

4D Tools

Reference
Windows®/Mac™ OS



4D Tools Version 2004

Reference

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Introduction

What is 4D Tools?

4D Tools is a utility that allows you to maintain and repair 4th Dimension databases. It allows you to check and repair the entire database, only selected tables, or only selected structure file objects. When you know that a problem only exists in a particular area of the database, the latter option can dramatically reduce the 'downtime' connected with repairs and maintenance.

The 4D Tools interface is a dialog box that has the following screens:

- **Information:** 4D Tools provides descriptive statistics which allow you to view the principal characteristics of the database at a glance.
- **Maintain:** 4D Tools' maintenance features allow you to verify the data integrity, to sort the records in a specific order, and to compact the data file.
- **Repair:** 4D Tools' repair features can be used if the database is damaged. Several different repair methods are available. Different options are appropriate depending on the type and the degree of damage.
- **Structure:** These features allow you to verify, repair, and defragment the structure file.

When do you use 4D Tools?

Maintenance

We recommend that you use 4D Tools maintenance features regularly, both in developing and deploying your databases. The information about the status of the data file as well as the different checks help you to verify the integrity of the data file.

You can also check the status of the database as needed, for example after a power failure or a system crash.

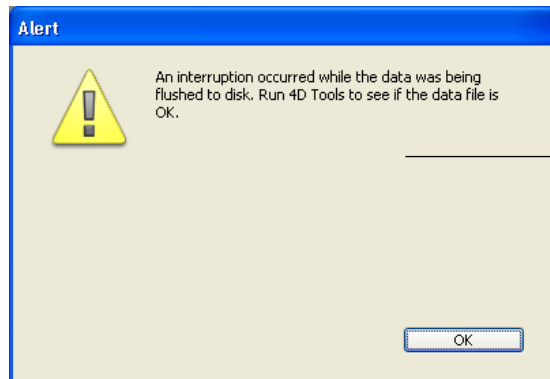
Use the permanent sort feature if you want to sort your records in a different order than the order that was created as the data were entered. This feature is normally used only after all the data have been entered in the database.

It is also important to compact the database regularly, in particular when you add many records and then delete them. 4D Tools indicates whether compacting is necessary based on the degree of fragmentation of the data file.

Repair

In general, you should use the 4D Tools repair features only *on request* by 4D or 4D Tools; e.g., if either program displays an alert box indicating that the data has to be repaired.

This alert can appear when 4D opens the database or after a check by 4D Tools:



Message displayed by 4th Dimension when opening a damaged database

The reasons for this message could be:

- An incident occurred while the database cache was being saved to disk: power failure, damaged sector, virus, etc.
- The data file on disk is damaged.

Note You should consider the use of the 4D Tools repair functions as an extreme solution under particular circumstances. In case of an incident affecting data integrity, we recommend that you use a backup and, if the data have been modified in the meantime, to integrate the current log file. You can even configure your application so that these operations are carried out automatically when the database is restarted. For more information about the integrated back-up of 4th Dimension, refer to the *User Reference* manual.

Structure

4D Tools' administration features allow you to maintain and repair the structure file.

You can check the structure of the database at every important phase of development: after the integration of new libraries or components, before or after updating the structure with a new version of 4D, before compiling or deploying the database, etc.

Note Checking the structure file can be carried out from the opening dialog box of 4th Dimension (for more information, refer to the *Design Reference* manual).

You should use the 4D Tools repair features for the structure file only *on request*. If the structure file is damaged, 4D or 4D Tools displays an alert box when opening the database.

Finally, it is useful to compact the structure file during development if you have created a lot of structure objects (forms, pictures, methods, etc.). Depending on the degree of fragmentation of the structure file, 4D Tools indicates whether compacting is necessary.

Starting and Using 4D Tools

4D Tools must be used locally, on the computer containing the structure file or the data file you want to check.

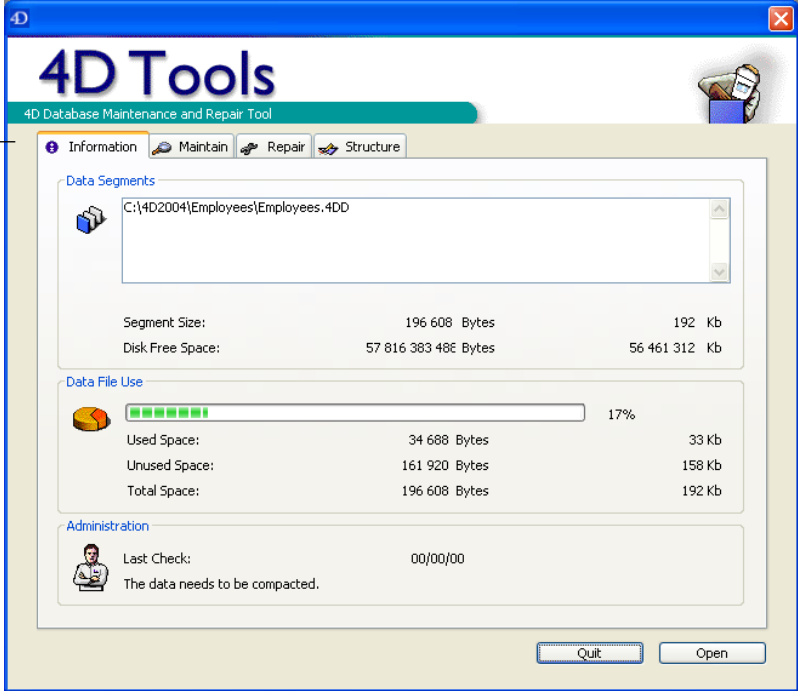
► To do so:

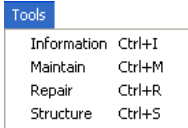


- 1 Double-click on the 4D Tools application icon.**
A standard open file dialog box appears.
- 2 Select and open the structure file of the database on which you want to use 4D Tools.**
 - If the database you choose to open has a password access system installed, the standard 4th Dimension password entry dialog box appears. Note that only the Designer or Administrator can open a database using 4D Tools. For more information on the password access system, refer to the 4th *Dimension Design Reference* manual.
 - If the database you choose to open is damaged, 4D Tools automatically displays a window that describes the damage and suggests a repair.

The following dialog box appears:

Tab Controls to navigate between the pages





The 4D Tools main window consists of several pages that can be accessed via tabs or via the **Tools** menu commands. Each page contains functions related to a mode of use of 4D Tools. For example the **Information** screen displays information about the usage of the data file, number and size of the data segments, and when the data file was last compacted. For more information, refer to [“The Information Page” on page 11](#).



You can open a different database by choosing **Open Database...** from the 4D Tools **File** menu or by clicking the **Open** button in the 4D Tools main window.

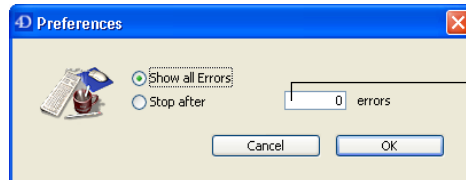
The **Quit** button/command allows you to quit 4D Tools.

Setting Preferences

In the 4D Tools Preferences dialog box you tell 4D Tools how to handle errors during data and structure file checking.

This preference applies to both the data and structure files. For more information, refer to the sections [“Data Check” on page 16](#) and [“Structure Check and Repair” on page 34](#).

To set this preference, choose **Preferences...** from the 4D Tools **Edit** menu and click “Show all Errors” or indicate the maximum number of errors that 4D Tools should accept before stopping the check:



Option for maximum number of errors accepted

When the “Show all Errors” option is selected, the “Stop after ...errors” option is inactive.

