#print("###CSE422\_Lab03\_Mohammad Shafkat Hasan\_19101077###\n")

import numpy as np

import random

MAX, MIN = 1000, 0

def minimax(depth, nodeIndex, maximizingPlayer,

values, alpha, beta):

if depth == 3:

return values[nodeIndex]

if maximizingPlayer:

best = MIN

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex \* 2 + i,

False, values, alpha, beta)

best = max(best, val)

alpha = max(alpha, best)

# Alpha Beta Pruning

if beta <= alpha:

break

return best

else:

best = MAX

for i in range(0, 2):

val = minimax(depth + 1, nodeIndex \* 2 + i,

True, values, alpha, beta)

best = min(best, val)

beta = min(beta, best)

# Alpha Beta Pruning

if beta <= alpha:

break

return best

#### Task 01 #####

id = input("Enter your student ID: ")

#If any digit in your id is 0 consider it as 8

n = str(id)

n2=n.replace('0','8')

id = n2

print("Converted ID:",id)

min\_hp = int(id[4])

#Reverse last 2 digits of your student ID

total\_win = int(id[:6-1:-1]) #lst[:index-1:-1]

max\_hp = int(total\_win \* 1.5)

randomlist = random.sample(range(min\_hp, max\_hp), 8)

print("Generated 8 random points between the minimum and maximum point limits:",randomlist)

print("Total points to win:",total\_win)

values = randomlist

Winner = minimax(0, 0, True, values, MIN, MAX)

print("Achieved point by applying alpha-beta pruning = ", Winner)

if Winner> total\_win:

print("The Winner is Optimus Prime")

else:

print("The Winner is Megatron")

#### Task 02 #####

print("\nAfter the shuffle:")

wins = 0 #wins count

new\_list = randomlist.copy()

for i in range(int(id[3])):

random.shuffle(new\_list)

Winner = minimax(0, 0, True, new\_list, MIN, MAX)

if Winner > total\_win:

wins += 1

print(new\_list)

max\_value = np.max(new\_list)

print('The maximum value of all shuffles:',max\_value)

print('Won',wins,"times out of",int(id[3]),'number of shuffles')