(1) Student and Computing Information

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- Advance Programming Principles and Assignment 6

- Completed on a MacBook Pro running macOS Monterey version 12.3.1 and used Microsoft visual studios as the IDE and SWISH as the prolog compiler (https://swish.swi-prolog.org/p/GZYwQAmm.pl)

(2) Purpose statement:

The objective of this assignment was broken into two different parts. The first part involved creating a small prolog script containing facts and rules using SWI-Prolog and learning how to use queries to interact with those facts and rules to produce outputs.

* The program outputs “cpsc376” for what does Charlie studies. Next it outputs “charlie and olivia” for who are the students of professor lee.
* The program takes the input of the prolog arguments and matches it to the input statements.
* The program will then process the information based on the rules set by the user and the relationships established by the user as well.

The assignment's second goal is to teach students how to use Python to build a graphical program. The turtle library is used by this software to quickly render images to a window. Both the montePi and showMontePi routines only accept one number parameter, numDarts. At random x and y coordinates, many "darts" are launched. When determining whether or not the dart is inside a circle, the distance is determined. By dividing the number of darts in the circle by four times the total number of darts, one may get the value of pi.

* The program outputs a graph using the turtle library.
* The program takes the input used in both the montePi and showMontePi to accept the parameter called numDarts.
* The program will then process the information based on the parameters set for the montePi and showMontePi. Then randomly at the (x,y) coordinates it will determine if the dart is within the circle generated by the program.

(3) Copy/paste your code into the Word file:

**Prolog code**

student(charlie,cpsc376). /\*charlie studies cpsc376.\*/

student(olivia,cpsc376). /\*olivia studies cpsc376.\*/

student(jack,cpsc311). /\*jack studies cpsc311.\*/

student(authur,cpsc246). /\*arthur studies cpsc246.\*/

professor(lee,cpsc376). /\*lee teaches cpsc376.\*/

professor(kirke,cpsc311). /\*kirke teaches cpsc311.\*/

professor(kirke,cpsc374). /\*kirke teaches cpsc374.\*/

professor(juniper,cpsc246). /\*juniper teaches cpsc246.\*/

/\*

\* Setting the rule for the program

\* X is a professor of Y if X teaches C and Y studies C.

\*/

professorSRU(X,Y) :- professor(X,C),student(Y,C).

/\*

%charlie studies what? OR What does charlie study?

?- student(charlie,X).

%Who are the students of professor lee.

?- professorSRU(lee,StudentsInLee).

\*/

----------------------------------------------------------------------

**Python Code**

import random

import math

import turtle

from turtle import \*

def montePi(numDarts):

inCircle = 0

for i in range(numDarts):

x = random.random()

y = random.random()

distance = math.sqrt(x\*\*2 + y\*\*2)

if distance <= 1:

inCircle = inCircle + 1

pi = inCircle / numDarts \* 4

return pi

def showMontePi(numDarts):

wn = turtle.Screen()

drawingT = turtle.Turtle()

wn.setworldcoordinates(-2, -2, 2, 2)

drawingT.up()

drawingT.goto(-1, 0)

drawingT.down()

drawingT.goto(1, 0)

drawingT.up()

drawingT.goto(0, 1)

drawingT.down()

drawingT.goto(0, -1)

inCircle = 0

drawingT.up()

for i in range(numDarts):

x = random.random()

y = random.random()

distance = math.sqrt(x\*\*2 + y\*\*2)

drawingT.goto(x, y)

if distance <= 1:

inCircle = inCircle + 1

drawingT.color("blue")

else:

drawingT.color("red")

drawingT.dot()

pi = inCircle / numDarts \* 4

wn.exitonclick()

return pi

#Allows for 100 differnet points to be placed on the python graph

y = showMontePi(25)

print(y)

(4) Screenshots: copy/paste all output screenshots into the Word file



