
  #glColor3f(1.0, 1.0, 0.0)
  glPointSize(5) #pixel size. by default 1 thake
  glBegin(GL_LINES)
  glVertex2f(x1,y1) #jekhane show korbe pixel
  glVertex2f(x2,y1)
  glVertex2f(x2,y1)
  glVertex2f(x2,(y1+y2)/2)
  glVertex2f(x2,y2)
  glVertex2f(x1,y2)
  glVertex2f(x1,(y1+y2)/2)
  glVertex2f(x1,y2)
  glVertex2f(x1,(y1+y2)/2)
  glVertex2f(x2,(y1+y2)/2)
  glEnd()
def draw_three(x1, y1,x2,y2):
```

```
    #glColor3f(1.0, 0.0, 0.0)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glVertex2f(x2,y2)
    glVertex2f(x1,y2)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glEnd()
  def draw_four(x1, y1,x2,y2):
    #glColor3f(1.0, 1.0, 1.0)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glVertex2f(x1,y1)
    glVertex2f(x1,(y1+y2)/2)
    glEnd()
  def draw_five(x1, y1,x2,y2):
    #glColor3f(0.5, 1.0, 0.5)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glVertex2f(x1,y2)
    glVertex2f(x1,y1)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glVertex2f(x2,y2)
    glEnd()
  def draw_six(x1, y1,x2,y2):
    #glColor3f(0.5, 0.0, 0.5)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
```

```
    glVertex2f(x2,y2)
    glVertex2f(x1,y2)
    glVertex2f(x1,y1)
    glVertex2f(x1,y2)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glVertex2f(x2,y2)
    glEnd()

  def draw_seven(x1, y1,x2,y2):
    #glColor3f(1.5, 0.5, 1.0)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glEnd()
  def draw_eight(x1, y1,x2,y2):
    #glColor3f(0.0, 1.0, 1.0)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glVertex2f(x2,y2)
    glVertex2f(x1,y2)
    glVertex2f(x1,y1)
    glVertex2f(x1,y2)
    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glEnd()
  def draw_nine(x1, y1,x2,y2):
    #glColor3f(0.0, 0.0, 1.0)
    glPointSize(5) #pixel size. by default 1 thake
    glBegin(GL_LINES)
    glVertex2f(x1,y1) #jekhane show korbe pixel
    glVertex2f(x2,y1)
    glVertex2f(x2,y1)
    glVertex2f(x2,y2)
    glVertex2f(x2,y2)
    glVertex2f(x1,y2)
```

```
    glVertex2f(x1,y1)
    glVertex2f(x1,(y1+y2)/2)

    glVertex2f(x1,(y1+y2)/2)
    glVertex2f(x2,(y1+y2)/2)
    glEnd()


def iterate():
    glViewport(0, 0, 500, 500)
    glMatrixMode(GL_PROJECTION)
    glLoadIdentity()
    glOrtho(0.0, 500, 0.0, 500, 0.0, 1.0)
    glMatrixMode (GL_MODELVIEW)
    glLoadIdentity()

def showScreen():
    glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT)
    glLoadIdentity()
    iterate()
    #glColor3f(1.0, 1.0, 0.0) #konokichur color set (RGB)
    #call the draw methods here
    glColor3f(0.0, 0.0, 1.0)
    draw_two(50,250,70,200)

    glColor3f(0.0, 1.0, 0.0)
    draw_zero(90,250,110,200)

    glColor3f(1.0, 1.0, 0.5)
    draw_three(130,250,150,200)

    glColor3f(1.0, 1.0, 1.5)
    draw_zero(170,250,190,200)

    glColor3f(1.0, 1.5, 1.5)
    draw_one(210,250,230,200)

    glColor3f(1.0, 1.5, 0.0)
    draw_two(250,250,270,200)

    glColor3f(0.0, 1.5, 1.5)
    draw_three(290,250,310,200)

    glColor3f(1.5, 0.0, 1.0)
```

```
    draw_zero(330,250,350,200)
    glutSwapBuffers()



glutInit()
glutInitDisplayMode(GLUT_RGBA)
glutInitWindowSize(500, 500) #window size
glutInitWindowPosition(0, 0)
wind = glutCreateWindow(b"OpenGL Coding Practice") #window name
glutDisplayFunc(showScreen)

glutMainLoop()
```

Output: