Hdb2Win

Application Cook Book

Version 2.6 – March 2025

1 General remarks

1.1 What contains this document?

This document is a brief description how to create applications for the database management system Hdb2Win. The Hdb2Win package includes three published applications – PaleoTax, PalCol, and Oliva. An application encompasses a set of tables (which are in a certain way connected to each other) and a set of programmes to display, analyse and output data. Even if it looks like that, but the applications do not form part of the database system. It is comparably easy to create applications on their own, at least the part of the data structure. To analyse and output data is still a more complex matter.

1.2. In what consists an application?

An application consists primarily in a set of interconnected database tables. The tables and their interconnections should follow the model of normalisation. Secondarily, the application consists of

(1) a small describing parameter file (*.APP),

(2) a start-up file (*.PTX), and

(3) an (optional) EMF, BMP, JPG, or WMF image.

Having the tables and the three mentioned files, it is possible to work with the database as an application, to append data, to search for them etc. Only analysing and more complex output operations need some more manual work.

1.3 Which software is needed?

You need a complete installation of Hdb2Win from version 2.6 on (published applications such as PaleoTax or PalCol are not needed). A vector graphic programme helps you to create your own application background.

1.4 Which hardware is needed?

Nothing extraordinary special. Processor speed is not important. A few megabytes of free hard-disk space is needed for the database programme, and the space for your data (256 MB of free main memory is enough even for large databases).

2 How to get started?

The creation of a new application consists in four steps:

1. Creating the data structure and creating the tables
2. Modifying the background image (BMP, EMF, JPG, WMF)
3. Writing the application parameter file (APP)
4. Writing the start-up file (PTX).

2.1 Data structure

The design of the data structure is the must crucial part of the application because it describes entirely the problem you want to solve with your database application. Everything else is anyhow only 'technical'. So you need to think thoroughly about the objects you want to record with the database programme. A database consists of various tables; a tables is structured into fields and has records. A field may be the name, address, phone number etc. in a address table, a record corresponds to a person, and another record corresponds to another person. A data field has a data type.

2.1.1 Design

The database model insists that for all data that belongs to a certain class of objects, separate tables must be created. In a database of persons, countries, cities, addresses, and person names must be stored in different tables. The person tables has beside the information on the person (name, surname, phone number, e-mail) a reference to an item in the address table. The address consists of a optional institution, a street name and house number and a reference to a city table. This table has the postcode and a reference to the city name table. The city name table has the name of the city, the phone area code, and a reference to the table of countries which finally has the country name, the country phone code, and the postal abbreviation. Graphically it looks like this:

Table of Persons - PERSONS	**Table of Addresses - ADDRESS**	**Table of Cities - CITY**
Name	Institution*	City postal code*
Surname	Street*	City name ⇨ Table of city names*
Phone	House number	
E-Mail Address	City name ⇨ Table of cities*	
Address ⇨ Table of addresses		

Table of City Names - CITYNAME	**Table of Countries - COUNTRY**
City name*	Country name*
Country ⇨ Table of countries	Country phone code
City phone code	Country postal abbreviation

What is the behind this splitting of data? First, the rules say that any single data must not be stored twice (a single data in our example is the name of a city, an address or a country). Imagine that suddenly the name of country will change, the country name is stored in various places in the database. In this case the data need to be manually updated which may be a source of errors and inconsistency. The model forbid redundancies, so nothing must be stored more often than only one time. For this reason, any objects which belong to the same type of data are stored in one table.

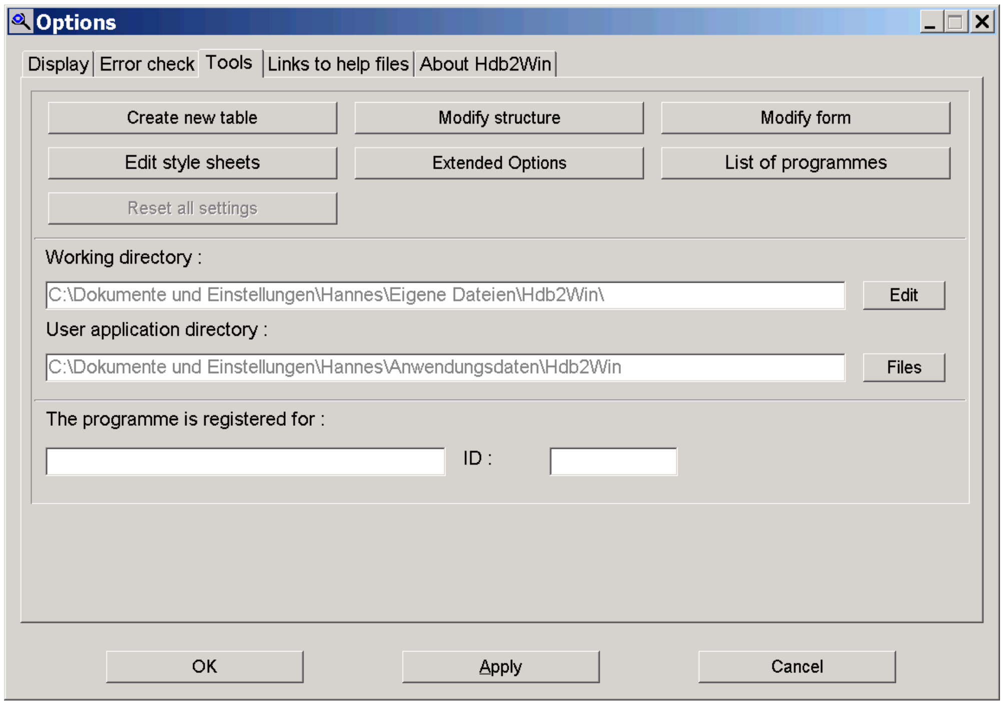
When here is referred to "references" to a table (see the arrows in the above table) it means that one field in a table refers ("is connected to") a specified record in another table. So the address in the main table of persons in the above example is not contained in the table of persons, but in the table of addresses and in the table of the persons is only a link to a record in the table of addresses.

