

User Manual for datatooltk version 0.4b

Nicola L. C. Talbot

www.dickimaw-books.com

2013-07-09

Contents

1	Introduction	3
1.1	What it isn't	5
1.2	File Extensions	5
1.3	Verbatim	6
2	Graphical Mode	9
2.1	Cell Editor	10
2.2	Header Dialog	10
3	Tools	13
3.1	Sorting the Data	13
3.2	Shuffling the Data	16
3.3	Sorting and Shuffling	21
3.4	Plugins	24
4	Importing Data	33
4.1	Import CSV Data	33
4.2	Import SQL Data	34
4.3	Import probsoln Data	35
5	Templates	39
5.1	Writing a Template File	39
6	Application Properties	42
7	Licence	49
	Glossary	56
	Acronyms	57
	Index	58

1 Introduction

The \LaTeX `datatool` package is able to save databases in its own internal format to allow for rapid loading (using `\DTLsaverawdb`). Files in this format are difficult to edit and only a \TeX pert should attempt it, but they are by far the fastest way of loading a `datatool` database in \LaTeX . This application provides a **graphical user interface (GUI)** making it easier to edit these files. It can also import data from **comma-separated values (CSV)** files, from **structured query language (SQL)** databases and from **probsoln** databases. This manual assumes the user has some knowledge of the `datatool` package.

The `datatooltk` application can run in either batch mode (default) or **GUI** mode (see [chapter 2](#)). Command line invocation:

```
datatooltk [<options>]
```

Available options:

--gui (or -g) Invoke `datatooltk` in **GUI** mode. (The command line invocation

```
datatooltk-gui [<options>]
```

is equivalent to

```
datatooltk --gui [<options>]
```

but additionally has a splash screen.)

--batch (or -b) Invoke `datatooltk` in batch mode (default).

--out *<filename>* (or -o *<filename>*) Save the database to *<filename>* (batch mode only).

--in (or -i) *<datatool file>* Load *<datatool file>*. The switch **--in** (or **-i**) is optional, so `datatooltk <file>` is equivalent to `datatooltk --in <file>`.

--name *<name>* If used with **--in**, **--csv**, **--sql** or **--probsoln**, sets the database label to *<name>*. (See [section 1.2](#).)

--version (or -v) Print the version details to STDOUT and exit.

--help (or -h) Print a brief summary of available options to STDOUT and exit.

--debug Enable debug mode.

`--nodebug` Disable debug mode. (Default.)

`--delete-tmp-files` Delete temporary files on exit. (Default.)

`--nodelete-tmp-files` Don't delete temporary files on exit.

`--map-tex-specials` Map TeX special characters when importing data from **CSV** or **SQL**.

`--nomap-tex-specials` Don't map TeX special characters when importing data from **CSV** or **SQL**. (Default.)

`--seed` *<number>* Set the random generator seed to *<number>* or clear it if *<number>* is `""`. (See [section 3.2](#).)

`--shuffle-iterations` *<number>* Set the number of iterations to perform in a shuffle to *<number>*. (See [section 3.2](#).)

`--shuffle` Shuffle the database. (Shuffle is always performed after sort, regardless of the option order.)

`--noshuffle` Don't shuffle the database. (Default.)

`--sort` [*<prefix>*]*<field>* Sort the database according to the column whose label is *<field>*. Optionally, *<prefix>* may be `+` (ascending order) or `-` (descending order). If *<prefix>* is omitted, ascending is assumed. (See [section 3.1](#).)

`--sort-case-sensitive` Use case-sensitive comparison when sorting strings.

`--sort-case-insensitive` Use case-insensitive comparison when sorting strings. (Default.)

`--csv` *<csv file>* Import data from the given **CSV** file. (See [section 4.1](#))

`--sep` *<character>* Specify the character used to separate values in the **CSV** file. (Defaults to a comma)

`--delim` *<character>* Specify the character used to delimit values in the **CSV** file. (Defaults to a double quote)

`--csvheader` The **CSV** file has a header row. (Default.)

`--nocsvheader` The **CSV** file doesn't have a header row.

`--sql` *<statement>* Import data from an **SQL** database where *<statement>* is an **SQL** SELECT statement. (See [section 4.2](#))

`--sqldb` *<name>* The **SQL** database name.

`--sqlprefix` *<prefix>* The Java **SQL** prefix. (Default: “`jdbc:mysql://`”.) Currently, only **MySQL** is supported. Additional libraries will be required for other **SQL** databases.

`--sqlport` *<port>* The **SQL** port number. (Default: 3306.)

`--sqlhost` *<host>* The **SQL** host. (Default: “`localhost`”.)

`--sqluser` *<user name>* The **SQL** user name.

`--sqlpassword` *<password>* The **SQL** password (insecure). If omitted, you will be prompted for a password if you try to import data from an **SQL** database.

`--wipepassword` For extra security, wipe the password from memory as soon as it has been used to connect to an **SQL** database. (Default.)

`--nowipepassword` Don’t wipe the password from memory as soon as it has been used to connect to an **SQL** database.

`--probsoln` *<filename>* Import `probsoln` data from *<filename>*. (See [section 4.3](#).)

