

Description for test data files (problems and solutions)

Data files

The first line contains the following information:

$m \ n \ t$

- **m**: maximum number of vehicles available in each depot
- **n**: total number of customers
- **t**: number of depots

The next t lines contain, for each depot, the following information:

$D \ Q$

- **D**: maximum duration of a route (not mentioned for all problems, in that case it is “0”)
- **Q**: allowed maximum load of a vehicle (same for all the vehicles assigned to all depots)

The next lines contain, for each customer, the following information:

$i \ x \ y \ d \ q \ f \ a \ \text{list} \ e \ l$

- **i**: customer number
- **x**: x coordinate
- **y**: y coordinate
- **d**: necessary service duration required for this customer (0 = no such hard requirement)
- **q**: demand for this customer
- **f**: frequency of visit (not necessary for this project)
- **a**: number of possible visit combinations (not necessary for this project)
- **list**: list of all possible visit combinations (not necessary for this project)
- **e**: beginning of time window, (not necessary for this project)
- **l**: end of time window, (not necessary for this project)

In short, for this project, only columns 1, 2, 3, 4 and 5 of customer data are required.

Note: For customer data, lines go from 1 to $n + t$ and the last t entries correspond to the t depots. In other words, the last t entries give the x and y coordinates of t depots (columns 2 and 3).

Example: Data files

4 50 4 →→→ m (vehicle) = 4, n (customer) = 50, t (depot) = 4

0 80 } Maximum duration of a route (0 = not hard requirement)

0 80 } Maximum load for each vehicle for t (= 4) depot = 80

| | | | | | | | | | | |
|----|----|----|---|----|---|---|---|---|---|---|
| 1 | 37 | 52 | 0 | 7 | 1 | 4 | 1 | 2 | 4 | 8 |
| 2 | 49 | 49 | 0 | 30 | 1 | 4 | 1 | 2 | 4 | 8 |
| 3 | 52 | 64 | 0 | 16 | 1 | 4 | 1 | 2 | 4 | 8 |
| 4 | 20 | 26 | 0 | 9 | 1 | 4 | 1 | 2 | 4 | 8 |
| 5 | 40 | 30 | 0 | 21 | 1 | 4 | 1 | 2 | 4 | 8 |
| 6 | 21 | 47 | 0 | 15 | 1 | 4 | 1 | 2 | 4 | 8 |
| 7 | 17 | 63 | 0 | 19 | 1 | 4 | 1 | 2 | 4 | 8 |
| 8 | 31 | 62 | 0 | 23 | 1 | 4 | 1 | 2 | 4 | 8 |
| 9 | 52 | 33 | 0 | 11 | 1 | 4 | 1 | 2 | 4 | 8 |
| 10 | 51 | 21 | 0 | 5 | 1 | 4 | 1 | 2 | 4 | 8 |
| 11 | 42 | 41 | 0 | 19 | 1 | 4 | 1 | 2 | 4 | 8 |
| 12 | 31 | 32 | 0 | 29 | 1 | 4 | 1 | 2 | 4 | 8 |
| 13 | 5 | 25 | 0 | 23 | 1 | 4 | 1 | 2 | 4 | 8 |
| 14 | 12 | 42 | 0 | 21 | 1 | 4 | 1 | 2 | 4 | 8 |
| 15 | 36 | 16 | 0 | 10 | 1 | 4 | 1 | 2 | 4 | 8 |
| 16 | 52 | 41 | 0 | 15 | 1 | 4 | 1 | 2 | 4 | 8 |
| 17 | 27 | 23 | 0 | 3 | 1 | 4 | 1 | 2 | 4 | 8 |
| 18 | 17 | 33 | 0 | 41 | 1 | 4 | 1 | 2 | 4 | 8 |
| 19 | 13 | 13 | 0 | 9 | 1 | 4 | 1 | 2 | 4 | 8 |
| 20 | 57 | 58 | 0 | 28 | 1 | 4 | 1 | 2 | 4 | 8 |
| 21 | 62 | 42 | 0 | 8 | 1 | 4 | 1 | 2 | 4 | 8 |
| 22 | 42 | 57 | 0 | 8 | 1 | 4 | 1 | 2 | 4 | 8 |
| 23 | 16 | 57 | 0 | 16 | 1 | 4 | 1 | 2 | 4 | 8 |
| 24 | 8 | 52 | 0 | 10 | 1 | 4 | 1 | 2 | 4 | 8 |
| 25 | 7 | 38 | 0 | 28 | 1 | 4 | 1 | 2 | 4 | 8 |
| 26 | 27 | 68 | 0 | 7 | 1 | 4 | 1 | 2 | 4 | 8 |
| 27 | 30 | 48 | 0 | 15 | 1 | 4 | 1 | 2 | 4 | 8 |
| 28 | 43 | 67 | 0 | 14 | 1 | 4 | 1 | 2 | 4 | 8 |
| 29 | 58 | 48 | 0 | 6 | 1 | 4 | 1 | 2 | 4 | 8 |
| 30 | 58 | 27 | 0 | 19 | 1 | 4 | 1 | 2 | 4 | 8 |
| 31 | 37 | 69 | 0 | 11 | 1 | 4 | 1 | 2 | 4 | 8 |
| 32 | 38 | 46 | 0 | 12 | 1 | 4 | 1 | 2 | 4 | 8 |
| 33 | 46 | 10 | 0 | 23 | 1 | 4 | 1 | 2 | 4 | 8 |
| 34 | 61 | 33 | 0 | 26 | 1 | 4 | 1 | 2 | 4 | 8 |
| 35 | 62 | 63 | 0 | 17 | 1 | 4 | 1 | 2 | 4 | 8 |
| 36 | 63 | 69 | 0 | 6 | 1 | 4 | 1 | 2 | 4 | 8 |
| 37 | 32 | 22 | 0 | 9 | 1 | 4 | 1 | 2 | 4 | 8 |
| 38 | 45 | 35 | 0 | 15 | 1 | 4 | 1 | 2 | 4 | 8 |
| 39 | 59 | 15 | 0 | 14 | 1 | 4 | 1 | 2 | 4 | 8 |
| 40 | 5 | 6 | 0 | 7 | 1 | 4 | 1 | 2 | 4 | 8 |
| 41 | 10 | 17 | 0 | 27 | 1 | 4 | 1 | 2 | 4 | 8 |
| 42 | 21 | 10 | 0 | 13 | 1 | 4 | 1 | 2 | 4 | 8 |
| 43 | 5 | 64 | 0 | 11 | 1 | 4 | 1 | 2 | 4 | 8 |
| 44 | 30 | 15 | 0 | 16 | 1 | 4 | 1 | 2 | 4 | 8 |
| 45 | 39 | 10 | 0 | 10 | 1 | 4 | 1 | 2 | 4 | 8 |
| 46 | 32 | 39 | 0 | 5 | 1 | 4 | 1 | 2 | 4 | 8 |
| 47 | 25 | 32 | 0 | 25 | 1 | 4 | 1 | 2 | 4 | 8 |
| 48 | 25 | 55 | 0 | 17 | 1 | 4 | 1 | 2 | 4 | 8 |
| 49 | 48 | 28 | 0 | 18 | 1 | 4 | 1 | 2 | 4 | 8 |
| 50 | 56 | 37 | 0 | 10 | 1 | 4 | 1 | 2 | 4 | 8 |
| 51 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52 | 30 | 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53 | 50 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 54 | 60 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Data for n (=50) customers.

