"""

Shahriar Ahmed - 20101588 - Lab2 - Genetic Algorithm

Sample Input - 1:

8 330

Tamim 68

Shoumyo 25

Shakib 70

Afif 53

Mushfiq 71

Liton 55

Mahmudullah 66

Shanto 29

"""

import random

matrix = []

with open('sample1.txt') as file:

for i in file:

lst = [x.strip() for x in i.split()]

matrix.append(lst)

print("Sample Input:")

print(matrix)

no\_bats = int(matrix[0][0])

target = int(matrix[0][1])

batsmen = []

average = []

matrix.pop(0)

for i in range(len(matrix)):

batsmen.append(matrix[i][0])

average.append(int(matrix[i][1]))

combos = []

def bit\_generate(n, s = ''):

if len(s) < n:

bit\_generate(n, s + '0')

bit\_generate(n, s + '1')

else:

combos.append(s)

bit\_generate(no\_bats)

fit = []

run = 0

def fitness(combos, fit, batsmen, average, run):

for i in range(len(combos)):

run = 0

for j in range(len(combos[i])):

if combos[i][j] == '1':

run += average[j]

fit.append(run)

return fit

fitness(combos, fit, batsmen, average, run)

fit\_chart = []

def selection(combos, fit):

for i in range(len(fit)):

if (fit[i] >= ((target \* 80) / 100) and fit[i] <= ((target \* 120) / 100)):

temp1 = (combos[i], fit[i])

fit\_chart.append(temp1)

return fit\_chart

selection(combos, fit)

parent = []

value = []

for i in range(len(fit\_chart)):

parent.append(fit\_chart[i][0])

value.append(fit\_chart[i][1])

def crossover(parent1, parent2):

child1, child2 = parent1[:], parent2[:]

point = random.randint(1, len(parent1)-2)

child1 = parent1[:point] + parent2[point:]

child2 = parent1[:point] + parent2[point:]

global child

child = [child1, child2]

return child

def mutate(child):

idx1 = random.randint(0, 2)

idx2 = random.randint(2, 3)

if child[0][idx1] == '0':

child[0][idx1].replace('0', '1')

else:

child[0][idx1].replace('1', '0')

if child[1][idx2] == '0':

child[1][idx2].replace('0', '1')

else:

child[0][idx2].replace('1', '0')

return child

"""Driver Code"""

global parent1, parent2

children = []

generations = 100

for i in range(generations):

parent1 = random.choice(parent)

parent2 = random.choice(parent)

for c in crossover(parent1, parent2):

mutate(child)

children.append(c)

final = []

fitness(children, final, batsmen, average, run)

print("Output:")

count = 0

for i in range(len(final)):

if final[i] == target:

count += 1

print(children[i])

break

if count > 0:

pass

else:

print("-1")