

Project Data File

The Project Data file can be created with any editor or word processor capable of generating pure ASCII files. Word processors usually insert special formatting codes into their regular document files, such as page breaks, which cannot be read by the **Lineback** program, so special care should be taken when using a word processor to generate a pure ASCII file. The project file also should not contain any blank lines. Once an input file has been created, it can be used repeatedly by the **Lineback** program.

Each line in the input file is associated with a single data item and contains two fields. The first field is the description or name of the data item. The name of the item is enclosed in square brackets and may not contain any spaces. The second field is then the value of the item to be used. The two fields are separated by one or more space or tab characters. For example:

```
[project_name]          CASEO1
[minimum_x_coordinate]  0
[maximum_x_coordinate]  32000
[minimum_y_coordinate]  0
[maximum_y_coordinate]  36000
[number_of_vehicles]    10
[vehicle_capacity]      5700
[infeasibility_penalty] 1000.000000
[distance_norm]         Euclidean
[number_of_customers]   100
[customer_file_name]    CaseO.cus
[number_of_suppliers]   100
[supplier_file_name]    CaseO.sup
[number_of_depots]      1
[depot_file_name]       CaseO.dep
[number_of_routes]      10
[route_file_name]       CaseO1.rou
[report_level]          3
[seed]                  12345
[number_of_iterations]  20
[time_limit]            30.000000
```

Project Name

The first item is the name of the current project. This name should be a maximum of 15 characters and should contain only letters, digits, and underscore characters. In the version 4.0 of **Lineback** or higher the size of this data field has been expanded and space characters are allowed, however the smaller size and no space characters should be used in the import files.

Customer File Name

Supplier File Name

Depot File Name

Route File Name

The next items are the names of the customer, supplier, depot, and route data files, respectively. They contain all the data for facilities of that respective type or for the routes. The file names must satisfy the Windows long file name conventions. A path must precede the file name if it is not in the current directory or in the data path. Long file names may be used, but the file name and the path cannot contain spaces. An example of a customer data file is the file ***Case5180.sup*** that holds the supplier

information. This file is included in the appendix and on the distribution disk. The files must be created outside the **Lineback** program with an editor capable of generating pure ASCII files. The extensions *cus*, *sup*, *dep* and *rou* are solely a convention, other extensions may be used.

Seed

The tour construction or improvement algorithms often need to make a random choice among several alternative departments. This random choice is made based on pseudo random numbers, generated from an initial seed. An algorithm will always make the same random choices if it is given the same random seed, and hence will create the same vehicle routes. The seed has to be a positive number in the range of [1,32767]. If a seed of zero is given, then the computer will pick a random seed based on the computer clock.

Tolerance

At the current time the tolerance parameter is not used in the program.

Time Limit

The maximum time limit is the maximum amount of time a single algorithm is allowed to execute. The time limit is expressed in seconds. Currently, the time limit is only used to terminate the exchange algorithms if they have exceeded the time limit after one complete iteration, i.e. after all possible exchanges have been tested. So it is possible that the execution time of the improvement algorithm is actually larger than the time limit specified.

Number of Iterations

The construction and improvement algorithms often need to make a random choice among several equivalent tour sequences. Different replications of the same algorithm can thus provide different tours. The higher the maximum number of replications, the more likely a good set of vehicle routes will be constructed. Of course, more replications require more computation time. The default number of the maximum number of replications is equal to 20. In version 4.0 or higher of **Lineback**, the name of this field has been changed to **Number of Replications**.

Report Level

Report level is the level of detail the program will use in generating output reports. There are six levels of detail, ranging from 0 through 5. The higher the report level the more information is written to the Output Log File and the more frequent halts during program execution.

Facility Data Files

The Facility Data files can be created with any editor or word processor capable of generating pure ASCII files. Word processors usually insert special formatting codes into their regular document files, such as page breaks, which cannot be read by the **Lineback** program, so special care should be taken when using a word processor to generate a pure ASCII file. The facility data files also should not contain any blank lines. Once an input files have been created, they can be used repeatedly by the **Lineback** program.

All facility data files have the same structure. The customer, depot, and supplier facility data are contained in a file with standard extension *cus*, *dep*, and *sup*,

respectively. They contain all the data for a single facility on a single line, which contains eight data fields. The fields contain the facility label, x coordinate, y coordinate, quantity, display shape, display size, display color, and facility name, respectively. A typical facility data line is shown below.

1	21524	24879	483	CIRCLE	250	RED	NONE
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Routes Data File

The Routes Data file contains a block of data lines for each currently defined route. The first line of each route block contains the number of customers on the route, the number of suppliers on the route, and the display color of the route. The lines after that contain the facilities on this route. Each route has to start with the depot facility and has to terminate with the depot facility. After the initial depot facility, all the customer facilities are listed followed by all the supplier facilities. A route may not have any customers or not any suppliers, but must include at least one facility different from the depot. For each facility the facility type and the facility label are given. The number of lines for the customer and supplier facilities has to match the number of customers and suppliers specified on the first line. A typical set of data lines for a single route is shown below.

3	1	BROWN
depot		D1
customer		20
customer		8
customer		12
supplier		5
depot		D1