EXERCISES SIMULATION

Exercise 1.

You are given two unit circles (circles with radius 1) with centers at $(0, 0.5)$ and $(0, -0.5)$. Write a simulation which calculates the area of the two circles.

Exercise 2.

You are rolling a pair of dice and moving around a monopoly board.
Calculate the average number of rolls needed to start from "go" and reach or pass "go" again. Remember if you go to jail you have not yet passed go and you will need to roll a pair in order to leave.

Answers:

Exercise 1.

```
from random import *

seed()

count = 0.0
n = 1000000
i = 0

while i < n:
    i += 1
    x = uniform(-1.5,1.5)
    y = uniform(-1,1)
    # test for inside circles
    if (x+0.5)*(x+0.5) + y*y < 1 or (x-0.5)*(x-0.5) + y*y < 1:
          count += 1

#Bounding box has area 6, and count/n is the percentage of the bounding box
print(6*count / n)
```

The answer is approximately 5.05.

Exercise 2.

```
from random import *

seed()

i = 0
n = 100000
count = 0.0
while i < n:
    state = 0
    i+=1
    while state < 40:
        state += randint(1,6) + randint(1,6)
        count += 1
        if state == 30:  # jail
            state = 10
```

```
        while randint(1,6) != randint(1,6):
            count += 1


print count / n
```

The answer is approximately 5.05.