2

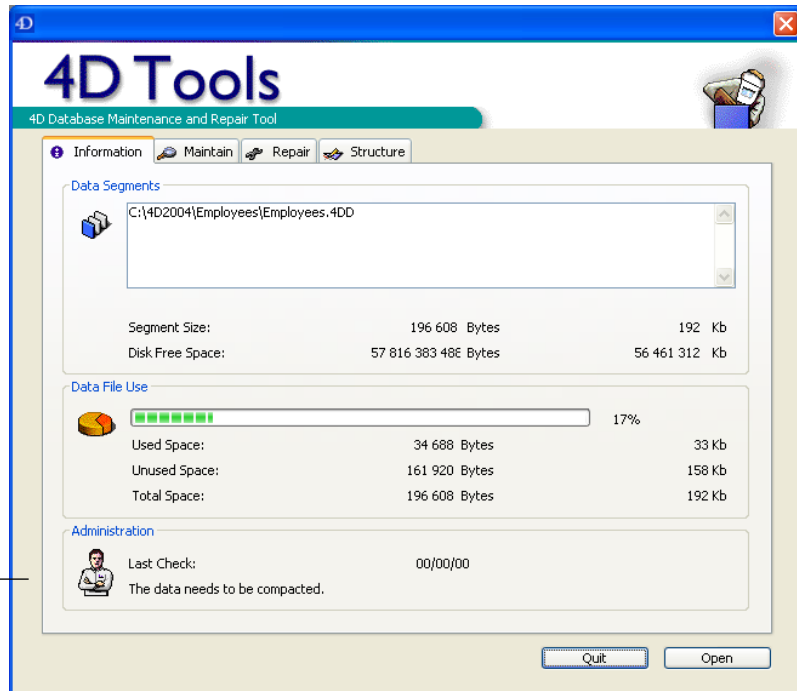
The Information Page

The **Information** page provides information about the location, size, and status of the data file. The administration area at the bottom of the window may suggest certain repairs or maintenance activities.

Location and size of
the data file and/or its
segments

Utilization of the data
file

Suggestions for data
administration



Data Segments

This area displays the name and the complete pathname of the segments of the data file. If the data file consists of only one segment, then only one pathname is shown.

The “Segment Size” area below the list of segments indicates the size of the segment selected in the list. You can also see the remaining space on the volume containing the file.

The total data size of the database is displayed in the Data File Use area. This information is useful if your database is composed of several data segments.

Note These values are displayed in Bytes and Kilobytes (Kb).
Reminder: 1 Kb=1024 Bytes.

Data File Use

The information provided in this area lets you know the utilization rate of space allocated to the data file on disk, i.e., the *fragmentation* of the data file. An overly fragmented data file makes data access less efficient.

An indicator displays the ratio between the actual use of the disk space and the space allocated to the data file on disk. These values appear under the indicator in Bytes and Kilobytes (Kb).

A very small percentage indicates that the data file is very fragmented. In this case, it would be a good idea to compact the data file. The message “The data needs to be compacted” appears in the Administration area. For more information, refer to the section [“Compact” on page 22](#).

Administration

This area displays messages that help you maintain the data file. First, 4D Tools indicates the date of the last check of the database or 00/00/00 if the data file has never been verified. If the date is long ago, 4D Tools recommends that the data be checked. For more information refer to the section [“Data Check” on page 16](#).

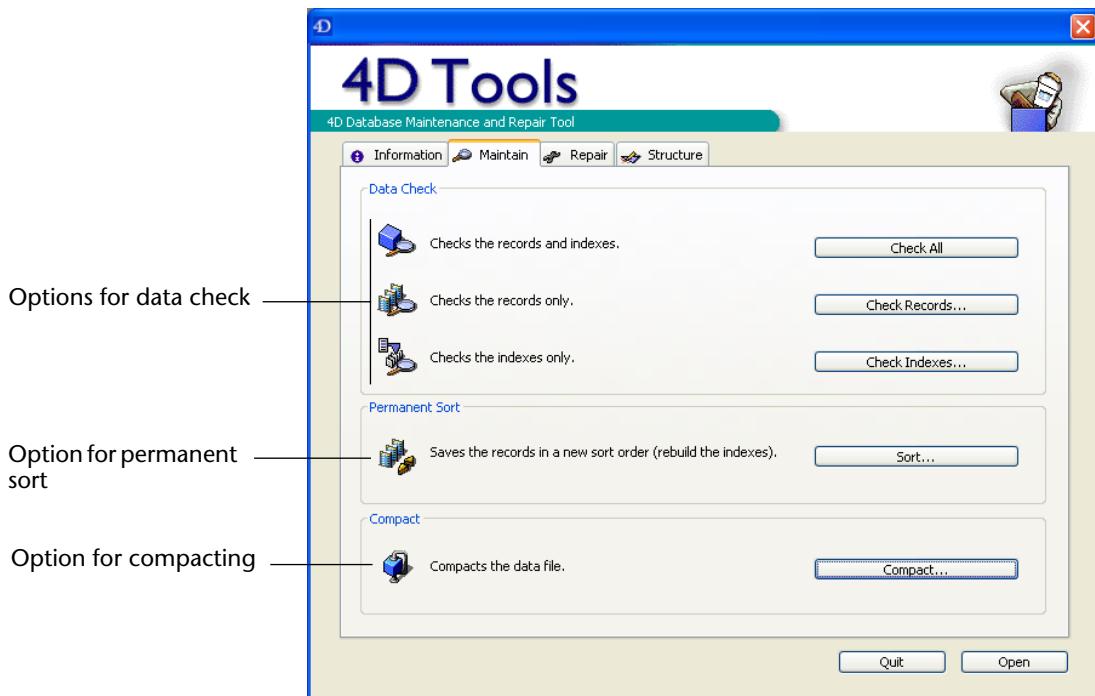
4D Tools also displays messages about the current status of the data. If your data is very fragmented, the message “The data needs to be compacted” is displayed.

3

The Maintain Page

The **Maintain** page contains the operations for routine maintenance of the data file. Three types of operations are provided:

- **Data Check** allows you to check the status of the data file periodically (records and/or index).
- **Permanent Sort** allows you to reorder the records in another sort order than was defined at the time they were entered.
- **Compact** allows you to optimize the performance of the data file by reducing the unused space.



Data Check

It may happen that 4th Dimension cannot read some of your records, for example, because a block on your hard disk is damaged. 4th Dimension may be able to handle the problem without requiring you to quit 4th Dimension and launch 4D Tools. The program indicates when it is unable to read a record. You will be asked to delete the affected record. If you confirm, the repair will be performed immediately and you can continue your work.

If you encounter a problem which 4th Dimension cannot solve, you will be asked to use the data check features of 4D Tools.

In addition, checking your data regularly — even if 4th Dimension doesn't encounter a problem while accessing records — is good prevention against data integrity problems.

4D Tools offers three data check options, accessible via the following buttons:

- Check All
- Check Records
- Check Indexes.

Using these options does not modify the database.

