Fishing Problem

10th August 2016 Advance Problem

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Problem description

Given:

Fishing Spots: 1 to N

3 Gates with gate position and number of fishermen waiting to get in

Distance between consecutive spots = distance between gate and nearest spot = 1 m

Fishermen are waiting at the gates to get in and occupy nearest fishing spot. Only 1 gate can be opened at a time and all fishermen of that gate must occupy spots before next gate is open.

There could be 2 spots closest to the gate. Assign only 1 spot to the last fisherman in such a way that we get minimum walking distance. For rest of the fishermen, ignore and assign any one.

Write a program to return sum of minimum distance need to walk for fishermen.

Distance is calculated as gate to nearest spot + nearest spot to closest vacant spot.

If the gate is at position 4, then fishermen occupying spot 4 will walk 1 m, fishermen occupying spot 3 or 5 will walk 2 m (1m for gate to spot#4 + 1M for sp

Ex: 3 gates at position 4,6 and 10. Total fishing spots = 10

G1 (2 Fishermen)

G2 (5 Fishermen)

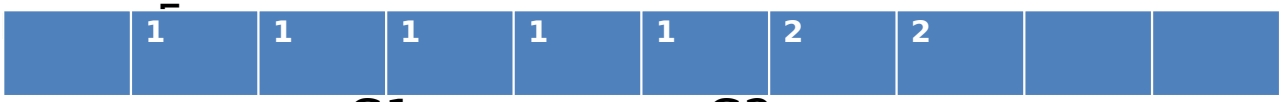
G3 (2 Fishermen)

If gates are opened in order G1->G2->G3

After G1 gate is opened, fishermen are placed at following spots.
Distance = 11m

G1

After G2 gate is opened, fishermen are placed at following spots.
Distance = 5m



G1 G2

After G3 gate is opened, fishermen are placed at following spots.
Distance = 3m

G1 G2

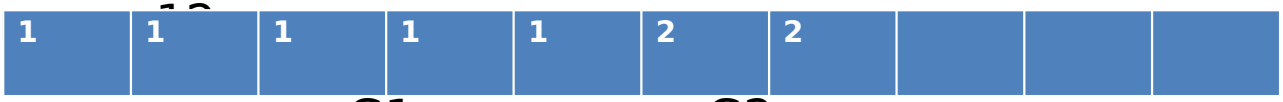
G3

Total distance in this order : 11 + 5 + 3 = 19

If gates are opened in order G2->G1->G3
Case1 –Last fisherman of gate#2 is placed at pos # 7
After G2 gate is opened, fishermen are placed at following spots.
Distance = 3m

G2

After G1 gate is opened, fishermen are placed at following spots.
Distance = 12m



G1 G2

After G3 gate is opened, fishermen are placed at following spots.
Distance = 3m

G1 G2

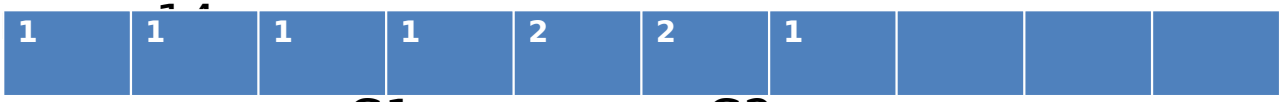
G3

Total distance in this order : 3+12+3 = 18

If gates are opened in order G2->G1->G3
Case2 –Last fisherman of gate#2 is placed at pos # 5
After G2 gate is opened, fishermen are placed at following spots.
Distance = 3m

G2

After G1 gate is opened, fishermen are placed at following spots.
Dista



G1 G2

After G3 gate is opened, fishermen are placed at following spots.
Dista

G1 G2

G3

Total distance in this order : 3+14+3 = 20

Solutions

- Write function which takes gate # as input and assigns fishermen to nearest spots for that gate. It returns minimum distance and total number of position possible for last fishermen. If number of positions are 2, returns both positions.
- Generate all combinations and assigns fishermen in all gate combinations to calculate minimum walking distance.

- Generating combination can be done in both recursive and iterative way.


fishery_iterative.c


fishery_recursive.c


input.txt


output.txt