Whereas a database of addresses is somehow trivial, a database for instance of flight booking is more sophisticated. There are travellers, there are flights (from and to airports), there are travels, aircraft, seats in the aircraft, booking classes, prices, special menus etc. etc. The database of addresses consists only of five tables, but a database may easily encompass fifty or hundred tables.

The first step to design a data structures is to collect the different data types (which will later form tables). It is useful to make a list of different data types and to examine how they depend from each other and how they are interconnected, and to list for each data type (table) the data fields. Data fields can be strings (up to 250 characters wide), numbers (integer, without decimals; or real numbers with decimals), logical (allowing only false or true), larger texts, images and references to records of other tables. All other types (links to external files, binary objects) are not part of the DBF standard and are realised in a different way.

2.1.2 Creating tables

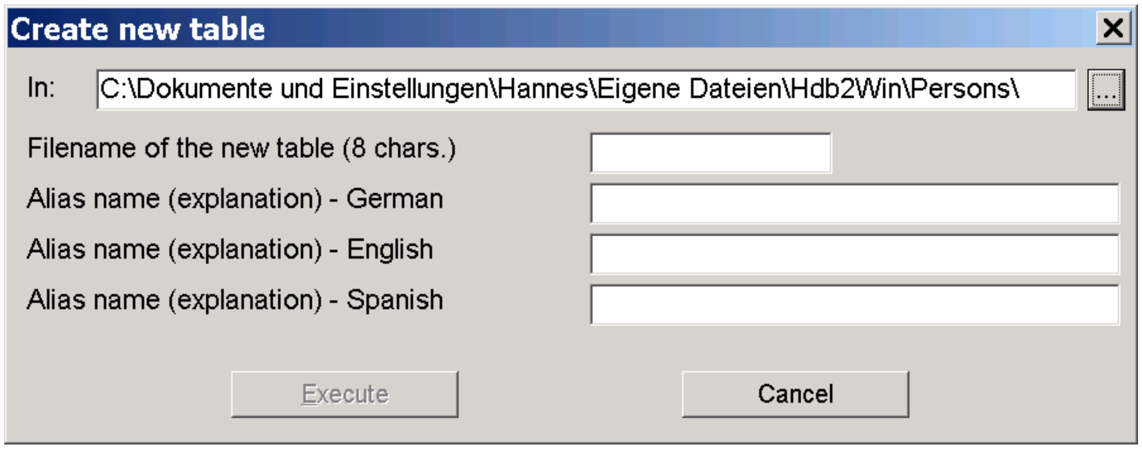
After having finished the design, the tables must be created using the database system. Please ensure that your current working directory - preferably C:\Users\<user name>\Documents\Hdb2Win\ (Windows 7 onwards) or c:\Documents and Settings\<user name>\Documents\Hdb2Win\ (Windows XP) - is correctly assigned (PaleoTax / Options / Tools):



Working directory :
C:\Dokumente und Einstellungen\Hannes\Eigene Dateien\Hdb2Win\
User application directory :
C:\Dokumente und Einstellungen\Hannes\Anwendungsdaten\Hdb2Win
The programme is registered for :
ID :

