

```

# Jingbo Wang
# ping-pong.py
# A program to play a B05 ping-pong ball game

from random import random

def main():
    printIntro()
    probA, probB = getInputs()
    winsA, winsB, win_roundsA, win_roundsB = simNGames(probA, probB)
    printSummary(winsA, winsB, win_roundsA, win_roundsB)

def printIntro():
    print("This program simulates a game of ping-pong ball between two")
    print('players called "A" and "B". The abilities of each player is')
    print("indicated by a probability (a number between 0 and 1) that")
    print("the player wins the point when serving. Player A always")
    print("has the first serve.")

def getInputs():
    # returns the two simulation parameters
    a = float(input("What is the prob. player A wins a serve? "))
    b = float(input("What is the prob. player B wins a serve? "))
    return a, b

def simNGames(probA, probB):
    # Simulates n games of ping-pong ball between players whose
    # abilities are represented by the probability of winning a serve.
    # Returns number of wins for A and B
    winsA = winsB = 0
    win_roundsA = [] # To store each round for A
    win_roundsB = [] # To store each round for B
    for i in range(5):
        scoreA, scoreB = simOneGame(probA, probB)
        if scoreA > scoreB:
            winsA = winsA + 1
            win_roundsA.append('W') # A wins this serve
            win_roundsB.append('-') # B lose this serve
        else:
            winsB = winsB + 1
            win_roundsA.append('-') # A lose this serve

```

```

        win_roundsB.append('W') # B wins this serve
    if winsA == 3 or winsB == 3:
        break
    return winsA, winsB, win_roundsA, win_roundsB

def simOneGame(probA, probB):
    # Simulates a single game of ping-pong ball between players whose
    # abilities are represented by the probability of winning a serve.
    # Returns final scores for A and B
    serving = "A"
    scoreA = 0
    scoreB = 0
    while not gameOver(scoreA, scoreB):
        if serving == "A":
            if random() < probA:
                scoreA = scoreA + 1
            else:
                serving = "B"
        else:
            if random() < probB:
                scoreB = scoreB + 1
            else:
                serving = "A"
    return scoreA, scoreB

def gameOver(a, b):
    # A and B represent scores for a ping-pong ball game
    # Returns True if the game is over, False otherwise.
    return a==11 or b==11

def printSummary(winsA, winsB, win_roundsA, win_roundsB):
    # Prints a summary of wins for each player.
    n = winsA + winsB
    print("\nGames simulated:", n)

    if winsA == 3:
        print("A is winner") # A is winner if A wins 3 serves
    else:
        print("B is winner") # B is winner if B wins 3 serves
    # the total win serves for A and B
    print("Wins for A: {0}".format(winsA))

```

```

print("Wins for B: {}".format(winsB))

# each serves for A and B
print("A: ", *win_ roundsA)
print("B: ", *win_ roundsB)
main()

```

```

IDLE Shell 3.10.1
Python 3.10.1 (v3.10.1:2cd268a3a9, Dec 6 2021, 14:28:59) [Clang 13.0.0 (clang-1300.0.29.3)] on darwin
Type "help", "copyright", "credits" or "license()" for more information.

===== RESTART: /Users/jingbowang/Developer/cs170/week14/weekly/ping-pong.py =====
This program simulates a game of ping-pong ball between two
players called "A" and "B". The abilities of each player is
indicated by a probability (a number between 0 and 1) that
the player wins the point when serving. Player A always
has the first serve.
What is the prob. player A wins a serve? 0.6
What is the prob. player B wins a serve? 0.56

Games simulated: 3
A is winner
Wins for A: 3
Wins for B: 0
A: W W W
B: - - -
>>>

===== RESTART: /Users/jingbowang/Developer/cs170/week14/weekly/ping-pong.py =====
This program simulates a game of ping-pong ball between two
players called "A" and "B". The abilities of each player is
indicated by a probability (a number between 0 and 1) that
the player wins the point when serving. Player A always
has the first serve.
What is the prob. player A wins a serve? 0.5
What is the prob. player B wins a serve? 0.55

Games simulated: 5
A is winner
Wins for A: 3
Wins for B: 2
A: W W - - W
B: - - W W -
>>>
Ln: 35 Col: 0

```

This program is to play a BO5 ping-pong game with two players A and B. User should input each player's possibility of winning a serve, and then the program will produce random numbers in each serve to determine who is the winner of the single game between players. If the player who wins 11 balls in a round firstly, then this player's total wins of ping-pong ball rounds will plus one. If a player who wins 3 rounds at first, the game will be over, and print out the final result of ping-pong game, each round of the game.