You can’t combine any of the following options: `--in`, `--csv`, `--sql`, `--probsoln`.

1.1 What it isn’t

The `datatooltk` application isn’t intended to have the full functionality of a spreadsheet. Its purpose is to allow you to edit `datatool` databases with multilined entries. If your data just consists of numbers or short single-lined text, then you’ll probably be better off just using a spreadsheet to input the data and use `datatooltk` in batch mode to convert from **CSV** to a `datatool` file.

1.2 File Extensions

The `datatool` database files loaded and saved by `datatooltk` are just **L^AT_EX** files, so they could simply have the standard `.tex` extension, but to help differentiate the database files from other files containing **T_EX**/**L^AT_EX** code (such as picture-drawing code), `datatooltk` assumes a default extension of `.dbtex`. If you use this extension, remember to include it in the argument of `\input`. Note that the database label (as used in commands like `\DTLnewdb`) is independent of the file name (although when importing data, it defaults to the file base name). The database label can be changed using **Edit**→**Edit Database Name...** in **GUI** mode or via the command line option `--name` *<label>*.

Example 1.

Suppose you have a database file called `my-data.dbtex` and you have set the database label to just “`data`” (as shown in [Figure 1.1](#)). Then you can load and display the data using:

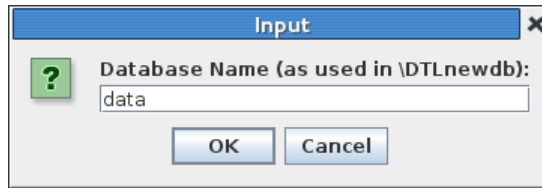


Figure 1.1: Setting the Database Name

```
\documentclass{article}
\usepackage{datatool}% remember to load the datatool package

\input{my-data.dbtex}% load the database from file 'my-data.dbtex'

\begin{document}

\DTLdisplaydb{data}% Display the database identified by the name 'data'

\end{document}
```

1.3 Verbatim

Since the contents of the database are stored in a \TeX token register, and assigned to control sequences via commands like `\DTLforeach`, verbatim text is not permitted. This is a common problem when attempting to use verbatim text within a command and is covered in the UK List of \TeX Frequently Asked Questions ([Why doesn't verbatim work within...?](#)). The `datatooltk` application checks for verbatim text¹ when you load a database or import data (unless the “map \TeX special characters” property is set for **CSV** or **SQL** imports). Also, `datatooltk` checks for verbatim text when you edit the contents of a cell. If it detects any, it will give a warning. If you ignore the warning, \TeX will give an error if you then attempt to load the database into a document.

If you just have a short fragment of inline verbatim text, consider one of the alternatives listed in [the FAQ](#). If on the other hand you have a block of verbatim text you'll have to put the verbatim text in a separate file and load it using `\verbatiminput` (from the `verbatim` package) or `\lstinputlisting` (from the `listings` package). For example, in [Figure 1.2](#) I have used `\lstinputlisting`.

That database requires two files: `HelloWorld.java`

```
public class HelloWorld
{
```

¹More specifically, it checks for any occurrences of `\verb`, `\lstinline` or the beginning of the `verbatim` or `lstlisting` environments.

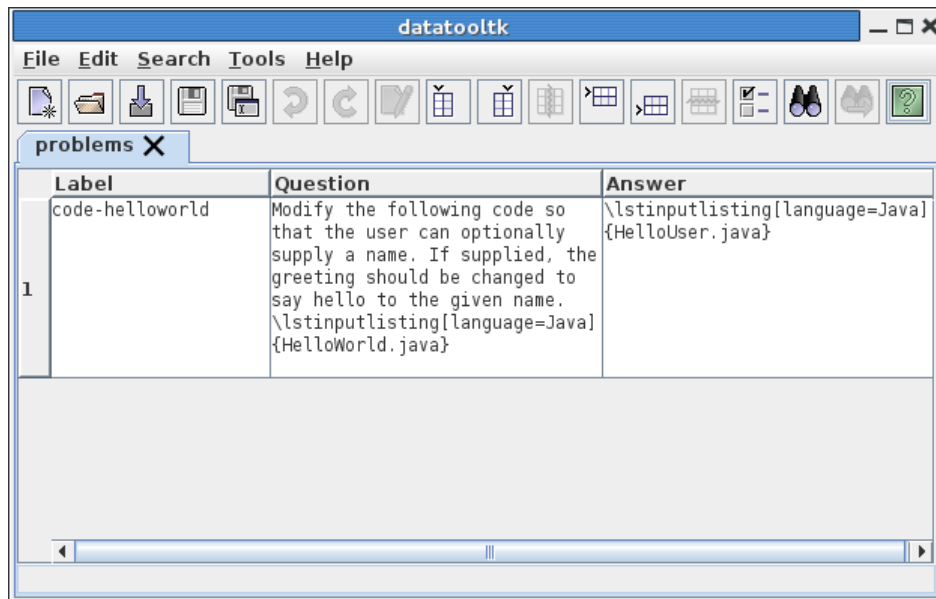


Figure 1.2: Verbatim Blocks Need to be in Separate Files

```
public static void main(String[] args)
{
    System.out.println("Hello World!");
}
```

and HelloUser.java:

```
public class HelloUser
{
    public static void main(String[] args)
    {
        System.out.println("Hello "
            + (args.length==0 ? "anon" : args[0])+"!");
    }
}
```