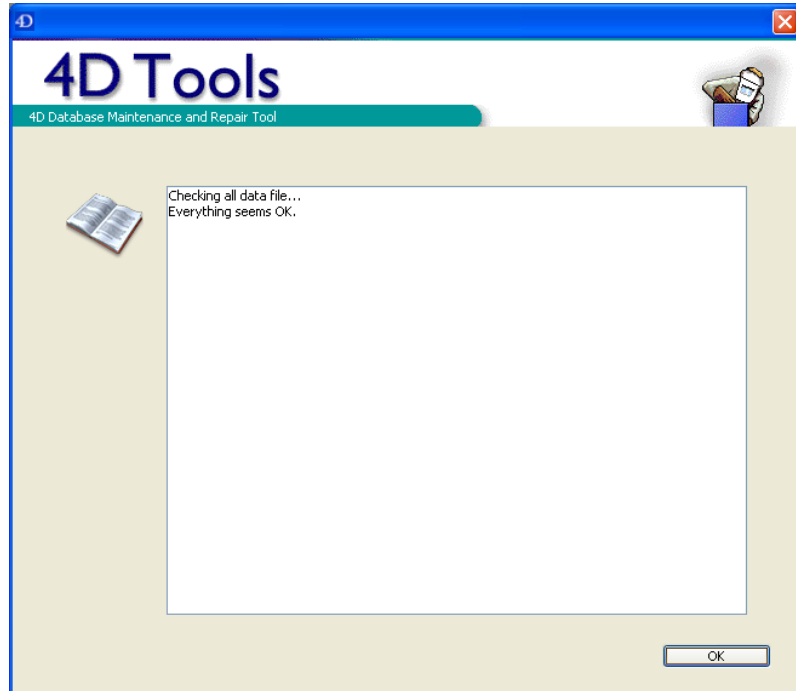
Check the Records and the Indexes

When you use the **Check All** option, 4D Tools immediately begins checking the data file. The program checks the integrity of all the records and all the indexes.

Choose this option for the regular maintenance of your database, or if 4th Dimension has detected a problem in your database that it cannot repair.

A progress indicator will appear. If errors are detected, 4D Tools either continues analyzing or stops when the maximum number of errors defined in your Preferences setting is reached. For more information refer to the section [“Setting Preferences” on page 9](#).

When checking is finished, a dialog box appears, listing the problems that were detected.



If necessary, 4D Tools also indicates the necessary repairs. 4D Tools creates a text file in the structure file's folder, named **Journal.TXT** (Windows) or **Journal** (Macintosh), which provides details of the problems detected by 4D Tools.

Click the **OK** button to close the dialog box.

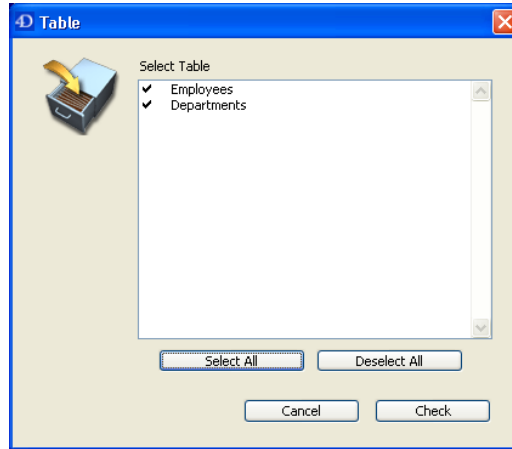
If no problems were detected, the dialog box reports "Everything seems OK."

Check the Records Only

The **Check Records...** option restricts the data check to just the records. In addition, you can select the specific tables you want to check. This option is useful when you want to do a quick check of certain tables in a large database.

Choose this option if you only want to check the records or only some of the tables of a database.

When you click the **Check Records...** button, a dialog box appears where you can select the table(s) whose records you want to check.



By default, all the tables are selected. To deselect a table, click its name. Its checkbox then disappears. To reselect it, click it again. When you are done, click the **Check** button to do the check.

If errors are detected, 4D Tools either continues analyzing or stops when the maximum number of errors defined in your Preferences setting is reached. When the check is finished, a window appears listing the problems that 4D Tools has detected. For more information, refer to the previous section [“Check the Records and the Indexes” on page 16](#).

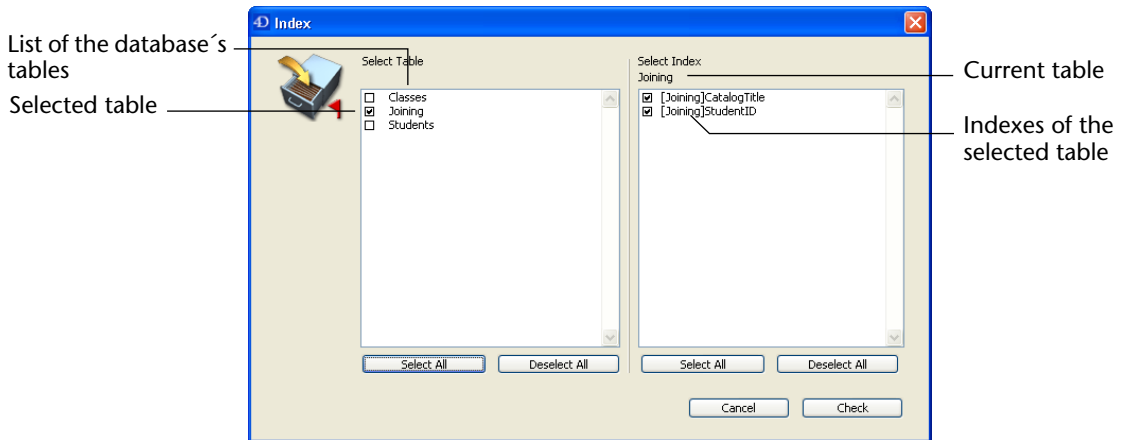
Check the Indexes Only

The **Check Indexes...** option restricts the data check to the indexes. In addition, you can select the indexes you want to check.

Choose this option if you only want to check the indexes or a specific index of a database.

Note For more information on the indexes, refer to the *4th Dimension Design Reference* manual.

When you click the **Check Indexes...** button, a dialog box appears in which you can select each index you want to check:



Select the tables the you want to check¹ from the list on the left. By default, all tables with at least one indexed field are selected; tables without indexed fields are deselected.

If more than one table contains indexes, click on the name of a table to view its indexes in the Select Index area.

The area on the right displays the indexes belonging to the table you clicked on. In the Select Index list, select the indexes to check. The **Select All** or **Deselect All** buttons allow you to select or deselect all indexes in the table whose indexes are currently being viewed. That is, “All” is not a global “All” that would refer to all indexes in all selected tables (a selected table is defined as a table with a check box to its left in the Select Table list).

When you are done, click the **Check** button to do the check.

If errors are detected, 4D Tools either continues analyzing or stops when the maximum number of errors defined in your Preferences setting is reached (see the section [“Setting Preferences” on page 9](#)). When checking is finished, a window appears listing the problems that 4D Tools has detected. For more information, refer to the section [“Check the Records and the Indexes” on page 16](#).

1. All the tables of the database are displayed, including the tables declared Invisible.

Permanent Sort

When a database is in use, users can sort the current selection using the Order By menu item (or by a custom interface control that executes the Order By or Order By Formula commands). However, this order is not saved with the database. By default, the records' sort order corresponds to the order in which they were entered.

With 4D Tools you can sort the database records permanently. Normally, you do not use this feature until all the records have been entered.

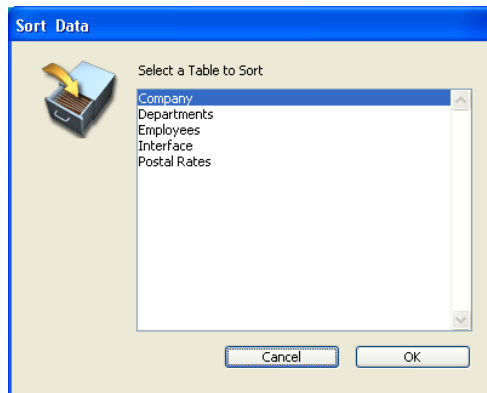
The next time the database is used, this order will appear by default. You can sort one, some, or all the tables of the database permanently.

