import random  
  
def GA(list1,Range):  
 C = -1  
 A = 0  
 D = mutation(list1,Range)  
 B = D[2]  
 count = 0  
 if B!= 0:  
 while B!=0 and count<=10000:  
 C = mutation(list1,Range)  
 B=C[2]  
 count =+1  
 return C  
  
def fitness(list1,target):  
 S = 0  
 for i in list1:  
 S = S+i  
 B = abs((target-S)/target)  
 return B  
  
  
def mutation(list1,Range):  
 Child = crossover(list1)  
 sample = []  
 a = len(list1)-1  
 for i in range(0,a):  
 if Child[i] ==1:  
 sample.append(list1[i])  
  
 Z = fitness(sample,int(Range))  
 return Child,sample,Z  
  
def crossover(List1):  
 half = len(List1)//2  
 X = []  
 Y = []  
 for i in range(0,len(List1)):  
 X.append(random.randint(0, 1))  
 Y.append(random.randint(0, 1))  
  
  
 X = X[half:]  
 Y = Y[:half]  
 XY = X + Y  
 return(XY)  
  
with open('input1.txt', 'r') as f:  
 Input = []  
 for lines in f:  
 Input.append(lines.strip().split())  
  
 Part1 = Input[:1]  
  
  
 for i in Input:  
 if i == []:  
 Input.remove(i)  
  
 Part2 = Input[1:]  
  
 for i in Part1:  
 i[0] = int(i[0])  
 i[1] = int(i[1])  
  
 Genes = []  
 for i in Part2:  
 Genes.append(int(i[1]))  
 A = GA(Genes,Part1[0][1])  
  
 Names = []  
 for i in Part2:  
 Names.append(i[0])  
 Score = A[0]  
  
 print(Names, Score)  
  
with open('Output2.txt','w') as w:  
  
 w.write(str(Names))  
 w.write('\n')  
 for i in Score:  
 w.write(str(i))  
 w.write(' ')