For this project, only columns 1, 2, 3, 4 and 5 are required

x and y coordinates for t (=4) depots.

It is mentioned in columns 2 and 3.

Solution files

The first line contains the cost of the solution (the total distance travelled by all vehicles across the depots in serving all customers).

The next lines contain, for each route, the following information:

l k d q list

- l: number of the depot
- k: number of the vehicle (for above depot)
- d: duration of the route for a particular vehicle from a particular depot
- q: carried load of the vehicle
- list: ordered sequence of customers (served by a particular vehicle with “0” means the vehicle starts and ends from a particular depot).

Example: Solution files

576.87 → → cost of the solution (should be minimized)

| | | | | | | | | | | | |
|---|---|-------|----|---|----|----|----|----|----|----|---|
| 1 | 1 | 60.06 | 71 | 0 | 44 | 45 | 33 | 15 | 37 | 17 | 0 |
| 1 | 2 | 66.55 | 79 | 0 | 42 | 19 | 40 | 41 | 13 | 0 | |
| 1 | 3 | 47.00 | 78 | 0 | 25 | 18 | 4 | 0 | | | |
| 2 | 1 | 53.44 | 73 | 0 | 6 | 27 | 1 | 32 | 11 | 46 | 0 |
| 2 | 2 | 79.47 | 80 | 0 | 48 | 8 | 26 | 31 | 28 | 22 | 0 |
| 2 | 3 | 81.40 | 77 | 0 | 23 | 7 | 43 | 24 | 14 | 0 | |
| 2 | 4 | 23.50 | 54 | 0 | 12 | 47 | 0 | | | | |
| 3 | 1 | 50.41 | 75 | 0 | 9 | 34 | 30 | 39 | 10 | 0 | |
| 3 | 2 | 25.22 | 54 | 0 | 49 | 5 | 38 | 0 | | | |
| 4 | 1 | 47.67 | 67 | 0 | 35 | 36 | 3 | 20 | 0 | | |
| 4 | 2 | 42.14 | 69 | 0 | 21 | 50 | 16 | 2 | 29 | 0 | |

Ordered sequence of the customers served by a particular vehicle with “0” means the vehicle starts and ends from a particular depot.

Carried load of a particular vehicle

Duration of a route for a particular vehicle from a particular depot

Vehicle no from corresponding depot

Depot no.