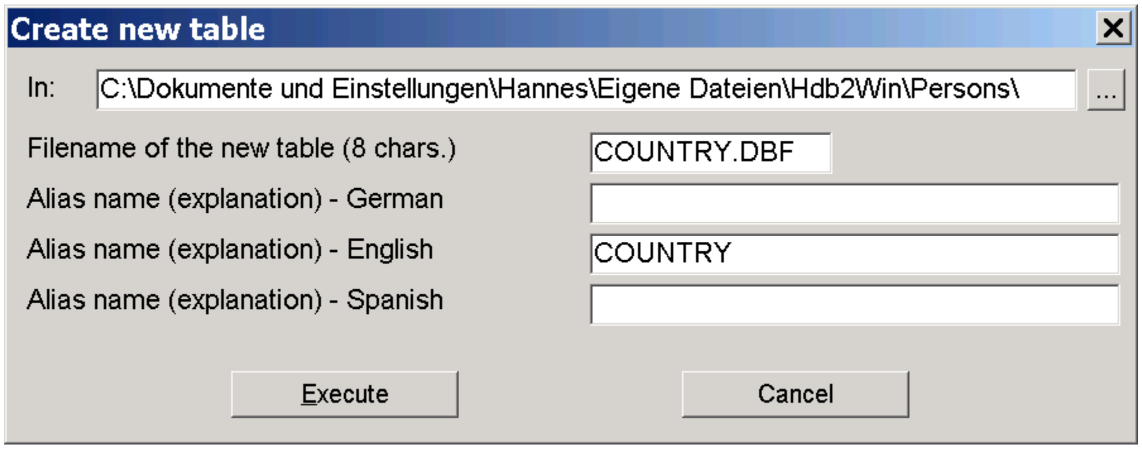
Create a new data folder in your working directory, for instance in our example Persons. The second step is to launch Hdb2Win again, choose Application Library > Options > Tools > Create new table.

Choose in the form the above created data path:



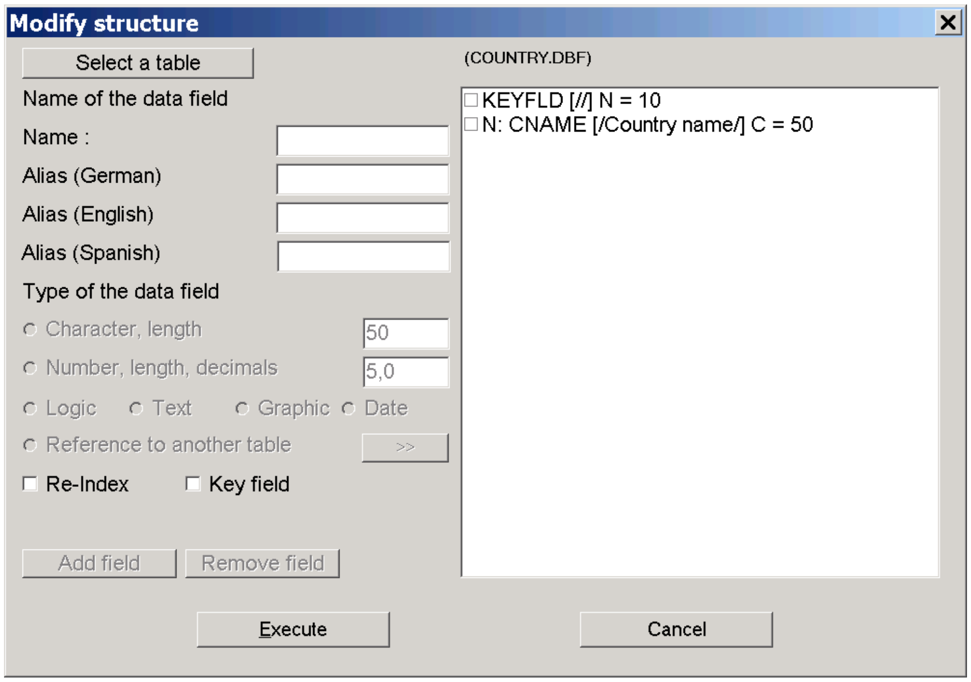
In:	C:\Dokumente und Einstellungen\Hannes\Eigene Dateien\Hdb2Win\Persons\
Filename of the new table (8 chars.)	
Alias name (explanation) - German	
Alias name (explanation) - English	
Alias name (explanation) - Spanish	

Start with the tables that do no refer to any other tables (in the above example only the table of the Countries). Enter the name of the table: see the list above and apply the names in blue capitals (you do not need to put the .DBF). Give a longer explication in your preferred language:



In:	C:\Dokumente und Einstellungen\Hannes\Eigene Dateien\Hdb2Win\Persons\
Filename of the new table (8 chars.)	COUNTRY.DBF
Alias name (explanation) - German	
Alias name (explanation) - English	COUNTRY
Alias name (explanation) - Spanish	

Click on Execute to start with the creation of the table:

