**Task 1**

def setup():

size(1000, 500)

noFill()

frameRate(5)

def draw():

background(500, 500, 500)

fill(230, 230, 250)

for x in range(50, width - 50, 50):

for y in range(50, height - 50, 50):

for i in range(0, 4, 1):

rect(x + i, y, x + i, y + 4)

rect(x, y + random(0, 6), x + 6, y + random(0, 6))

**Task 2**

angle = 0

offset = 150

step = 100

speed = 0.07

num = 20

j = 50

arr = [0, 0.4, 0.5, 0.7, 0.9, 1.1, 1.4, 1.5]

def setup():

size(500, 300)

fill(0)

noStroke()

#noLoop()

def draw():

background(255, 255, 255)

global angle

global j

for i in arr:

y = offset + sin(angle+i) \* step

ellipse(j+20, y, 20, 20)

j = j+50

angle = angle + speed\*0.1

j = 0

for m in arr:

push()

fill(255,0,0)

y = offset + cos(angle+m) \* step

ellipse(j+20, y, 20, 20)

j = j+50

angle = angle + speed\*0.1

pop()

j = 0

**Task 3**

angle = 0.0

speed = 0.005

x = 0

y = 0

targetX = 0

targetY = 0

def setup():

size(700, 500)

fill(0)

noStroke()

def draw():

background(255, 255, 255)

translate(width/2, height/2)

global angle

rotate(angle)

for i in range(10):

push()

rotate(i + TWO\_PI/2)

translate(2, mouseX)

ellipse(0, 0, 10, 10)

rotate(angle)

for j in range(5):

push()

fill(230,210,200)

rotate(j+TWO\_PI/2)

translate(0,mouseY)

triangle(0, 0, 111, 20, 70,30)

rotate(angle)

for k in range(5):

push()

fill(90)

rotate(k\*TWO\_PI/5)

translate(0, 100)

rect(0, 0, 10, 20)

pop()

pop()

pop()

angle = angle + speed

def mousePressed():

global targetX, targetY

targetX = mouseX

targetY = mouseY

**Task 4**

rot = 0

freq = 0.000007

def setup():

size(700, 550)

def draw():

background(200)

global rot

pushMatrix()

translate(300,300)

rotate(radians(rot))

for i in range(300):

rotate(radians(rot/6))

circl = 70 + 200 \* cos(millis()\*freq\*i)

r = map(circl, 100, 150, 1, 0)

fill(70,0,14)

noStroke()

ellipse(circl\*cos(i), circl\*millis()\*freq, r\*3, r\*3)

rot = rot + 0.00005

popMatrix()

**Task 5**

angle = 0

def setup():

size(1200, 700)

noFill()

stroke(255, 122)

frameRate(1)

def draw():

background(0)

drawShape(width/2, height/2)

def drawShape(w, h):

background(170,200,190)

push()

translate(w, h)

scaler = 100 # размер шейпов

s = 1 # установите 1, чтобы получить резуотиаи как на рис. 26

for s in range(s):

beginShape() # рисуем сложную форму по точкам через curveVertex()

# параметры суперформулы

m = random(1,70)

n1 = random(1,70)

n2 = random(1,70)

n3 = random(1,70)

points = superFormula(m, n1, n2, n3)

for i in range(len(points)):

curveVertex(points[i][0] \* scaler, points[i][1] \* scaler)

endShape()

pop()

push()

translate(w, h)

scaler = 30 # размер шейпов

s = 1 # установите 1, чтобы получить резуотиаи как на рис. 26

for s in range(s):

beginShape() # рисуем сложную форму по точкам через curveVertex()

# параметры суперформулы

m1 = random(1,70)

n\_1 = random(1,70)

n\_2 = random(1,70)

n\_3 = random(1,70)

points\_1 = superFormula(m1, n\_1, n\_2, n\_3)

for i in range(len(points)):

curveVertex(points\_1[i][0] \* scaler, points\_1[i][1] \* scaler)

endShape()

pop()

def superFormula(m, n1, n2, n3):

numPoints = 360

phi = TWO\_PI / numPoints

points = []

for i in range(numPoints):

points.append(superFormulaPoint(m, n1, n2, n3, phi\*i))

return points

def superFormulaPoint(m, n1, n2, n3, phi):

r = 0

a = 1

b = 1

t1 = 0

t2 = 0

x = 0

y = 0

t1 = cos(m \* phi / 4) / a

t1 = abs(t1)

t1 = pow(t1, n2)

t2 = sin(m \* phi / 4 ) / b

t2 = abs(t2)

t2 = pow(t2, n3)

r = pow(t1 + t2, 1/n1)

if abs(r) == 0:

x = 0

y = 0

else:

r = 1 / r

x = r \* cos (phi)

y = r \* sin (phi)

return (x, y)