Assuming that I've saved my database in a file called `prob-verb.dbtex` with database label "problems", here's a sample document:

```
\documentclass{article}

\usepackage{etoolbox}
\usepackage{datatool}
```

```

\usepackage{listings}

\newtoggle{showanswers}
\toggletrue{showanswers}

\input{prob-verb.dbtex}

\begin{document}

\begin{enumerate}
  \DTLforeach*{problems}{\Question=Question,\Answer=Answer}%
  {%
    \item \Question

    \iftoggle{showanswers}{Answer: \Answer}{}
  }
\end{enumerate}

\end{document}

```

See also:

- [Shuffling the Data](#)
- [Sorting and Shuffling](#)
- [Import probsoln Data](#)

2 Graphical Mode

To run `datatooltk` in graphical mode you must invoke it with either `datatooltk-gui` or `datatooltk --gui`. The main window is shown in [Figure 2.1](#). Each database is in a tabbed pane, with the name of the database in the tab. Note that the name corresponds to the database's identifying label, as used in commands like `\DTLnewdb`. This is not necessarily the same as the filename (see [section 1.2](#)). Since this name is used as a label, it shouldn't contain any of \TeX 's special characters or any other active characters that could cause problems. An asterisk `*` following the label in the tab indicates that the database has been modified. If you move the mouse over the tab, you will see the filename appear in a tooltip, if the database has been saved to a `datatool` file.

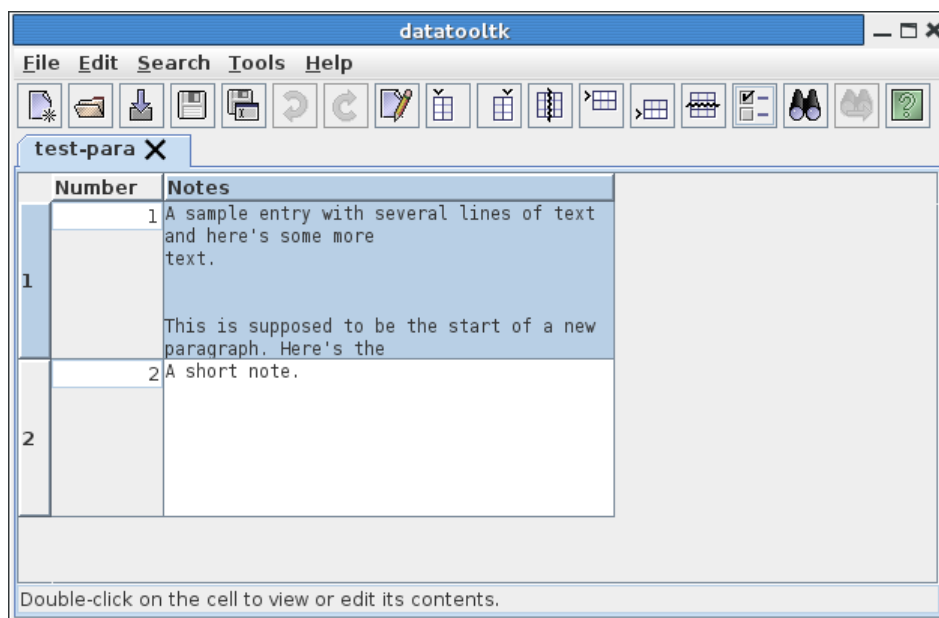


Figure 2.1: Main Window

You can use the **File** menu to create a new database, load an existing database or import data (see [chapter 4](#)). To load an existing database, use **File**→**Open...**. These database files contain \LaTeX code in a specific format. The `datatooltk` application assumes a `.dbtex` file extension (see [section 1.2](#)). You can load these files into a \LaTeX document using `\input`, but remember to specify the `.dbtex` extension. (Also remember to load the `datatool` package.)

Each column has a corresponding data type: string, integer, real or currency. The type is automatically detected from the column data, but can be changed, as described in [section 2.2](#).

Non-string entries can be edited by double-clicking on the relevant cell, or you can select the relevant cell and use **Edit→Edit Cell...** In the first case, a cursor will appear in the cell and you can edit the numerical value and press “Enter” to finish editing. In the second case, the cell editor dialog box will open, see [section 2.1](#).

Only the first few lines of a string entry are visible in the main window. If an entry has more than that number of lines, you will need to use the cell editor dialog box to view the entire contents of that cell. The default row height can be changed in the Preferences dialog box (see [chapter 6](#)). Columns set to integer or real data types have single-lined cells with no line wrap. Columns set to currency data type may wrap, but using “Enter” will finish editing the cell (unless you’re using the cell editor dialog box). If you insert a newline character in the cell edit dialog box (for any data type), the type for that column will be converted to “string”.

To edit or view an entry in a column with the “string” data type, double-click on the relevant cell or select the cell and use **Edit→Edit Cell...** to open the cell editor dialog box (see [section 2.1](#)). You can now scroll through the cell contents.