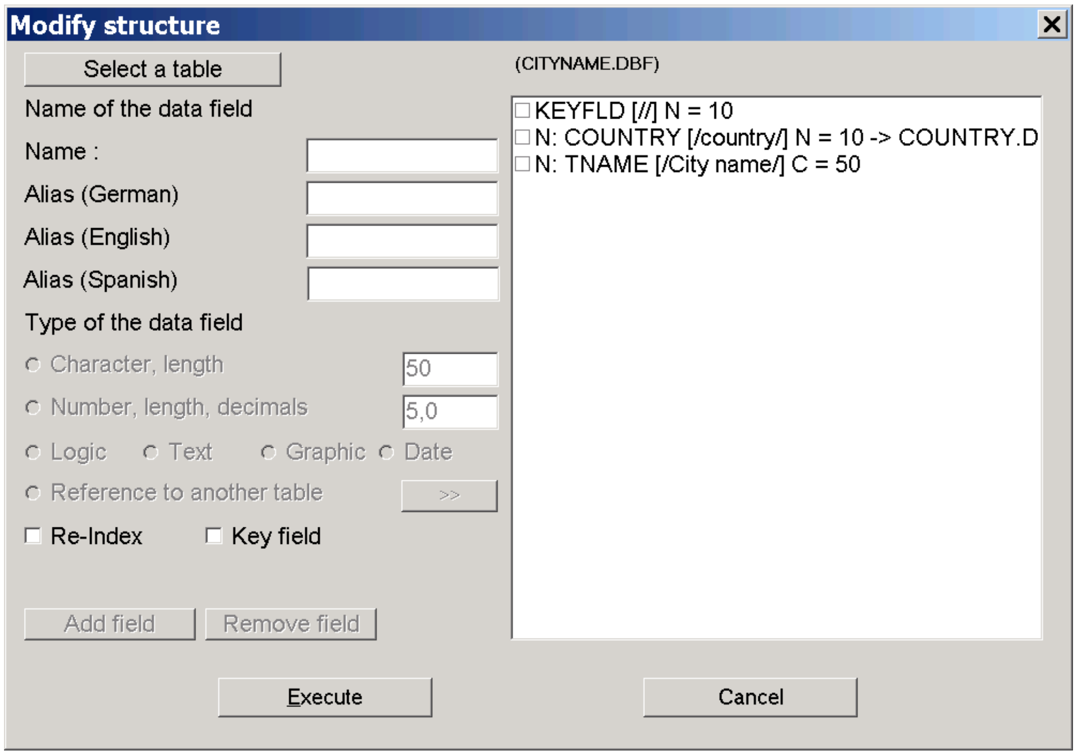


(COUNTRY.DBF)

KEYFLD [//] N = 10
N: CNAME [/Country name/] C = 50

50
5,0

Leave the “KEYFLD” unchanged. Give a name to each field (not more than eleven characters for the field name) and give explications in your language. Define type and length of each field. Interconnected fields require (click on the button with the >>) the selection of another table, the fields which should be shown for selection and the fields which should be shown in the higher ranking table (in the above list these fields are marked with *). Click in "Add field" when ready.



(CITYNAME.DBF)

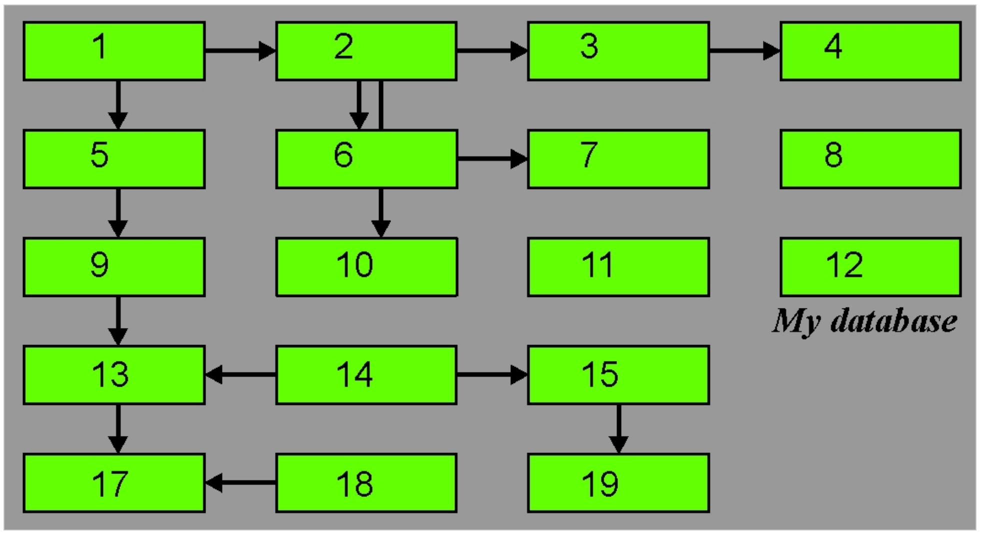
KEYFLD [//] N = 10
N: COUNTRY [/country/] N = 10 -> COUNTRY.D
N: TNAME [/City name/] C = 50

50
5,0

Click on "Execute" when ready with the table. You may modify the form, but you can do this later as well. Create the next table. You can always return to a a table, add and remove fields.

2.2 Background image

The background image is optional from version 2.6 on. The initial and principal form of the application is an image with boxes and arrows. The boxes represent tables that are frequently used, the arrows represent the connections between them. Together with this documentation, files in various formats (cookbook.CDR, *.WMF, *.EMF, *.JPG) are made available that can be modified and saved preferred as EMF files. See the standard file on the following page.



