import random

input\_file = open("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment03\_InputFile\_Summer2024\_task1.txt")

output\_file = open("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment03\_OutputFile\_Summer2024\_task1.txt", "w")

turn = int(input\_file.readline())

player = ["Scorpion", "Sub-Zero"]

cnt = [0, 0]

res = []

max\_depth = 5

def alpha\_beta\_pruning(depth, maximizer\_turn, alpha, beta):

if depth == max\_depth:

return random.choice((1, -1))

ret = (-1 if maximizer\_turn else 1) \* float("inf")

for i in range(2):

val = alpha\_beta\_pruning(depth + 1, maximizer\_turn ^ 1, alpha, beta)

if maximizer\_turn:

ret = max(ret, val)

alpha = max(alpha, val)

else:

ret = min(ret, val)

beta = min(beta, val)

if beta <= alpha:

break

return ret

for i in range(3):

if alpha\_beta\_pruning(0, turn, -float("inf"), float("inf")) == -1:

cnt[0] += 1

res.append(player[0])

else:

cnt[1] += 1

res.append(player[1])

turn ^= 1

output\_file.write(f"Game Winner: {player[cnt[0] < cnt[1]]}\nTotal Rounds Played: 3\n")

for i in range(3):

output\_file.write(f"Winner of Round {i + 1}: {res[i]}\n")

input\_file.close()

output\_file.close()

input\_file = open("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment03\_InputFile\_Summer2024\_task2.txt")

output\_file = open("23341065\_Istiaque\_CSE422\_08\_Lab\_Assignment03\_OutputFile\_Summer2024\_task2.txt", "w")

max\_level = 3

score = [3, 6, 2, 3, 7, 1, 2, 0]

def alpha\_beta\_pruning(level, id, maximizer\_turn, alpha, beta):

if level == max\_level:

return max(score[id], score[id + 1])

ret = (-1 if maximizer\_turn else 1) \* float("inf")

for i in range(2):

val = alpha\_beta\_pruning(level + 1, id + i \* (pow(2, (max\_level - level))), maximizer\_turn ^ 1, alpha, beta)

if maximizer\_turn:

ret = max(ret, val)

alpha = max(alpha, val)

else:

ret = min(ret, val)

beta = min(beta, val)

if beta <= alpha:

break

return ret

def pacman\_game(c):

res = alpha\_beta\_pruning(1, 0, 1, -float("inf"), float("inf"))

mx = max(score)

magic = mx - c

if magic > res:

output\_file.write(f"The new minimax value is {magic}. Pacman goes {"right" if score.index(mx) >= len(score) // 2 else "left"} and uses dark magic\n")

else:

output\_file.write(f"The minimax value is {res}. Pacman does not use dark magic\n")

pacman\_game(int(input\_file.readline()))

input\_file.close()

output\_file.close()