2.1 Cell Editor

To open the cell editor dialog box (see [Figure 2.2](#)) double-click on the required cell, which must be in a column with a string data type. Alternatively, select the cell (of any type) and use **Edit→Edit Cell...**

Remember that the contents of the cell should be \LaTeX code, so be careful if you use any of \TeX ’s special characters. Also, see the section on verbatim text ([section 1.3](#)) if you haven’t already read it. Once you have made your edits, click on **Okay** to update the database. To discard the edits, click **Cancel**.

If you’ve used **datatool**, you will probably know that if you want a paragraph break in your cell entries you need to use `\DTLpar`, but with **datatooltk** you don’t need to worry about it as blank lines in an entry will automatically be converted behind the scenes. Note that redundant blank lines will be removed.

Note: if you use **datatool**’s `\DTLsaverawdb` command to overwrite your file, you will lose any pretty-printing spaces or comments in your code.

2.2 Header Dialog

Each column has a title, a uniquely identifying label and an associated type. The type can be one of: **String**, **Integer**, **Real** or **Currency**. The type is automatically detected from the column data, but can be changed using the **Edit→Column→Edit Header** menu item or by double-clicking on the column header which opens the header dialog box (see [Figure 2.3](#)). The label corresponds to the label used to identify the column in commands



Figure 2.2: Cell Editor Dialog

such as `\DTLforeach`. The title is used in commands like `\DTLdisplaydb`. See [chapter 6](#) for currency mappings.

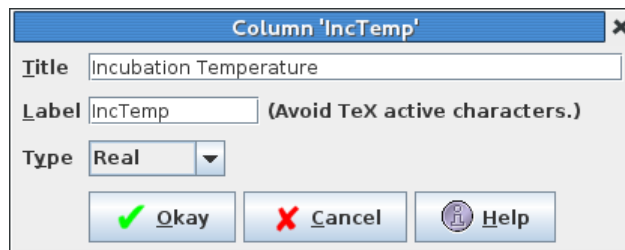


Figure 2.3: Header Dialog

In **GUI** mode, column headers show the title. If you move the mouse over the column header, you will see the label and type displayed in a tooltip (see [Figure 2.4](#)).

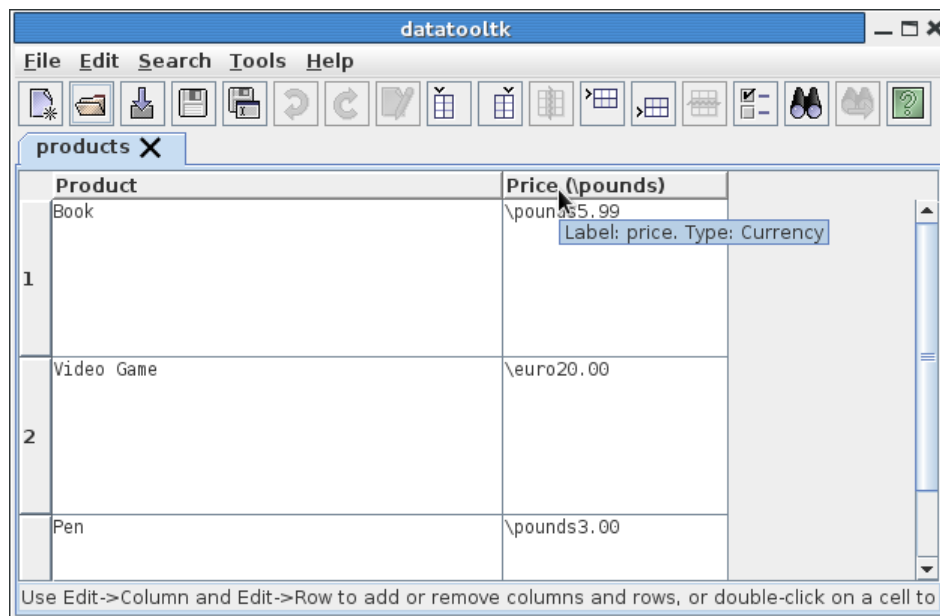


Figure 2.4: Header Details Shown in Tooltip

3 Tools

There are currently two tools available: `sort` (see [section 3.1](#)) and `shuffle` (see [section 3.2](#)). These both reorder the rows of the database and can be invoked either from the **Tools** menu or from the command line (as long as you have also loaded a database using `--in` or one of the import options). If you use both `--sort` and `--shuffle` in the command line invocation, `sort` will always be performed first, regardless of the option order.

3.1 Sorting the Data

Although you can sort data in `datatool` using `\DTLsort`, it's far more efficient to sort it in `datatooltk`.¹ So instead of doing, say,

```
\input{mydata.dbtex}% loads database labelled 'data' from file 'mydata.dbtex'
\DTLsortdb{Surname}{data}% sort data on 'Surname' field
% Later in the document:
\DTLdisplaydb{data}% display data in tabular environment
```

It's better to run, say,

```
datatooltk --in mydata.dbtex --sort Surname --out mydata-sorted.dbtex
```

Then in the document, just load `mydata-sorted.dbtex`:

```
\input{mydata-sorted.dbtex}
% Later in the document:
\DTLdisplaydb{data}% display data in tabular environment
```

or, if you have shell escape enabled you can use `TeX`'s `\write18` mechanism:

```
\immediate\write18{datatooltk --in mydata.dbtex --sort Surname
--out mydata-sorted.dbtex}
```

```
\input{mydata-sorted.dbtex}
% Later in the document:
\DTLdisplaydb{data}% display data in tabular environment
```

¹If the original data is in an [SQL](#) database, it's even more efficient to do the sorting in the `SELECT` statement when you import the data (see [section 4.2](#)).

