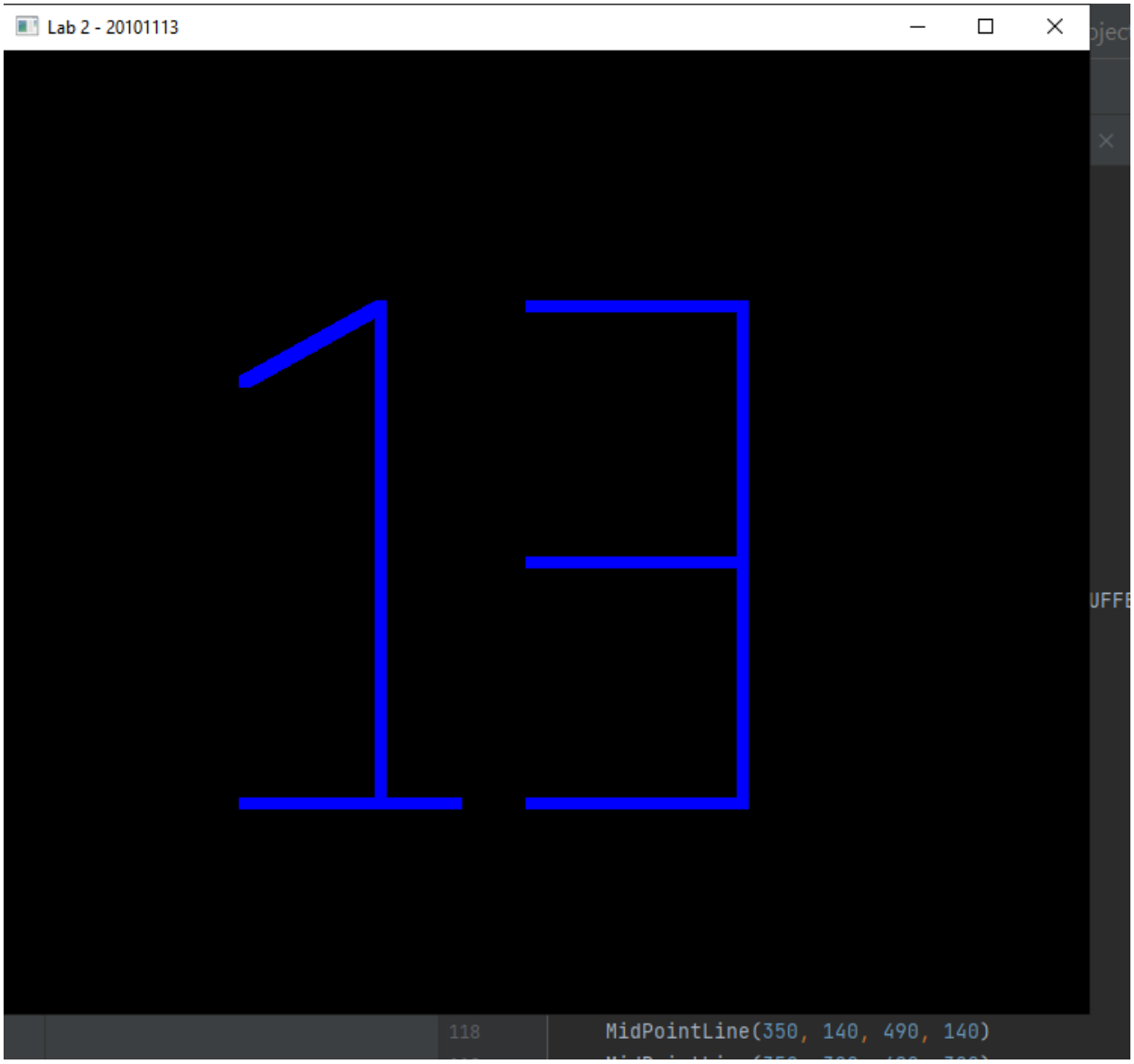
ID : 20101113

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

def draw(x, y):
   glPointSize(8)
   glBegin(GL_POINTS)
   glVertex2f(x, y)
   glEnd()

def FindZone(dx, dy):
   dx1, dy1 = abs(dx), abs(dy)
   if dx >= 0 and dy >= 0 and dy1 <= dx1:
       return 0
   elif dx >= 0 and dy >= 0 and dy1 >= dx1:
       return 1
   elif dx < 0 and dy > 0 and dy1 >= dx1:
       return 2
   elif dx < 0 and dy > 0 and dy1 <= dx1:
       return 3
   elif dx < 0 and dy < 0 and dx1 >= dy1:
       return 4
   elif dx < 0 and dy < 0 and dy1 >= dx1:
       return 5
   elif dx > 0 and dy < 0 and dy1 >= dx1:
       return 6
   elif dx > 0 and dy < 0 and dy1 <= dx1:
       return 7

def ConvertToZone0(x1, y1, x2, y2, zone):
   if zone == 0:
       return x1, y1, x2, y2
   elif zone == 1:
       return y1, x1, y2, x2
   elif zone == 2:
       return y1, -x1, y2, -x2
   elif zone == 3:
       return -x1, y1, -x2, y2
   elif zone == 4:
       return -x1, -y1, -x2, -y2
   elif zone == 5:
       return -y1, -x1, -y2, -x1
   elif zone == 6:
       return -y1, x1, -y2, x2
   elif zone == 7:
       return x1, -y1, x2, -y2
```

```
def OriginalZone(x, y, zone):
   if zone == 0:
       return x, y
   elif zone == 1:
       return y, x
   elif zone == 2:
       return -y, x
   elif zone == 3:
       return -x, y
   elif zone == 4:
       return -x, -y
   elif zone == 5:
       return -y, -x
   elif zone == 6:
       return y, -x
   elif zone == 7:
       return x, -y

def MidPointLine(x1, y1, x2, y2):
   dx = x2 - x1
   dy = y2 - y1
   zone = FindZone(dx, dy)
   x1, y1, x2, y2 = ConvertToZone0(x1, y1, x2, y2, zone)
   nx = []
   ny = []
   d = []
   dx = x2 - x1
   dy = y2 - y1
   d_init = 2 * dy - dx
   d += [d_init]
   NE = 2 * dy - 2 * dx
   E = 2 * dy
   x = x1
   y = y1
   while x <= x2:
       nx += [x]
       ny += [y]
       sx, ex = OriginalZone(x, y, zone)
       draw(sx, ex)
       x = x + 1
       if d_init > 0:
           y = y + 1
           d_init = d_init + NE
       else:
           d_init = d_init + E
           d += [d_init]

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, 0.0, 2.0)

    # Drawing the number 1
    MidPointLine(160, 420, 250, 470)
    MidPointLine(160, 140, 300, 140)
    MidPointLine(250, 140, 250, 470)

    # Drawing the number 3
    MidPointLine(490, 140, 490, 470)
    MidPointLine(350, 470, 490, 470)
    MidPointLine(350, 140, 490, 140)
    MidPointLine(350, 300, 490, 300)
    glutSwapBuffers()

glutInit()
glutInitDisplayMode(GLUT_RGBA)
glutInitWindowSize(720, 640)
glutInitWindowPosition(0, 0)
wind = glutCreateWindow(b"Lab 2 - 20101113")
glutDisplayFunc(showScreen)

glutMainLoop()
```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MidPointLine(350, 140, 490, 140)