Note Permanent sorting of a table automatically rebuilds all indexes for the table.

► To change the permanent sort order:

1 On the Maintain page, click on the Sort... button.

4D Tools displays a dialog box for selecting the tables to sort:

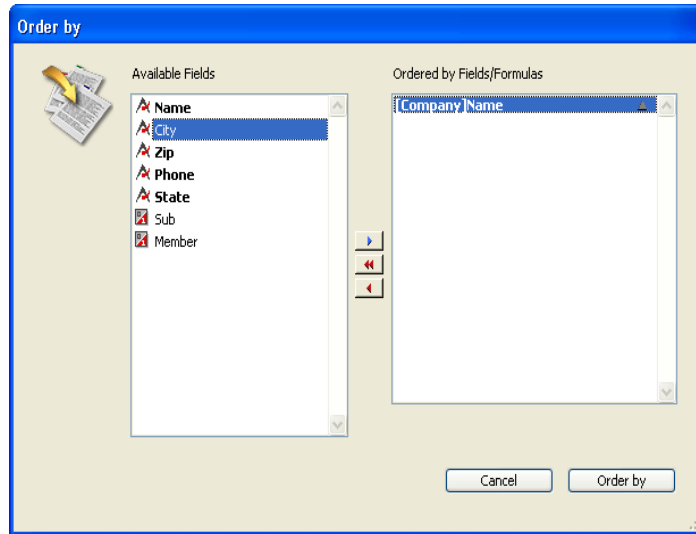


2 Select the table you want to sort and click OK.

The standard 4th Dimension Order by editor appears:

Note If the data file is damaged, 4D Tools detects the problem and suggests a repair option before beginning the sorting operation.

3 Set the desired sort parameters..



Proceed exactly the same way as for a sorting operation in 4th Dimension. For more information, refer to the *4th Dimension User Reference* manual.

4 Click on the Order by button to do the sort.

The operation takes longer than a temporary sort within 4th Dimension because 4D Tools reorganizes the address tables and reindexes the table.

5 If necessary, repeat the operation for each table of the database that you want to sort.

Compact

4D Tools can also be used to compact 4D data files. Data files may have unused space (“holes”) when records are modified and deleted. Holes are created when information no longer fits in the space it once occupied or when information is deleted. Although 4th Dimension reuses a hole when a new record can fit into it, there are always remaining “holes” that waste space and reduce the efficiency of the database. This happens when the size of the records is variable or a large amount of data is deleted.

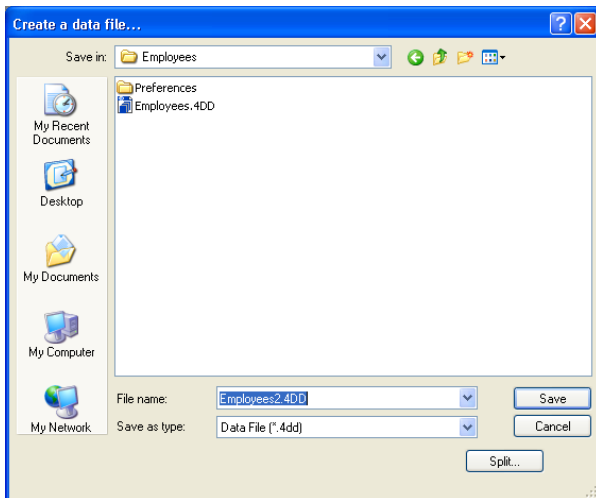
The ratio of space allocated to the data on disk and the space actually used for the data is called the *Total Used Space* of the data file (see the section, [“Data File Use” on page 12](#)). The term *fragmentation* refers only to the unused space created by data modification and deletion that occurs in normal use. This unused space is often referred to as “holes” in the data file. The remaining unused space is created internally and automatically by 4th Dimension for its own use during the process of data entry. In normal use, most of the unused space is due to fragmentation.

An overly fragmented data file reduces the performance of the hard disk, and consequently of the database. The 4D Tools Information page displays the current fragmentation of the data file.

When you compact the data file, the “holes” are deleted. The data are reorganized and optimized on the disk.

- To compact data files:
 - 1 **Be sure that you have enough room on your disk for another copy of the database.**
The process of compacting the files creates new copies of both files.
 - 2 **Click the Compact... button on the Maintain page.**

A standard save file dialog box is displayed.



By default, the number “2” is appended to the name of the data file. It is impossible to delete the original data file.

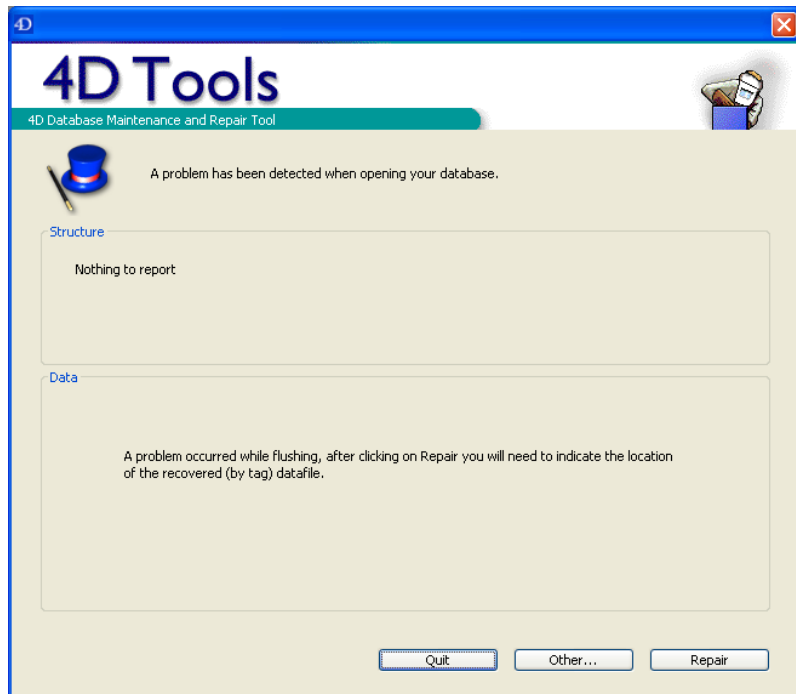
- 3 Use the default data file name or choose your own name and location for the new data file.**
- 4 Click the Save button.**

4D Tools compacts the data and stores it in the new data file. The indexes are also compacted and reconstructed.

