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1 # Fundamentals of Genomics & Proteomics
2 # Lab 03 | 05.09.2022
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4 # Roll: 43
5 # written in python3
6
7 import math
8 def partialDigest(distanceList, n):
9     maxElement = max(distanceList)
10    pointList = [0] # initializing with zero
11    while distanceList:
12        maxDistance = max(distanceList)
13        pointA, pointB = maxElement - maxDistance, maxDistance
14        chosenA, chosenB = True, True
15        distanceDifferencesA, distanceDifferencesB = [], []
16        # check validity of point A
17        for currentPoint in pointList:
18            currentDistance = abs(currentPoint - pointA)
19            distanceDifferencesA.append(currentDistance)
20            if currentDistance not in distanceList:
21                chosenA = False
22                break
23        # check validity of point B
24        if not chosenA:
25            for currentPoint in pointList:
26                currentDistance = abs(currentPoint - pointB)
27                distanceDifferencesB.append(currentDistance)
28                if currentDistance not in distanceList:
29                    chosenB = False
30                    break
31        # in case of invalidity of both points
32        if not chosenA and not chosenB:
33            return None
34        # in case of choosing A in the list
35        if chosenA:
36            pointList.append(pointA)
37            for currentDistance in distanceDifferencesA:
38                distanceList.remove(currentDistance)
39        # in case of choosing B in the list
40        elif chosenB:
41            pointList.append(pointB)
42            for currentDistance in distanceDifferencesB:
43                distanceList.remove(currentDistance)
44    return sorted(pointList) # return the points sorted
45
46 if __name__ == "__main__":
47     # distanceList = list(map(int,input().strip().split()))
48     distanceList = [2, 2, 3, 3, 4, 5, 6, 7, 8, 10]
49     n = (1+math.sqrt(1+8*len(distanceList)))/2
50     print('Distance List:\t', distanceList)
51     pointList = partialDigest(distanceList, int(n))
52     if pointList:
53         print('Point List:\t', pointList)
54     else:
55         print('No Solution')

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