

Assignment of: **Zohaib Khan (BSCS-221335)**

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Subject: **Computer Science**

Course: **Computer Graphics**

**BSCS-A 6th Semester ISLAMIA COLLEGE PESHAWER**

# ***Bicycle In pyopengl using python different algorithms implementation***

from **OpenGL**.**GL** import \*

from **OpenGL**.**GLUT** import \*

from **OpenGL**.**GLU** import \*

import **math**

global cycle\_x, pedal\_angle

cycle\_x = -100

pedal\_angle = 0

def **draw\_pixel**(x, y, r, g, b):

**glColor3f**(r, g, b)

**glPointSize**(3)

**glBegin**(GL\_POINTS)

**glVertex2f**(x, y)

**glEnd**()

def **draw\_circle**(xc, yc, r, color):

**glColor3f**(\*color)

**glBegin**(GL\_TRIANGLE\_FAN)

    for angle in **range**(0, 360, 5):

        rad = **math**.**radians**(angle)

        x = xc + r \* **math**.**cos**(rad)

        y = yc + r \* **math**.**sin**(rad)

**glVertex2f**(x, y)

**glEnd**()

def **dda**(x1, y1, x2, y2, color):

**glColor3f**(\*color)

**glBegin**(GL\_LINES)

**glVertex2f**(x1, y1)

**glVertex2f**(x2, y2)

**glEnd**()

def **draw\_background**():

**glColor3f**(0.5, 0.8, 1.0)

**glBegin**(GL\_QUADS)

**glVertex2f**(-120, 0)

**glVertex2f**(120, 0)

**glVertex2f**(120, 100)

**glVertex2f**(-120, 100)

**glEnd**()

**glColor3f**(0.0, 0.6, 0.2)

**glBegin**(GL\_QUADS)

**glVertex2f**(-120, -100)

**glVertex2f**(120, -100)

**glVertex2f**(120, 0)

**glVertex2f**(-120, 0)

**glEnd**()

**glColor3f**(0.4, 0.3, 0.1)

**glBegin**(GL\_QUADS)

**glVertex2f**(-120, -60)

**glVertex2f**(120, -60)

**glVertex2f**(120, -40)

**glVertex2f**(-120, -40)

**glEnd**()

def **draw\_wheel\_lines**(xc, yc, r, color):

    for angle in **range**(0, 360, 30):

        rad = **math**.**radians**(angle)

        x = xc + r \* **math**.**cos**(rad)

        y = yc + r \* **math**.**sin**(rad)

**dda**(xc, yc, x, y, color)

def **draw\_pedals**(xc, yc, r, color):

    global pedal\_angle

    pedal\_rad = **math**.**radians**(-pedal\_angle)

    pedal\_x1 = xc + r \* **math**.**cos**(pedal\_rad)

    pedal\_y1 = yc + r \* **math**.**sin**(pedal\_rad)

    pedal\_x2 = xc - r \* **math**.**cos**(pedal\_rad)

    pedal\_y2 = yc - r \* **math**.**sin**(pedal\_rad)

**dda**(xc, yc, pedal\_x1, pedal\_y1, color)

**dda**(xc, yc, pedal\_x2, pedal\_y2, color)

**draw\_circle**(pedal\_x1, pedal\_y1, 3, color)

**draw\_circle**(pedal\_x2, pedal\_y2, 3, color)

def **draw\_cycle**():

    global cycle\_x

**glClear**(GL\_COLOR\_BUFFER\_BIT)

**draw\_background**()

    frame\_color = (0.2, 0.2, 0.8)

    wheel\_color = (0.1, 0.1, 0.1)

    pedal\_color = (1, 1, 0)

**draw\_circle**(cycle\_x - 60, -50, 40, wheel\_color)

**draw\_circle**(cycle\_x + 60, -50, 40, wheel\_color)

**draw\_wheel\_lines**(cycle\_x - 60, -50, 40, (0.8, 0.8, 0.8))

**draw\_wheel\_lines**(cycle\_x + 60, -50, 40, (0.8, 0.8, 0.8))

**dda**(cycle\_x - 60, -50, cycle\_x, 20, frame\_color)

**dda**(cycle\_x, 20, cycle\_x + 60, -50, frame\_color)

**dda**(cycle\_x - 60, -50, cycle\_x + 60, -50, frame\_color)

**dda**(cycle\_x, 20, cycle\_x, 50, frame\_color)

**dda**(cycle\_x - 15, 50, cycle\_x + 15, 50, frame\_color)

**dda**(cycle\_x + 60, -50, cycle\_x + 80, 40, frame\_color)

**dda**(cycle\_x + 80, 40, cycle\_x + 100, 50, frame\_color)

**dda**(cycle\_x + 100, 50, cycle\_x + 80, 50, frame\_color)

**draw\_circle**(cycle\_x, -50, 10, frame\_color)

**draw\_pedals**(cycle\_x, -50, 15, pedal\_color)

**glFlush**()

def **update**(value):

    global cycle\_x, pedal\_angle

    cycle\_x += 2

    pedal\_angle = (pedal\_angle - 10) % 360

    if cycle\_x > 100:

        cycle\_x = -100

    glutPostRedisplay()

    glutTimerFunc(50, **update**, 0)

def **init**():

**glClearColor**(0, 0, 0, 1)

    gluOrtho2D(-120, 120, -100, 100)

**glutInit**()

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB)

glutInitWindowSize(600, 600)

**glutCreateWindow**(b"Realistic Animated Bicycle Implemented By Zohaib Khan 221335 BSCS-A")

glutDisplayFunc(**draw\_cycle**)

glutTimerFunc(50, **update**, 0)

**init**()

glutMainLoop()