4

The Repair Page

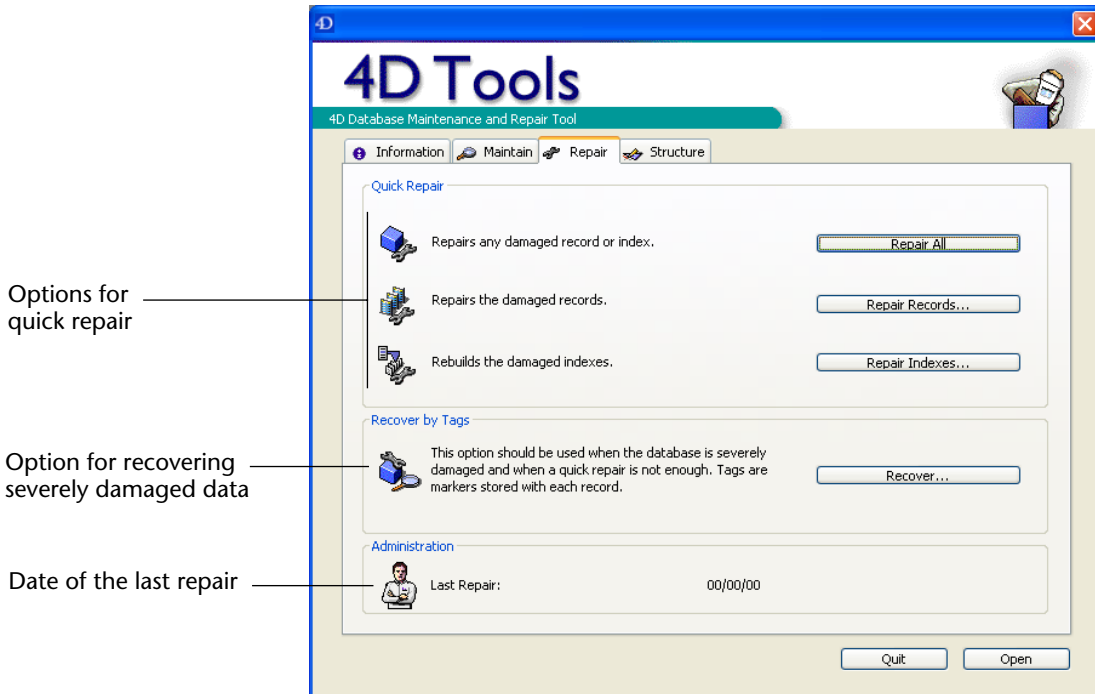
The **Repair** page contains the tools that you use to repair a damaged data file. In general, you should use these features only when requested i.e., when 4th Dimension or 4D Tools detect anomalies on opening the database or after a data check. In this case, a dialog box appears and indicates the operations that need to be carried out:



The **Repair** button immediately triggers the suggested repair and the **Others...** button displays the “Repair” page, which gives you the possibility of choosing another type of repair.

There are two sets of options for repairing a data file:

- **Quick Repair** allows you to repair records and/or indexes which are slightly damaged.
- **Recover by Tags** allows you to recover data which are severely damaged.



Quick Repair

Generally, you should use this option when 4D Tools has detected minor anomalies. When this happens the program will notify you that you have to do a quick repair.

A quick repair allows you to select the records and/or the indexes to repair. 4D Tools offers three options for quick repair, that can be accessed via the following buttons: **Repair All**, **Repair Records**, and **Repair Indexes**.

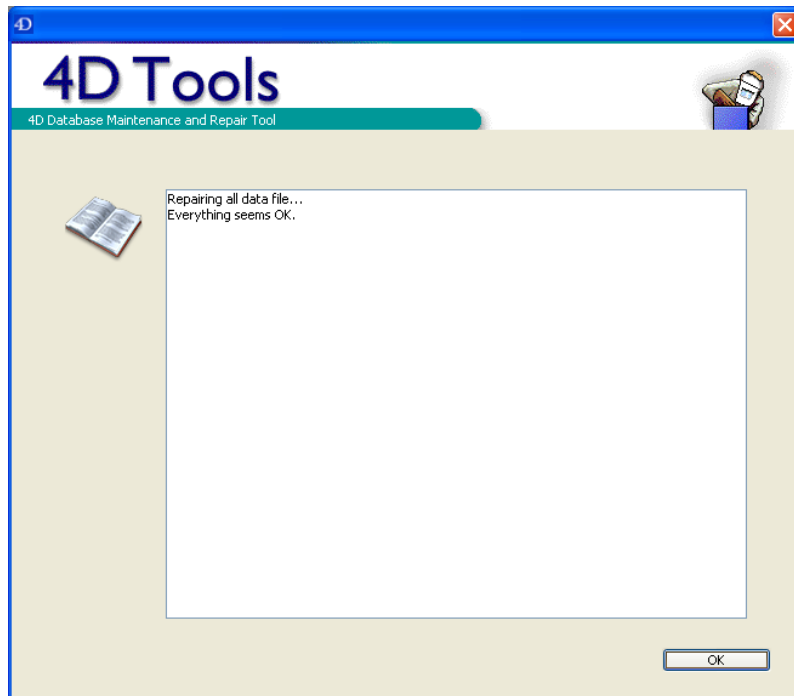
Repair All

When you click **Repair All**, 4D Tools begins to repair the data file. All the records and indexes are analyzed and repaired if necessary.

This option is the most thorough, but also the slowest, particularly when the data file is large.

Choose this option when 4D Tools requests a quick repair of your database and you don't want to restrict the repair to specific records and/or indexes.

When the repair is finished, a window with the analysis appears:



If repairs were performed, 4D Tools displays them and assigns them to the text file in the Structure file's folder, named **Journal.TXT** or **Journal** (Macintosh).

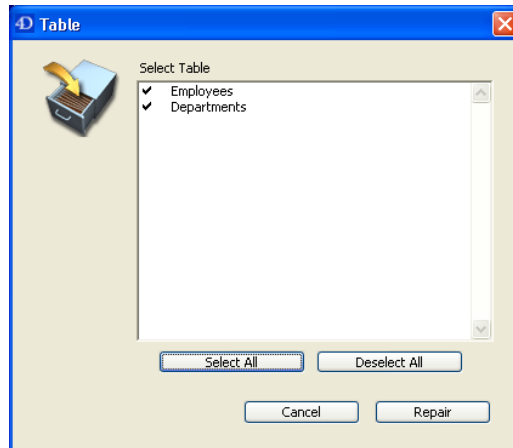
Click the **OK** button to close the dialog box.

Repair Records

This option restricts the data repair to only the records. In addition, you can select the tables you want to repair. This option is useful for repairing only the damaged part of a large database.

Choose this option if you are sure that only the records in the database are damaged.

When you click this button, a dialog box appears where you can select the table(s) whose records you want to repair:



If you know which tables contain damaged records, you can deselect the other ones: This speeds up the repair operation.

By default, all the tables are selected. To deselect a table, click its name; to reselect it, click it again.

When you are done, click the **Repair** button to execute the operation.

A progress bar appears to represent the operation underway. When the repair is finished, a window appears listing the repairs performed by the program. For more information, refer to previous section [“Repair All” on page 27](#).

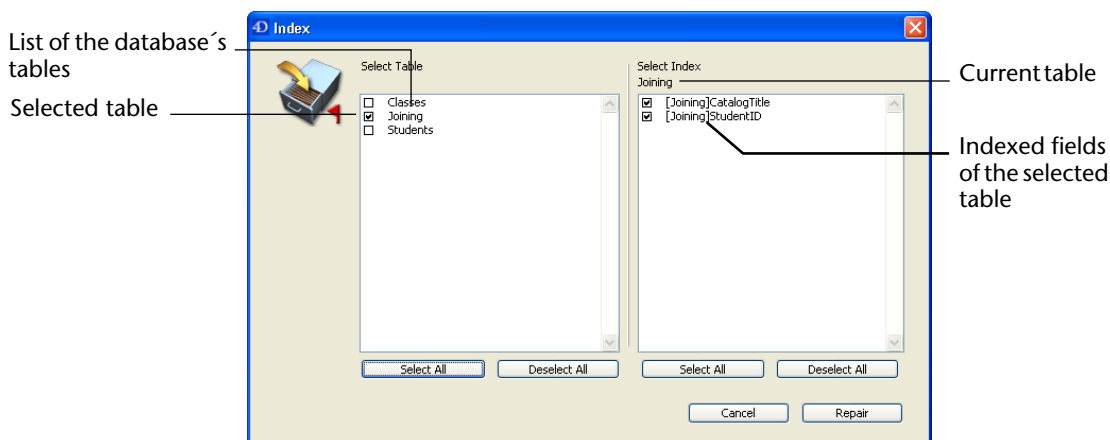
Repair Indexes

This option restricts the repair to the indexes. In addition, you can select the specific indexes you want to repair. This option is useful for repairing only the damaged indexes in a large database.