A database can be sorted according to a particular column in either ascending or descending order. In batch mode, this is done with the `--sort` option, as shown above, where the sort column is identified by the column's unique label. If the label is preceded by `-` then descending order is used (for example, `--sort -Surname`). If the label is preceded by `+` (or has no prefix) then ascending order is used. For alphabetical comparisons you can also use `--sort-case-sensitive` for case-sensitive comparisons and `--sort-case-insensitive` for case-insensitive comparisons. The default is case-insensitive.

In **GUI** mode, sorting is done using the **Tools**→**Sort...** menu item which opens the **Sort Database** dialog box (see **Figure 3.1**).

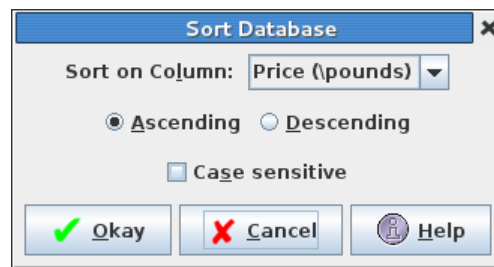


Figure 3.1: Sort Dialog

Select the column you wish to sort by from the drop-down list of column titles, and check the appropriate radio button for ascending or descending sort. If the column has the string data type, you also need to specify whether or not you want to use case-sensitive comparisons by checking or unchecking the **Case sensitive** box. If the column type has a numerical type, the entries will be sorted via a numerical comparison (10 is greater than 2) and the case-sensitive option is ignored. If the column type is a string type, the entries will be sorted via an alphabetical comparison (“10” comes before “2”).

Example 2.

Consider the data shown in **Figure 3.2** and reproduced in **Table 3.1**.

Table 3.1: Original Data

Book	\pounds5.99
Video Game	\euro20.00
Pen	\pounds3.00

The first column has a string data type and the second has a currency data type. Sorting in ascending order on the second column, will sort numerically on just the number. The currency symbol is ignored (see **Table 3.2**). If the type of the second column is changed from currency to string, and the sort is redone, the order is now based on a string comparison that includes the currency symbol (see **Table 3.3**).

	Product	Price (\pounds)
1	Book	\pounds5.99
2	Video Game	\euro20.00
3	Pen	\pounds3.00

Use Edit->Column and Edit->Row to add or remove columns and rows, or double-click on a cell to...

Figure 3.2: Original Data

Table 3.2: Data Sorted on Second Column (Currency Comparison)

Pen	\pounds3.00
Book	\pounds5.99
Video Game	\euro20.00

Table 3.3: Data Sorted on Second Column (String Comparison)

Video Game	\euro20.00
Pen	\pounds3.00
Book	\pounds5.99

3.2 Shuffling the Data

Data can be reordered by randomly swapping pairs of rows. By default, this random row swapping is done 100 times, but this number can be changed via the `--shuffle-iterations` command line option or the **Shuffle Iterations** field in the Preferences dialog box. Data shuffling can be performed either by the `--shuffle` command line option or the Tools→Shuffle menu item.

Example 3.

Consider the database shown in Figure 3.3. This database has three columns. The first is a question, the second is the corresponding answer (optional) and the third is a number indicating the question level. For example, 1 could correspond to easy and 2 could correspond to medium difficulty.

	Question	Answer	Level
1	Describe what is meant by object-oriented programming.		1
2	Describe what is meant by the term <code>\emph{inheritance}</code> in object-oriented programming. Use examples.		1
3	A coin is weighted so that heads is four times as likely as tails. Find the probability that: $\begin{array}{l} \text{\item tails appears,} \\ \text{\item heads appears} \end{array}$	Let $p=P(T)$, then $P(H)=4p$. We require $P(H)+P(T)=1$, so $4p+p=1$, hence $p=\frac{1}{5}$. Therefore: $\begin{array}{l} \text{\item } P(T)=\frac{1}{5}, \\ \text{\item } P(H)=\frac{4}{5} \end{array}$	2
4	Under which of the following functions does $S=\{a_1, a_2\}$ become a probability space? $\begin{array}{l} \text{\item } P(a_1)=\frac{1}{3}, \\ \text{\item } P(a_2)=\frac{1}{3}, \\ \text{\item } P(a_1)=\frac{1}{3}, P(a_2)=\frac{1}{3} \end{array}$	<code>\ref{validprobspacescorrect1}</code> and <code>\ref{validprobspacescorrect2}</code>	2
5	Identify, if any, the sinks and sources of the digraph shown in Figure~\ref{fig:digraph}.	A is a source and C is a sink.	2

Use Edit->Column and Edit->Row to add or remove columns and rows, or double-click on a cell to edit it.

