## Задание. Написать программу для выполнения действий поворота и сдвига геометрических фигур:

-- Вводим фигуры

data BaseFigure = Circle Float Float Float

| Rectangle Float Float Float Float

| Triangle Float Float Float Float Float Float deriving (Eq, Show, Read)

-- Сдвиг фигуры на заданную величину по x и y

setFigureMovement (Rectangle x1 y1 x2 y2) dx dy = (Rectangle (x1+dx) (y1+dy) (x2+dx) (y2+dy))

setFigureMovement (Circle x y r) dx dy = (Circle (x+dx) (y+dy) r)

setFigureMovement (Triangle x1 y1 x2 y2 x3 y3) dx dy = (Triangle (x1+dx) (y1+dy) (x2+dx) (y2+dy) (x3+dx) (y3+dy))

-- Поиск новых координат точки для поворота

xnew :: Float -> Float -> Float -> Float -> Float -> Float

xnew x y x0 y0 alpha = (x-x0)\*cos(alpha) - (y-y0)\*sin(alpha) + x0

ynew :: Float -> Float -> Float -> Float -> Float -> Float

ynew x y x0 y0 alpha = (x-x0)\*sin(alpha) + (y-y0)\*cos(alpha) + y0

-- Поиск центра фигуры

findRectangleCentre :: Float -> Float -> Float

findRectangleCentre x1 x2 = (x2-x1)/2 + x1

findTriangleCentre :: Float -> Float -> Float -> Float

findTriangleCentre x1 x2 x3 = (x1+x2+x3)/3

-- Поворот фигуры на угол alpha

setFigureRotate :: BaseFigure -> Float -> BaseFigure

setFigureRotate (Rectangle x1 y1 x2 y2) alpha = (Rectangle x1new y1new x2new y2new)

where x1new = xnew x1 y1 (findRectangleCentre x1 x2) (findRectangleCentre y1 y2) alpha

y1new = ynew x1 y1 (findRectangleCentre x1 x2) (findRectangleCentre y1 y2) alpha

x2new = xnew x2 y2 (findRectangleCentre x1 x2) (findRectangleCentre y1 y2) alpha

y2new = ynew x2 y2 (findRectangleCentre x1 x2) (findRectangleCentre y1 y2) alpha

setFigureRotate (Circle x y r) alpha = (Circle x y r)

setFigureRotate (Triangle x1 y1 x2 y2 x3 y3) alpha = (Triangle x1new y1new x2new y2new x3new y3new)

where x1new = xnew x1 y1 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

y1new = ynew x1 y1 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

x2new = xnew x2 y2 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

y2new = ynew x2 y2 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

x3new = xnew x3 y3 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

y3new = ynew x3 y3 (findTriangleCentre x1 x2 x3) (findTriangleCentre y1 y2 y3) alpha

--Main-метод

main :: IO ()

main = do

let testCircle = Circle 2 3 5

print("testCircle ",testCircle)

let testTriangle = Triangle 1 1 4 4 9 9

print("testTriangle ",testTriangle)

let testRectangle = Rectangle 1 1 4 4

print("testRectangle ",testRectangle)

print("---- setFigureMovement ----")

print(setFigureMovement testCircle 7 8)

print(setFigureMovement testTriangle 3 1)

print(setFigureMovement testRectangle 2 5)

print("---- setFigureRotate ----")

print(setFigureRotate testCircle 30)

print(setFigureRotate testTriangle 60)

print(setFigureRotate testRectangle 45)

Вывод:

ghci> main

("testCircle ",Circle 2.0 3.0 5.0)

("testTriangle ",Triangle 1.0 1.0 4.0 4.0 9.0 9.0)

("testRectangle ",Rectangle 1.0 1.0 4.0 4.0)

"---- setFigureMovement ----"

Circle 9.0 11.0 5.0

Triangle 4.0 2.0 7.0 5.0 12.0 10.0

Rectangle 3.0 6.0 6.0 9.0

"---- setFigureRotate ----"

Circle 2.0 3.0 5.0

Triangle 7.0412083 9.276485 5.098401 5.504815 1.8603897 (-0.78130245)

Rectangle 2.9883723 0.4356618 2.0116277 4.564338