Choose this option if you are sure that only the indexes in the database are damaged.

For more information on indexes, refer to the *4th Dimension Design Reference* manual.

When you click **Repair Indexes...**, a dialog box appears in which you can select each index you want to repair:



Select the tables¹ whose indexes you wish to repair from the list on the left. By default, all tables with at least one indexed field are selected; the tables without indexed fields are deselected. Click on the name of a table to view its indexes in the Select Index area.

If you know which index(es) are damaged, you can deselect the other ones. This speeds up the repair operation.

The area on the right displays the indexes of the table you clicked on. The **Select All** or **Deselect All** buttons allow you to select or deselect all indexes in the table whose indexes are currently being viewed. That is, "All" is not a global "All" that would refer to all indexes in all selected tables (a selected table is defined as a table with a check box to its left in the Select Table list).

1. All the tables of the database are displayed, including the tables marked Invisible.

When you are done, click the **Repair** button to execute the operation.

A progress bar appears to represent the operation underway. When the repair is finished, a window appears listing the repairs performed by the program. For more information about this window, refer to the [“Repair All” paragraph on page 27](#).

Recover by Tags

This option should be used only on request by 4D Tools, when a file is seriously damaged and cannot be repaired using the **Quick Repair** options.

Please note that this option builds a new data file rather than repairing the original one. You must have enough free space on your hard disk to store a new copy of the data file.

Note You should consider the use of Recover by Tags as an extreme solution in particular circumstances. In case of an incident affecting data integrity, we recommend that you use a backup and, if the data have been modified in the meantime, to integrate the current log file. You can even configure your application so that these operations are carried out automatically when the database is restarted. For more information about the integrated back-up of 4th Dimension, refer to the *User Reference* manual.

What is Recovery by Tags?

4th Dimension’s records are of variable length. Therefore, in order to find them again, it is necessary to save their location in an address table. The program retrieves the record’s address via an index and an address table.

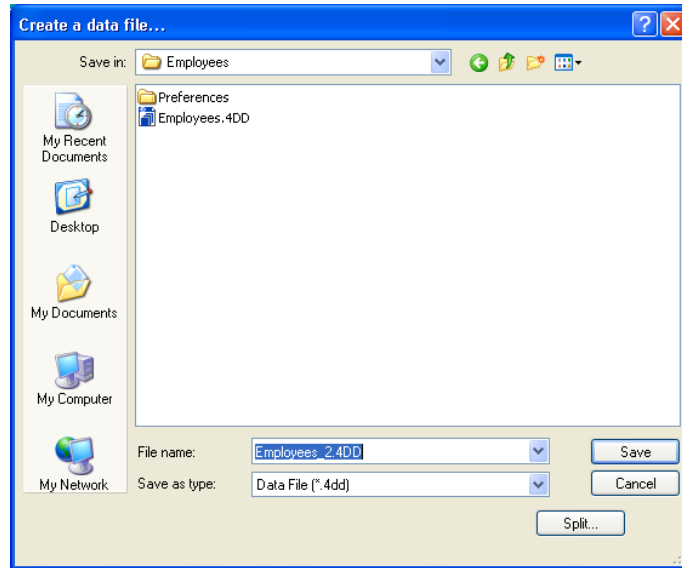
If only the records or the indexes are damaged, normally a **Quick Repair** option can solve the problem.

However, when the address table is affected, a more sophisticated recovery is necessary because it must be reconstructed.

For this operation, 4D Tools uses the markers or the “tags” stored in the header of every record. Tags are like a record’s résumé containing essential information that can be used for the reconstruction of the address table.

The Recovery

Clicking the **Recover...** button opens a standard save file dialog box where you can choose the name and location for the new “repaired” data file (by default, the suffix `_2` is added):



The program also renames the original file by replacing the last letter by the “`_`” character.

You cannot replace the original file. Make sure there is enough space for the new file on your disk (preferably, double the original file’s size).

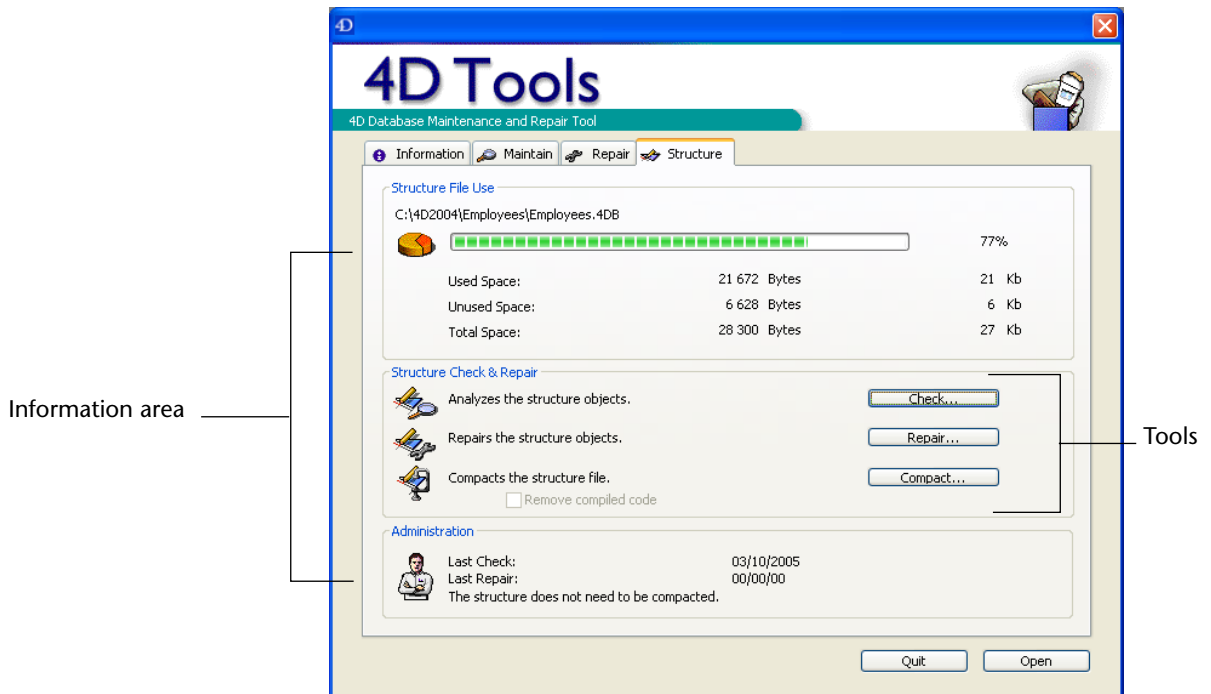
In a data file recovered by tags, some records may be deleted because they were damaged. Conversely, records already deleted may reappear if the option **Completely Deleted** was not selected in the table properties window in 4th Dimension. For more information, refer to the *4th Dimension Design Reference* manual.

5

The Structure Page

The **Structure** page contains the tools to analyze, check, and repair the structure file. These tools are for developers who want to check the structure file's integrity during development and deployment.

The **Structure** page reports on the total size of the structure file and the proportion of the total space used. It also contains options to repair or compact the structure file:



Structure File Use

This area displays the ratio of used space to total space allocated to the structure file, i.e., the *fragmentation* of the structure file. A very fragmented structure reduces the performance of the hard disk, and consequently that of the database.

An indicator displays the ratio of the actual use of the disk space and the space allocated to the structure. These values appear under the indicator in Bytes and Kilobytes (Kb).