Figure 3.3: Shuffle Example

Now suppose I want to write an assignment sheet that has one randomly selected question of level 1 and two randomly selected questions of level 2. Let's suppose the file name is `data.dbtex` and the database label is "`problems`". Then I can run `datatooltk` in batch mode using:

```
datatooltk --shuffle --in data.dbtex --out data-shuffled.dbtex
```

Remember to use `--seed` if you don't want a different ordering every time you run that command. For example:

```
datatooltk --seed 2013 --shuffle --in data.dbtex --out data-shuffled.dbtex
```

This shuffled database can now be loaded in my document:

```
\documentclass{article}

\usepackage{etoolbox}
\usepackage{datatool}

% Used by some of the questions:
\usepackage{paralist}
\usepackage{tikz}

\newtoggle{showanswers}
\toggletrue{showanswers}

\input{data-shuffled.dbtex}

% Number to select from level 1
\newcounter{maxleveli}
\setcounter{maxleveli}{1}

% Number to select from level 2
\newcounter{maxlevelii}
\setcounter{maxlevelii}{2}

% Counter to keep track of level 1 questions
\newcounter{leveli}

% Counter to keep track of level 2 questions
\newcounter{levelii}

\begin{document}
```

```

\begin{enumerate}
\DTLforeach*{problems}%
{\Question=Question,\Answer=Answer,\Level=Level}%
{%
  % Increment counter for this level
  \stepcounter{level\romannumeral\Level}%
  % Have we reached the maximum for this level?
  \ifnumgreater
    {\value{level\romannumeral\Level}}%
    {\value{maxlevel\romannumeral\Level}}%
  {% reached maximum, do nothing
  {\item \Question

    \ifdefempty\Answer
    {% no answer
    {% do answer if this is the solution sheet
      \iftoggle{showanswers}{Answer: \Answer}{}%
    }%
  }%
  % do we need to continue or have we got everything?
  \ifboolexpr
  {%
    test{\ifnumgreater{\value{leveli}}{\value{maxleveli}}}
    and
    test{\ifnumgreater{\value{levelii}}{\value{maxlevelii}}}
  }%
  {\dtlbreak}{}%
}
\end{enumerate}

\end{document}

```

What if I want all the easy questions listed first? This requires some modifications to the code as shown below:

```

\documentclass{article}

\usepackage{etoolbox}
\usepackage{datatool}

% Used by some of the questions:
\usepackage{paralist}
\usepackage{tikz}

```

```

\newtoggle{showanswers}
\toggletrue{showanswers}

\input{data-shuffled.dbtex}

% Number to select from level 1
\newcounter{maxleveli}
\setcounter{maxleveli}{1}

% Number to select from level 2
\newcounter{maxlevelii}
\setcounter{maxlevelii}{2}

% Counter to keep track of level 1 questions
\newcounter{leveli}

% Counter to keep track of level 2 questions
\newcounter{levelii}

% List of level 1 questions
\newcommand*{\listleveli}{}

% List of level 2 questions
\newcommand*{\listlevelii}{}

\begin{document}

\DTLforeach*{problems}%
{\Question=Question,\Answer=Answer,\Level=Level}%
{%
  % Increment counter for this level
  \stepcounter{level\romannumeral\Level}%
  % Have we reached the maximum for this level?
  \ifnumgreater
    {\value{level\romannumeral\Level}}%
    {\value{maxlevel\romannumeral\Level}}%
  {% reached maximum, do nothing
  {% Add row number to the appropriate list
    \listcsxadd{listlevel\romannumeral\Level}{\DTLcurrentindex}%
  }%
  % do we need to continue or have we got everything?
  \ifboolexpr
    {%
      test{\ifnumgreater{\value{leveli}}{\value{maxleveli}}}

```

```

        and
        test{\ifnumgreater{\value{levelii}}{\value{maxlevelii}}}
    }%
    {\dtlbreak}{}%
}

\renewcommand{\do}[1]{%
    \dtlgetrow{problems}{#1}%
    \dtlgetentryfromcurrentrow{\Question}{\dtlcolumnindex{problems}{Question}}%
    \dtlgetentryfromcurrentrow{\Answer}{\dtlcolumnindex{problems}{Answer}}%
    \item \Question

    \ifdefempty\Answer
    {}% no answer
    {% do answer if this is the solution sheet
        \iftoggle{showanswers}{Answer: \Answer}{}%
    }%
}

\begin{enumerate}

% do easy questions
\dolistloop{\listleveli}

% do medium level questions
\dolistloop{\listlevelii}

\end{enumerate}
\end{document}

```

Now, the `\DTLforeach` loop just stores the row numbers of the required questions in two lists, corresponding to the two different levels. Then each list is iterated through and the corresponding row is fetched using `\dtlgetrow`. Extending this example to accommodate an arbitrary number of levels is left as an exercise for the reader.

