**Python实验报告十三**

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8.1：

代码：# 乒乓球赛制：每人连发两球（轮流分），发球方输了，对方得分。先得11分赢

from random import random

def printIntro():

print("这个程序模拟两个选手A和B的某种竞技比赛")

print("程序运行需要A和B的能力值（以0到1之间的小数表示）")

def getInputs():

a = eval(input("请输入选手A的能力值(0-1): "))

b = eval(input("请输入选手B的能力值(0-1): "))

n = eval(input("模拟比赛的场次: "))

return a, b, n

def simNGames(n, probA, probB): #probA：选手A的能力值

winsA, winsB = 0, 0 #probB：选手B的能力值

for i in range(n):

scoreA, scoreB = simOneGame(probA, probB)

if scoreA > scoreB:

winsA += 1

else:

winsB += 1

return winsA, winsB

def gameOver(a,b):

return a==11 or b==11

def simOneGame(probA, probB):

scoreA, scoreB = 0, 0

serving = 0 #表示A发球

t =0

while not gameOver(scoreA, scoreB):

if serving == 0:

if random() < probA:

scoreA += 1

else:

scoreB += 1 #否则就给B加一分

else:

if random() < probB:

scoreB += 1

else:

scoreA += 1 #否则就给A加一分

t=t+1 #每轮两次就换发球方

if t%2 ==0:

serving = (serving\*1)%2

return scoreA, scoreB

def printSummary(winsA, winsB):

n = winsA + winsB

print("竞技分析开始，共模拟{}场比赛".format(n))

print("选手A获胜{}场比赛，占比{:0.1%}".format(winsA, winsA/n)) #A赢所占比例

print("选手B获胜{}场比赛，占比{:0.1%}".format(winsB, winsB/n)) #B赢所占比例

def main():

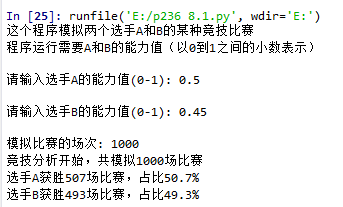
printIntro()

probA, probB, n = getInputs()

winsA, winsB = simNGames(n, probA, probB)

printSummary(winsA, winsB)

main()



8.1改编：

代码：

#赛制：先得21分的赢，轮回5次换发球人

from random import random

def printIntro():

print("这个程序模拟两个选手A和B的某种竞技比赛")

print("程序运行需要A和B的能力值（以0到1之间的小数表示）")

def getInputs():

a = eval(input("请输入选手A的能力值(0-1): "))

b = eval(input("请输入选手B的能力值(0-1): "))

n = eval(input("模拟比赛的场次: "))

return a, b, n

def simNGames(n, probA, probB):

winsA, winsB = 0, 0

for i in range(n):

scoreA, scoreB = simOneGame(probA, probB)

if scoreA > scoreB:

winsA += 1

else:

winsB += 1

return winsA, winsB

def gameOver(a,b):

return a==21 or b==21

def simOneGame(probA, probB):

scoreA, scoreB = 0, 0

serving = 0 #表示A发球

t =0

while not gameOver(scoreA, scoreB):

if serving == 0:

if random() < probA:

scoreA += 1

else:

scoreB += 1 #否则就给B加一分

else:

if random() < probB:

scoreB += 1

else:

scoreA += 1 #否则就给A加一分

t=t+1

if t%5 ==0: #轮回5次才换发球人

serving = (serving\*1)%5

return scoreA, scoreB

def printSummary(winsA, winsB):

n = winsA + winsB

print("竞技分析开始，共模拟{}场比赛".format(n))

print("选手A获胜{}场比赛，占比{:0.1%}".format(winsA, winsA/n))

print("选手B获胜{}场比赛，占比{:0.1%}".format(winsB, winsB/n))

def main():

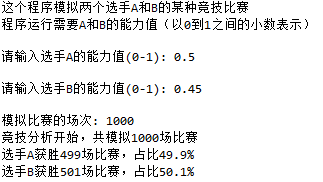
printIntro()

probA, probB, n = getInputs()

winsA, winsB = simNGames(n, probA, probB)

printSummary(winsA, winsB)

main()