A very small percentage indicates that the file is very fragmented. In this case, it would be a good idea to compact the file (see the [“Compacting” paragraph on page 40](#)). In the Administration area, the message “The structure needs to be compacted” appears.

Structure Check and Repair

This area contains the options for maintaining and repairing the structure file. The maintenance and repair tools are available via buttons.

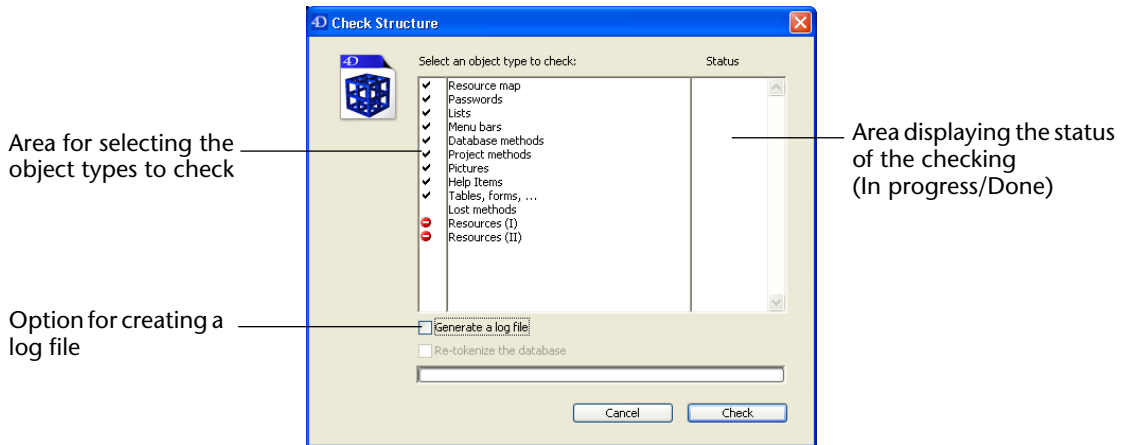
Note Checking the structure file can be carried out from the opening dialog box of 4th Dimension (for more information, refer to the *Design Reference* manual).

Check

This feature checks the structure file’s integrity. You can check all the elements of the structure or select the elements to check.

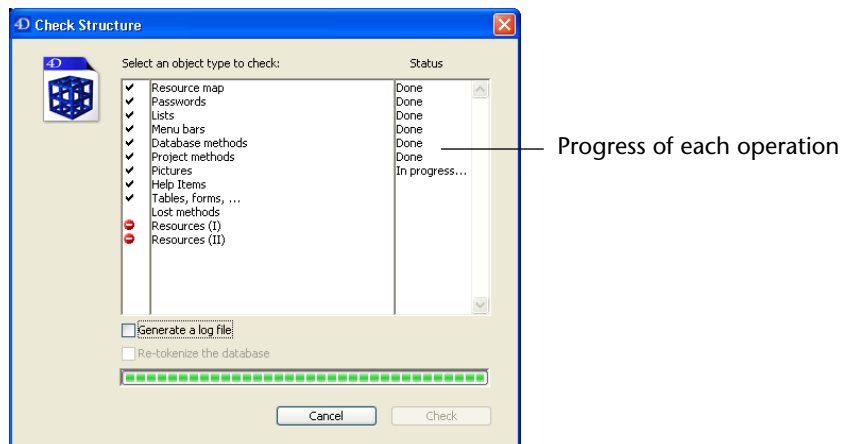
Choose this option for the regular maintenance of your structure file, or if you want to check only some object types in your database.

When you click this button, a dialog box appears, listing the object types in the structure file:



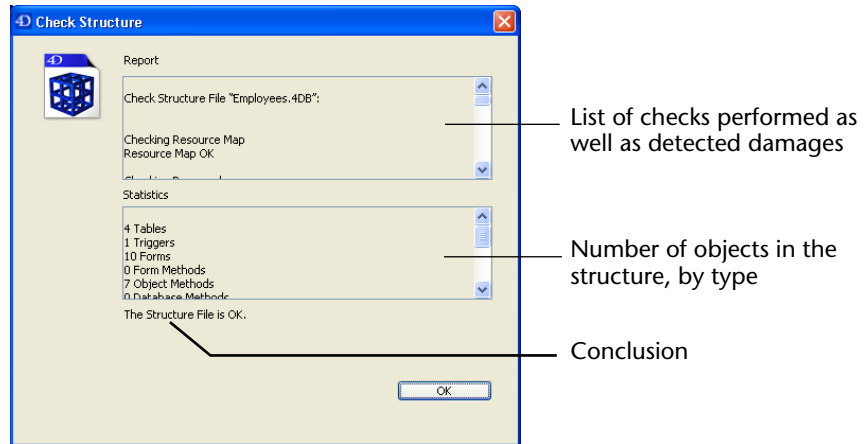
You can deselect the object types you don't want to check. For more information, refer to the section [“The Elements Checked” on page 38.](#)

When you are finished specifying the object types to be checked, click the **Check** button to execute the operation. The Status column displays the progress of the operation.



If errors are detected, the program continues analyzing or stops when the maximum number of errors set in the Preferences is reached. For more information, refer to the section [“Setting Preferences” on page 9.](#)

When the check is finished, a window appears that lists the results of the check. Any problems the program has detected are described.



Options

You can check two options before launching the check of the structure: **Generate a log file** and **Re-tokenize the database**.

- **Generate a log file:** When this option is checked, 4D Tools creates a text file named "Journal.TXT" in the folder of the structure file when the operation is completed. This file lists any observations made during the check.
- **Re-tokenize the database** (only available for a check carried out from the 4th Dimension or 4D Server application): When this option is checked, 4th Dimension analyzes the contents of all the methods during the check. Each reference (command name, method name, etc.) is tokenized and saved.

Checking the Structure File Directly

You can immediately check the structure file after having selected it in the 4D Tools' open file dialog box or via drag & drop on the desktop. This feature allows you to check a structure file without necessarily having a data file, as well as when the database is severely damaged and blocks 4D Tools when the file is opened.

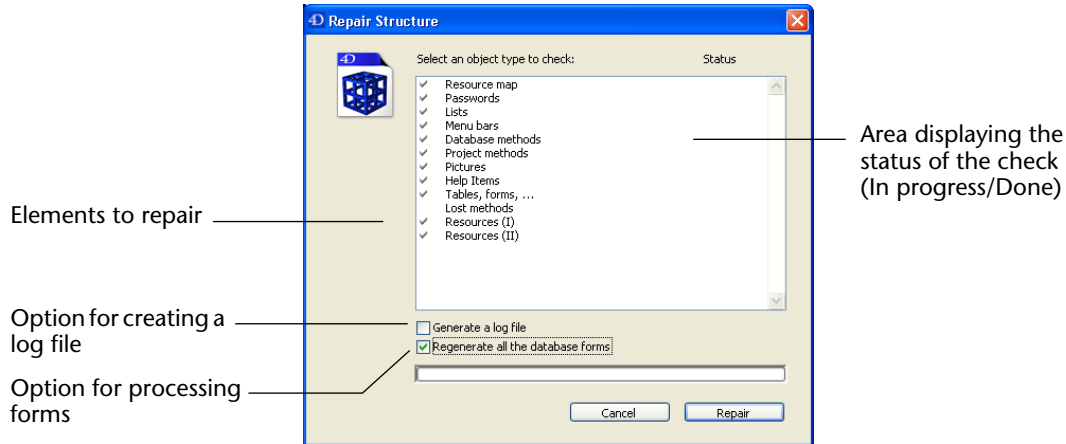
- To check the structure file directly:
 - **Open the structure file with 4D Tools while holding down the Ctrl key (Windows) or the Command key (MacOS).**
The dialog box appears with all the object types selected. 4D Tools starts the checking immediately.