Remember that if you have shell escape enabled when you run `LATEX` you can invoke `datatooltk` in your document *before* you load the database:

```

\immediate\write18{datatooltk --in data.dbtex --seed 2013 --shuffle
--out data-shuffled.dbtex}

\input{data-shuffled.dbtex}

```

3.3 Sorting and Shuffling

As mentioned earlier, if you specify both `--sort` and `--shuffle`, the sorting will always be performed first, regardless of the option order, but why would you want to sort the data if you're going to shuffle it? Consider the command invocation:

```
datatooltk --shuffle --in <in-file> --out <out-file>
```

Every time you run this command, you will get a different ordering. If, however, you set a seed for the random generator, for example:

```
datatooltk --seed 2013 --shuffle --in <in-file> --out <out-file>
```

You will always get the same random ordering *provided the original data in <in-file> has remained unchanged*. If you want to modify the shuffled data in your document and save it to the original file <in-file> using `\DTLsaverawdb`, the ordering in that file will change, so the next time you shuffle it, you'll get a different ordering, even if you use the same seed. If you sort first on a unique label, that will ensure the shuffle has the same starting point (unless you add or remove rows).

Example 4.

Suppose you have a database of exam questions and you want to keep track of the year in which each question was last used. (To make life easier, let's identify the academic year "2012/13" as 2013, the academic year "2013/14" as 2014, etc.) Let's further suppose the database of questions is in a file called `mth-101.dbtex` and the database label is "problems" (see Figure 3.4). The database contains a column with the label "Label", which uniquely identifies an exam question, a column with the label "Question" that contains the exam question, a column with the label "Answer" that contains the answer and an integer column with the label "Year" that contains the exam year in which that question was last used. (A zero entry means the question hasn't been used.)

Now suppose the exam requires five questions to be randomly selected from this database, but must not include any question used in the past three years. So the exam L^AT_EX document needs to load in a shuffled version of `mth-101.dbtex`, use the first five questions that don't have a year set in the past three year range, set the year for the selected questions to the current exam year, display the questions (and optionally the answers for the solution sheet), and at the end of the document, overwrite `mth-101.dbtex` so that it now has a record of this year's exam questions.

There are two problems. Firstly, if the process is to be automated with a call to `datatooltk --shuffle` followed by a L^AT_EX call, a different set of problems will be selected on each run, even with the same seed. To overcome this, a sort on the `Label` column needs to be done before the shuffle:

```
datatooltk --sort Label --seed 2013 --shuffle --in mth-101.dbtex ↵  
--out mth-101-shuffled.dbtex
```

(The symbol ↵ above indicates a line wrap. Don't insert a line break at that point.) This way the shuffle always starts from the same ordering.

datatooltk				
File Edit Search Tools Help				
problems X				
	Label	Question	Answer	Year
1	tan	$y = \tan x$	$\begin{aligned} y &= \tan x \\ \frac{dy}{dx} &= \frac{\sin x}{\cos x} \\ \frac{dy}{dx} &= \frac{\sin x}{\cos x} + \sin x \times \frac{-1}{\cos^2 x} \\ \frac{dy}{dx} &= \sec^2 x \end{aligned}$	0
2	cosxsqsinx	$y = \cos(x^2)\sin x$	$\frac{dy}{dx} = -\sin(x^2)2x\sin x + \cos(x^2)\cos x$	0
3	exp3x+2	$y = \exp(3x+2)$	$\frac{dy}{dx} = 3\exp(3x+2)$	0
4	cubic	$y = x^3 + 4x^2 - x + 3$	$\frac{dy}{dx} = 3x^2 + 8x - 1$	0
5	xlnx	$y = (x+1)\ln(x+1)$	$\begin{aligned} \frac{dy}{dx} &= \ln(x+1) + \frac{x+1}{x+1} \\ \frac{dy}{dx} &= 1 + \ln(x+1) \end{aligned}$	0

Figure 3.4: Sort and Shuffle Example

The second problem occurs if you edit the database such that you add or remove rows. This will change the initial conditions, even with the sort. If you add or remove rows, you need to accept that the document may well end up with a different selection of questions, which is okay if you haven't finalised the exam, but it means that some of the questions will be identified as having been used in that exam year from a previous run but are now no longer selected. In order to make them available for the next year, if they haven't been selected but have had the year set to this year, the year needs to be cleared.

To solve this, once you have selected the maximum required number of questions, don't break out of the loop, as was done earlier (see [section 3.2](#)). Instead, for the rest of the loop, if the exam year is set to the current year, clear it.

```
% arara: pdflatex: {shell: on}
\documentclass{article}

\usepackage{etoolbox}
\usepackage{datatool}
\usepackage{listings}
%
\newtoggle{showanswers}
\togglefalse{showanswers}

\newcommand{\examyyear}{2013}
\newcommand{\maxquestions}{5}
\newcounter{question}

\immediate\write18{datatooltk --sort Label --seed \examyyear\space
--shuffle --in mth-101.dbtex --out mth-101-shuffled.dbtex}

\input{mth-101-shuffled.dbtex}

\begin{document}

\begin{enumerate}
\DTLforeach{problems}{\Question=Question,\Answer=Answer,\Year=Year}%
{%
% If year hasn't been specified, set it to 0 to
% allow numeric comparisons
\ifdefempty{\Year}{\def\Year{0}}{}%
\ifnumgreater{\value{question}}{\maxquestions}
{%
% Finished selecting questions, unset any year
% equal to this exam year
\ifnumequal{\Year}{\examyyear}
{%
```

```

        % unset year
        \DTLreplaceentryforrow{Year}{0}%
    }%
    {}%
}%
{%
    % Still selecting questions.
    % Check the year
    \ifboolexpr
    {%
        test{\ifnumequal{\Year}{\examyyear}}
        or
        test{\ifnumless{\Year}{\examyyear-3}}
    }
    {% select this question
        \stepcounter{question}%
        \item \Question

        \iftoggle{showanswers}{Answer: \Answer}{}%
        % update year
        \DTLreplaceentryforrow{Year}{\examyyear}%
    }%
    {% skip this question, it was used in the past 3 years
    }%
}%
}
\end{enumerate}

% update database file
\DTLsaverawdb{problems}{mth-101.dbtex}
\end{document}

```

Note: since this overwrites the `datatool` file, you will lose any pretty-printing spaces or comments you may have done in `datatooltk`'s cell editor dialog.