The numbers are just for your orientation; you will need them later. But in the final version they are not shown. Also the boxes for your orientation and are not shown because the database creates the boxes itself. The boxes only help you in the design. You may remove boxes, but you should not change their position nor add new boxes. There must remain at least one box. Do not be surprised about the high number of boxes. The address application is a very simple application; but there are applications which may have one hundred tables of which 15 are really important and often need direct access. So if you have a small application you should plan for every table a box, but if you have an application with many tables, you should only reserve boxes for the most important tables. The boxes are currently numbered from left top to right bottom, so the first row encompasses the boxes one to four, the second five to eight, etc. Please note that box 16 and 20 are not available. You may put names into the boxes, but should be aware not to export this text. You may use the free space beyond the boxes for texts or even images (that are exported). You may also change the colour of the background. The colour of the boxes is set within the database programme. – In the end you should know which table will be in which box because this information is needed for the next step. If a JPG or BMP is created, it should have an proportion of approximately 1:0.54 (or 135:73mm as in the example). When exporting a EMF or WMF, there is no resolution to be set. When exporting a bitmap, it should be a multiple of the above values, depending a bit on your screen size. On a standard screen of 1024x768 pixels, the image should have 1000x540 pixels. On a UHD screen of 2600x1800 pixels, the size should be around 1350x730 pixels.

2.3 Application parameter file (APP)

The application file is a simple ASCII file that briefly describes your application and helps Hdb2Win to identify the tables and to find the background image file. The application file must have an eight letter name with the three letter extension APP. To create an ASCII file, use the Interpreter of Hdb2Win.

The file format is simple:

```
keyword,value[,value]
```

A keyword word is followed by a comma, a value, and in some cases a second value. There are currently only four key words. Any application file must have all of them!

2.3.1 Main file

The key word ‘main file’ is followed by the name of the table that has the focus when the application is started; it is usually the table which is most frequently used. For instance:

```
Main file,PERSONS
```

2.3.2 Background image

The image is optional. The key word graph file contains the name of the background image. It may be a image (vector or bitmap) file.

```
Graph file,PERSONS.EMF
```

2.3.3 Id of the application

Any application must have a three letter code which you may define as you want.

```
ID,PER
```

2.3.4 File list

The file list describes which tables are shown in the boxes of the images. So here you have to give the name of the table and its position as described above. The numbers correspond to the numbers in the boxes:

```
File,PERSONS,5

File,ADDRESS,6

File,CITY,10

File,CITYNAME,14

File,COUNTRY,18
```

It is very important that you give here the names of the files you have created. Any mistake will result in an error message.

2.4 Startup file (PTX)

The start-up file is a simple ASCII file which opens the database and connects the database with an application. Start-up file and applications are kept separated because you may have various structurally identically datasets of the same application. In this case you need various start-up files (each database demand its own start-up file) but only one application file. The start-up file must be a eight letter name with a the three letter extension PTX. Actually it is a programme file of the Hdb2Win internal interpreter. The start-up file opens the tables of the database. If one table refers to another table (here, for instance, the table of persons refers to the table of addresses), it is not necessary to open the referred table (addresses) because the table that refers to another table, opens it automatically. But any table to which no other table refers must be opened.

So, all independent tables need be opened. The code word is OPEN:

```
open persons,7
```

The number 7 is a parameter that should not be modified.

The name of the application should be assigned as well in the start-up file:

```
MOV  APP,'Persons'
```

The structural level must be indicated. This is like a version for the structure and can be zero:

```
MOV  SR,0
```

For the current project, these three lines constitute already the start-up file.

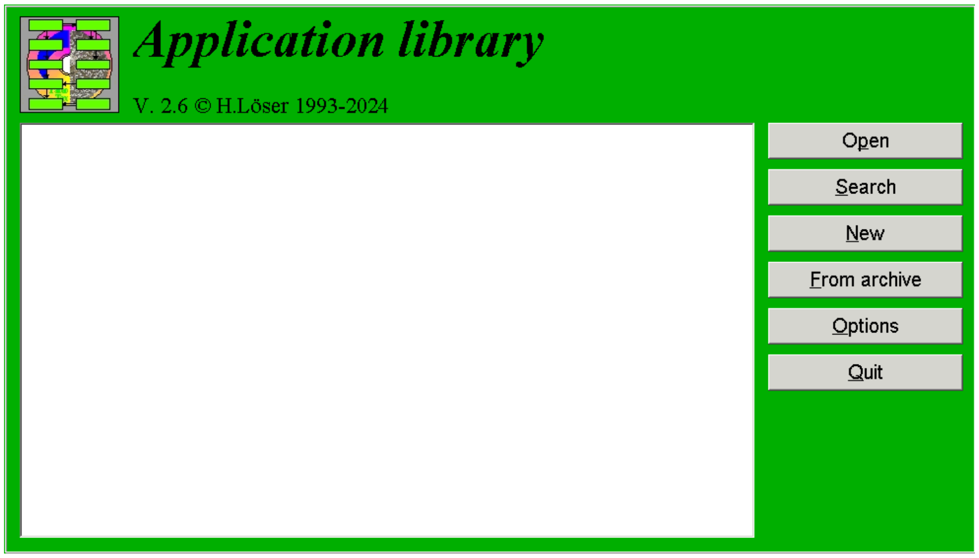
2.5 File location

All three parameter files should be in the data directory together with the database, so normally in C:\Users\<user name>\Documents\Hdb2Win\ (Windows 7 onwards) or C:\Documents and Settings\<user name>\Documents\Hdb2Win\ (Windows XP).