Repair

This function allows you to repair the integrity problems detected in the structure file as well as the forms. You can repair all or part of the structure's object types.

Choose this option when the 4D Tools checking feature has detected problems in the structure file.

When you click the **Repair...** button, a dialog box appears, listing the object types of the structure:



All the object types are selected. In contrast to the checking feature, you cannot deselect an object type for repairing. You can only choose whether or not to repair lost methods. For more information, refer to the paragraph [“The Elements Checked” on page 38](#).

Options

You can check two options before launching the repair of the structure: **Generate a log file** and **Regenerate all the database forms**.

- **Generate a log file:** Check this option if you want 4D Tools to create a text file listing the results of the repair. For more information, refer to the [“Options” paragraph on page 36](#).
- **Regenerate all the database forms:** Check this option to update and save all the database forms during the repair procedure. After updating a database with a new version of 4th Dimension, some forms may have operating anomalies, in particular when the database is older. This option provides a solution: when it is checked, 4th Dimension “forces” the analysis and saving of the forms.

When the original database contains damaged forms, using this option may lead to undesired effects. It is thus recommended to use it on a copy of the database, that you have compacted beforehand (see the “Compacting” paragraph on page 40.

Click the **Repair...** button to execute the operation. A standard save file dialog box appears in which you can specify the name and the location of the repaired structure file. 4D Tools performs the repairs on a copy of the structure.

When this dialog box is validated, 4D Tools starts the repair process. The Status column displays the progress of each operation.

When the operation is finished, a dialog box appears listing the repairs that were done. If you checked the **Generate a log file** option, 4D Tools creates a text file in the structure file’s folder, named **Journal.TXT** (Windows), or **Journal** (Macintosh), with the information shown in this dialog box. If a file with this name already exists in the structure file’s directory, the information will be added to the end of the document.

The Elements Checked

The following table describes the checking and repairing procedures by object type:

Object Type	Checking Procedure	Repairing Procedure
Resource map	Checks the integrity of the resources (low level)	
Passwords	Loads the password table	If 4D Tools encounters a problem loading the password table, it will try to recover the designer’s password. All other users and groups will be deleted. In the repaired database, the password table only contains the Designer (if its name had been changed, the new name will be restored). If the database is extremely damaged (if, for example, the password is missing), checking will be terminated. 4D Tools writes a list of the objects whose access privileges have been removed to the log file.
Lists	Checks the resources related to the lists	If a list is referenced but does not exist, it will be created. If a list exists but is not referenced, a reference to it will be created.

Object Type	Checking Procedure	Repairing Procedure
Menu Bars	Checks the resources related to the menu bars and menus	If a menu bar is damaged, it will be replaced by a generic ¹ menu bar 1. If a menu bar is referenced but does not exist, it will be created (blank). However, if a menu bar exists but is not referenced, or if a menu exists but is not referenced in a menu bar, it will be deleted.
Database Methods	Checks the resources related to the database methods	If a database method is referenced but does not exist, it will be created (blank). If a database method exists but is not referenced, it will be recovered if the "Looking for Lost Methods" option has been checked (see "Lost Methods," below)
Project Methods	Checks the resources related to the project methods	If a method is referenced but does not exist, it will be created (blank). It is possible to recover damaged methods if the "Looking for Lost Methods" option has been checked (see "Lost Methods," below).
Pictures	Checks the resources related to the pictures. Indicates the number and IDs of the unused pictures	If a picture is referenced but does not exist, it will be created (blank). If a picture exists but is not referenced, a reference to it will be created.
Help items	Checks the resources related to the help tips. Indicates the number and IDs of the unused help tips	If a help tip is referenced but does not exist, it will be created. If a help tip exists but is not referenced, a reference to it will be created.

Object Type	Checking Procedure	Repairing Procedure
Tables, forms, etc.	Checks the structural integrity of the database (logical level). Checks the resources related to the tables, triggers and forms.	If the structure of the tables/fields is faulty, 4D Tools will stop the repair procedure. The database is no longer usable. If the internal references of a table are damaged, the forms linked to this table will be lost. Only the object and form methods can be retrieved as "lost methods" (see "Lost Methods," below). If a form is damaged, it will be replaced by a generic form containing a Cancel button. Only the form method will remain attached to the form. Other objects on the form will be lost. The methods of these objects can be recovered as "lost methods" (see "Lost Methods" below). For each form, 4D Tools checks whether there is a form method and/or object methods. If a form method or object method is referenced but does not exist, it will be created.
Lost Methods	Retrieved "lost methods" are saved as project methods. This option is active only if the "Database Methods," "Project Methods" and "Tables, forms, ..." options were selected. These three options must be selected to make it possible to establish a list of methods that are not referenced by any other object. This list, therefore, becomes the lost methods list.	
Resources (I)	Checks the integrity of the pseudo-resources in 4D. This object type is systematically controlled in checking operations.	
Resources (II)	Checks the integrity of the MacOS resources in 4D. This object type is systematically controlled in checking operations.	

1. "Generic" menu bars only contain the standard **File** menu. Generic methods and lists are created blank. Generic forms only contain the **Cancel** button.

Compacting

4D Tools allows you to compact structure files.

Just like data files (see "[Compact](#)" on page 22), structure files can develop unused space ("holes"). As you design a database, the structure file develops holes when you modify and delete objects such as forms and methods. Holes are created when information no longer fits in the space once occupied or when information is deleted. Although 4th Dimension reuses a hole when another object can fit into it, there are always holes that cannot be reused.

The ratio of the space actually used for the structure to the size of the structure file on disk is called the *fragmentation* of the structure file. An overly fragmented structure reduces the performance of the hard disk, and consequently that of the database. The Structure page displays the current fragmentation of the structure file. For more information, refer to the section “[Structure File Use](#)” on page 34.

When you compact the structure file, the holes are deleted. The structure is reorganized and optimized on disk.

► To compact the structure file:

1 Be sure that you have enough room on your disk for a copy of the compacted structure.

The process of compacting the files creates a copy of the file.

2 Click the Compact... button on the Structure page.

A standard save file dialog box appears.

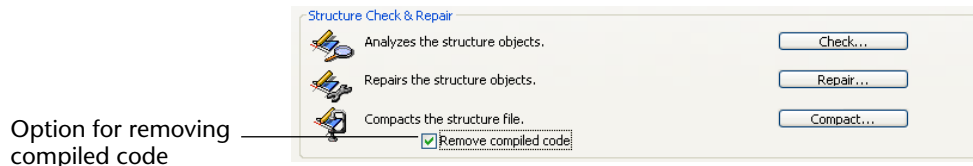
3 Use the default file name and location or choose your own name and location for the new structure file.

By default, the number “2” is appended to the name of the structure file. You cannot delete the original structure file.

4 Click the Save button.

4D Tools makes a copy of the file with the compacted structure.

Remove Compiled Code This option is only active when the structure file contains compiled code. When it is checked, compacting is accompanied by deletion of the compiled code found in the file:



In certain cases, this option can make for a considerable gain in space.

Administration

This area displays messages that help you monitor the structure's status. First, 4D Tools indicates the date of the last check of the structure or 00/00/00 if the structure has never been verified. If the date is very long ago, 4D Tools recommends that it be checked. For more information, refer to the section [“Check” on page 34](#).

4D Tools also displays the date of the last repair of the structure.

It also displays messages concerning the current status of the structure. If your structure is very fragmented, the message “The structure needs to be compacted” is displayed.

It is recommended that you regularly check the dates and messages in the Administration area.

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