8.1改编

代码：

from random import random

def printIntro():

print("这个程序模拟两个选手A和B的某种竞技比赛")

print("程序运行需要A和B的能力值（以0到1之间的小数表示）")

def getInputs():

a = eval(input("请输入选手A的能力值(0-1): "))

b = eval(input("请输入选手B的能力值(0-1): "))

n = eval(input("模拟比赛的场次: "))

return a, b, n

def simNGames(n, probA, probB):

winsA, winsB = 0, 0

for i in range(n):

scoreA, scoreB = simOneGame(probA, probB)

if scoreA > scoreB:

winsA += 1

else:

winsB += 1

return winsA, winsB

def gameOver(a,b):

if (a==11 and b<=9) or (b==11 and a<=9): # A和B中的一个先得11分，，其他一个人在9分以下

return True

elif (30>a>=10 and a-b==2) or (30>b>=10 and b-a==2):

return True #A和B中的一个在（10,30）分之间，且A和B相差两分

elif a==30 or b==30: #A和B先得30分

return True

return False

def simOneGame(probA, probB):

scoreA, scoreB = 0, 0

serving = 0 #表示A发球

t =0

while not gameOver(scoreA, scoreB):

if serving == 0:

if random() < probA:

scoreA += 1

else:

scoreB += 1 #否则就给B加一分

else:

if random() < probB:

scoreB += 1

else:

scoreA += 1 #否则就给A加一分

t=t+1 #轮流两次换发球方

if t%2 ==0:

serving = (serving\*1)%2

return scoreA, scoreB

def printSummary(winsA, winsB):

n = winsA + winsB

print("竞技分析开始，共模拟{}场比赛".format(n))

print("选手A获胜{}场比赛，占比{:0.1%}".format(winsA, winsA/n))

print("选手B获胜{}场比赛，占比{:0.1%}".format(winsB, winsB/n))

def main():

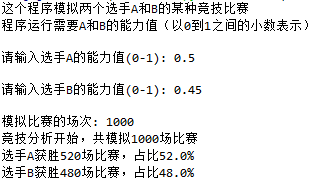
printIntro()

probA, probB, n = getInputs()

winsA, winsB = simNGames(n, probA, probB)

printSummary(winsA, winsB)

main()



8.2

代码：

#赛制：总共12分钟的比赛，A发球，最多24秒，投中给B发球，B可以抢篮球板，

#若B没有抢到，则A继续发球

from random import random

from random import randint #引入random（randint）库

def printIntro():

print("这个程序模拟两个选手A和B的某种竞技比赛")

print("程序运行需要A和B的能力值（以0到1之间的小数表示）")

def getInputs():

a = eval(input("请输入A队投篮能力(0-1): "))

b = eval(input("请输入B队投篮能力(0-1): "))

c = eval(input("请输入A队抢篮板能力(0-1):"))

d = eval(input("请输入B队抢篮板能力(0-1):"))

n = eval(input("模拟比赛的场次: "))

return a, b, c, d, n

def simNGames(n, probA, probB, boardA, boardB):

winsA, winsB = 0, 0

for i in range(n):

scoreA, scoreB = simOneGame(probA, probB,boardA, boardB)

if scoreA > scoreB:

winsA += 1

else:

winsB += 1

return winsA, winsB

def gameOver(t):

return t>=12\*60 #比赛总共的时间是12\*60秒

def simOneGame(probA, probB, boardA, boardB):

scoreA, scoreB = 0, 0

serving = 0 #表示A发球

totalTime =0

while not gameOver(totalTime):

t = randint(1,24) #随机生成（1,24）中的一个数字

totalTime += t

if t == 24:

serving = (serving + 1) %2 #时间超过24秒则换发球方

else:

if serving == 0:

if random() < probA: #A的能力值更大，A加一分，发球方变

scoreA += 1

serving = 1

else:

if random() < boardA: #A投进球，发球方不变

serving = 0

else:

serving = 1

else:

if random() < probB:

scoreB += 1

serving = 0

else:

if random() < boardB:

serving = 1

else:

serving = 0

return scoreA, scoreB

def printSummary(winsA, winsB):

n = winsA + winsB

print("竞技分析开始，共模拟{}场比赛".format(n))

print("选手A获胜{}场比赛，占比{:0.1%}".format(winsA, winsA/n))

print("选手B获胜{}场比赛，占比{:0.1%}".format(winsB, winsB/n))

def main():

printIntro()

probA, probB,boardA, boardB, n = getInputs()

winsA, winsB = simNGames(n, probA, probB, boardA, boardB)

printSummary(winsA, winsB)

main()