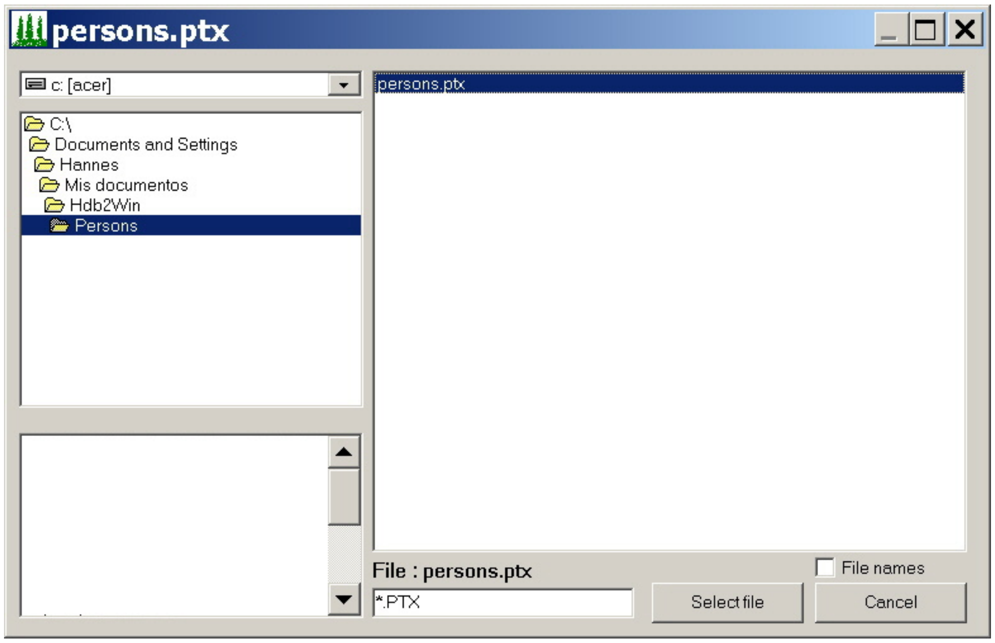
3 Work with the new database

3.1 Register the database

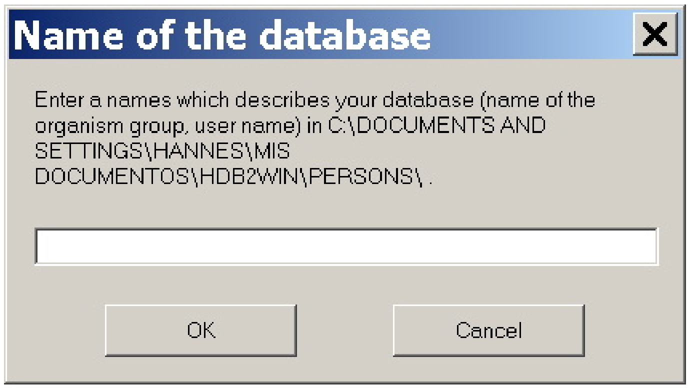
Open Hdb2Win and select Application Library. The list of databases will be empty:



To register your new database, you have to click on Search and search in the data directory the startup file persons.ptx:



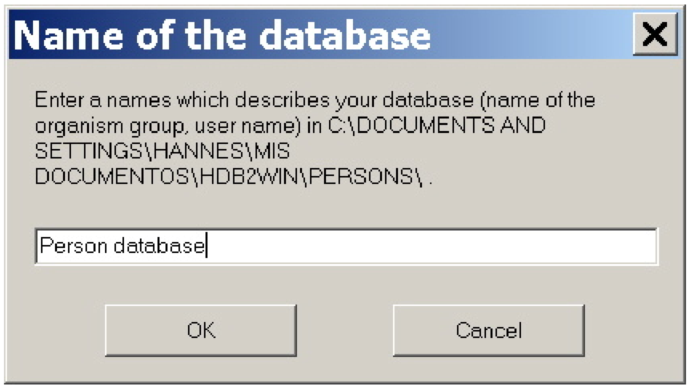
After you have selected the file, the programme will ask you for a real name for the database:



Name of the database

Enter a names which describes your database (name of the organism group, user name) in C:\DOCUMENTS AND SETTINGS\HANNES\MIS DOCUMENTOS\HDB2WIN\PERSONS\ .

For instance like this:

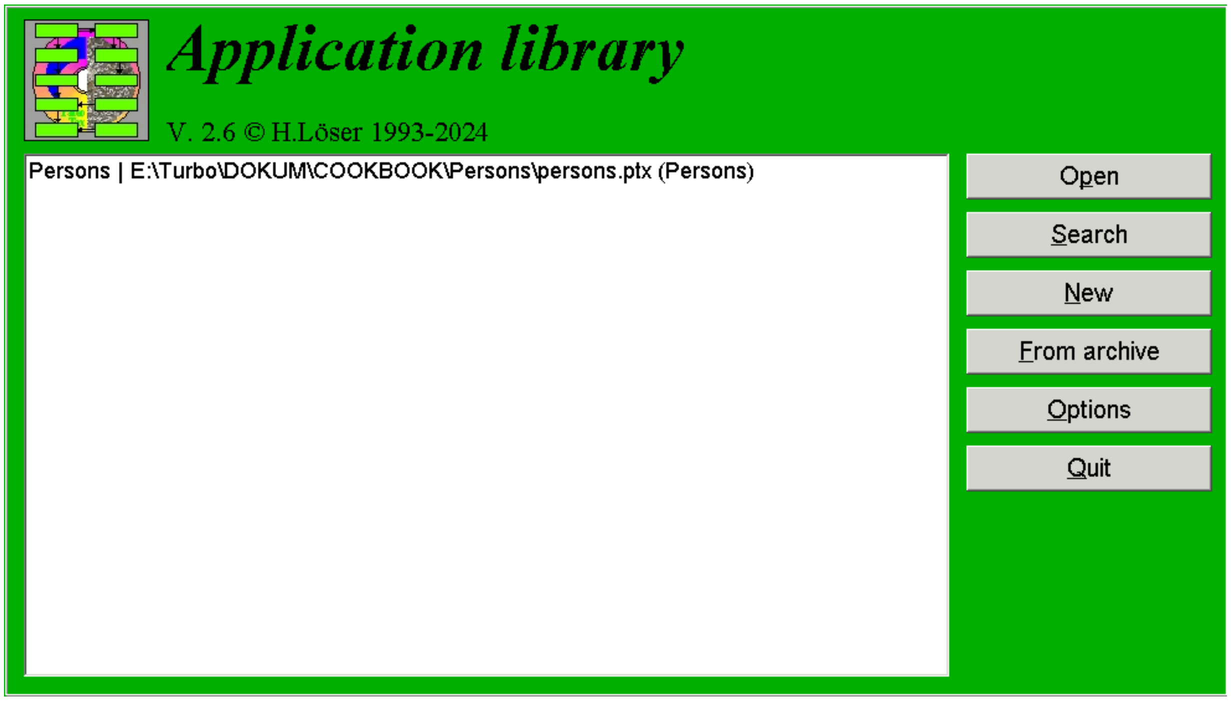


Name of the database

Enter a names which describes your database (name of the organism group, user name) in C:\DOCUMENTS AND SETTINGS\HANNES\MIS DOCUMENTOS\HDB2WIN\PERSONS\ .

Person database

Now the database appears in the database list. That means that is has been successful registered.



Application library

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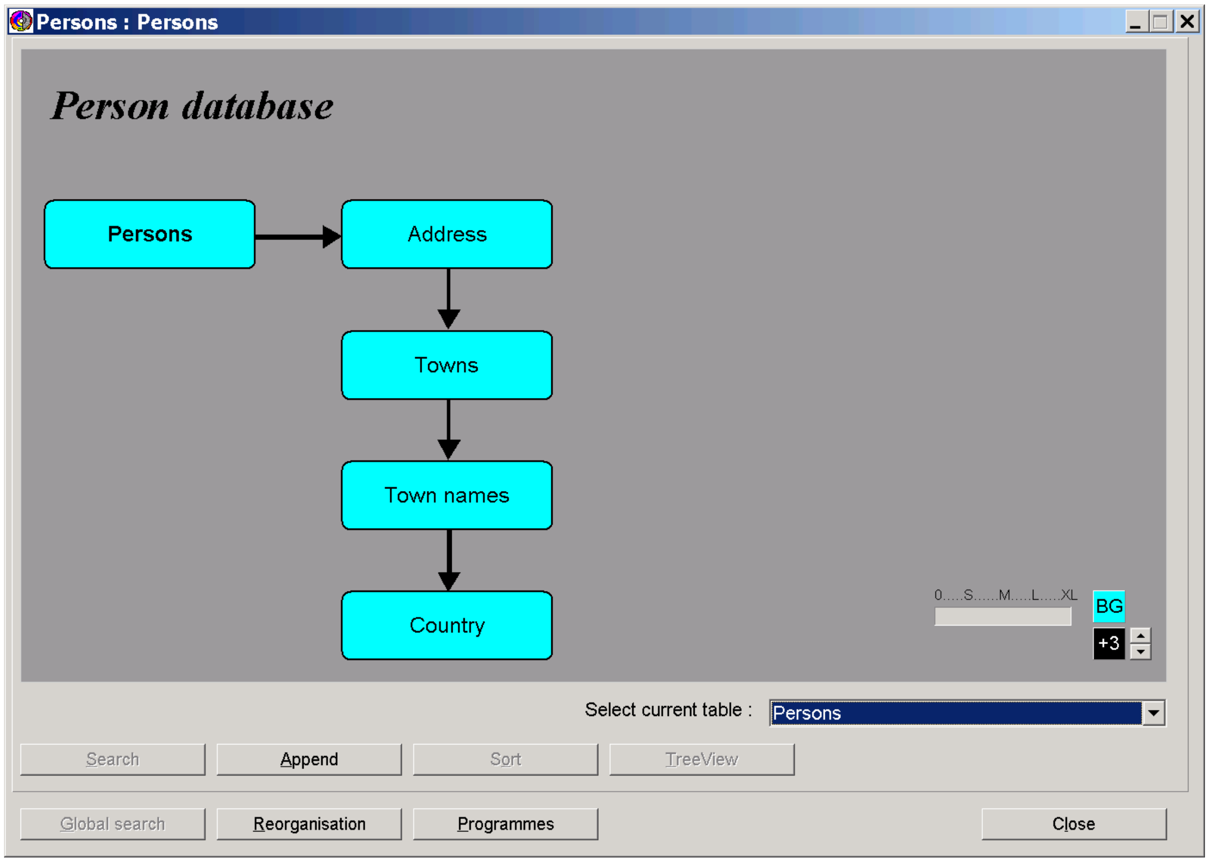
Persons | E:\Turbo\DOKUM\COOKBOOK\Persons\persons.ptx (Persons)

3.2 Open the database

To open the database just click on Open:



4 Limitations

The functionality that offer published applications such as PaleoTax and PalCol are not available in a newly created application. For instance the reorganisation menu is limited; only the creating of the access files and the backup copy is included.

All other functions are hidden in external interpreter programs:

Remove temporary files – DELTEMP.PRF (present in the example folder)

Various index files – INDEXP.PRF*

Global search – MGI.PRF*

Find unused records – CHCKBASE.PRF*

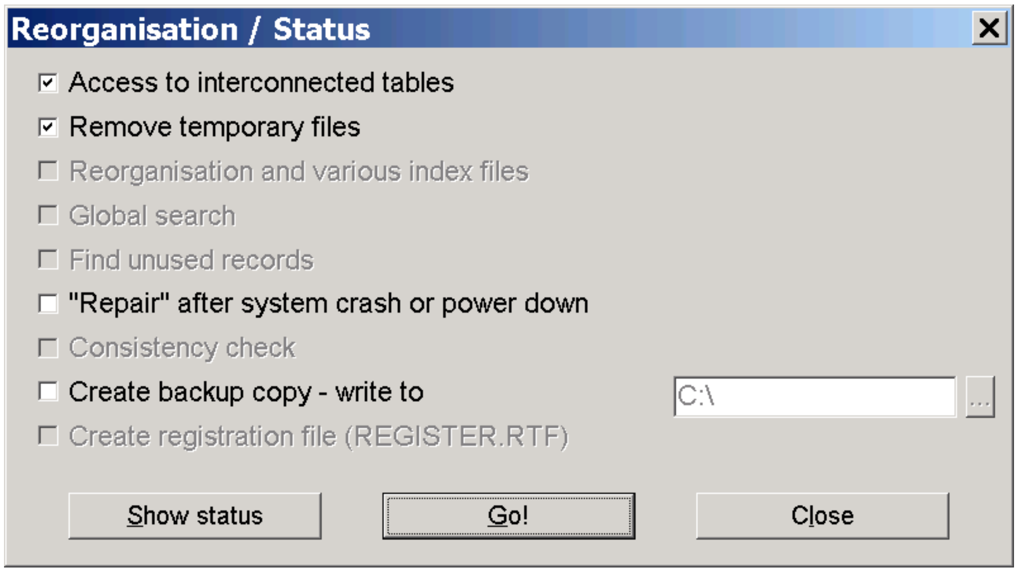
“Repair” ... – TESTINTG.PRF (present in the example folder)

Consistency check – CONSIST.PRF*

Create registration file – REGISTER.PRF

(*) Some of these programs depend directly on the data structure and need special adaptation.

The same applies to sort and search options.



Reorganisation / Status

- [x] Access to interconnected tables
- [x] Remove temporary files
- [ ] Reorganisation and various index files
- [ ] Global search
- [ ] Find unused records
- [ ] "Repair" after system crash or power down
- [ ] Consistency check
- [ ] Create backup copy - write to C:\
- [ ] Create registration file (REGISTER.RTF)

5 Files

In a separate ZIP archive cb-26.zip you will find a folder Persons that contains the database created as an example. In a second folder Template you will find a template for the background image in four different formats.

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