3.4 Plugins

Plugins are usually associated with a particular template (see [chapter 5](#)) and provide a convenient way of adding a row of data to the currently selected database. Typically when a plugin is run it will add a new row of data if no row is selected, otherwise it will allow you to edit the selected row. **Note:** you must have Perl installed to use the plugins (see [chapter 6](#)). **Really Important Note:** the plugin is sent the database information when you start each instance of the plugin, so if you change the database in `datatooltk` while a plugin is running there may be unexpected results. Wait until the plugin has

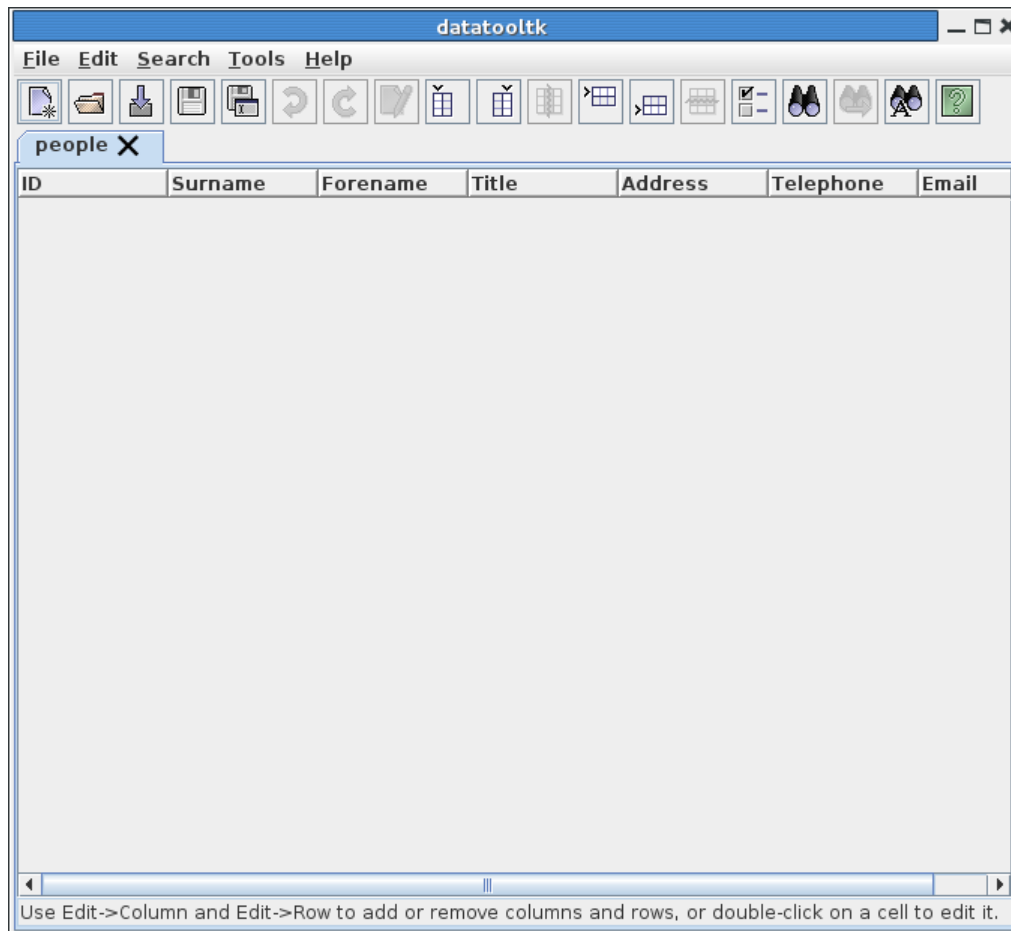


Figure 3.5: Database Created From people Template

finished (usually by clicking on **Okay** or **Cancel**) before you make any further edits to the database.

Example 5.

Suppose you create a new database using the **people** template. This creates a database with the following fields: ID, Title, Surname, Forename, Address, Telephone and Email, as illustrated in [Figure 3.5](#).

Having created this database, I can just use the **Edit→Row** menu to insert rows and then edit each entry, but suppose I want to automatically increment the associated ID for each person. I can do this using the **people** plugin that corresponds to this template via the **Tools→Plugins** menu.

If a row is currently selected, this plugin will allow you to edit the data for that row. Otherwise, it will allow you to insert a new row. For a new row of data, the **people** plugin will open the dialog box shown in [Figure 3.6](#).

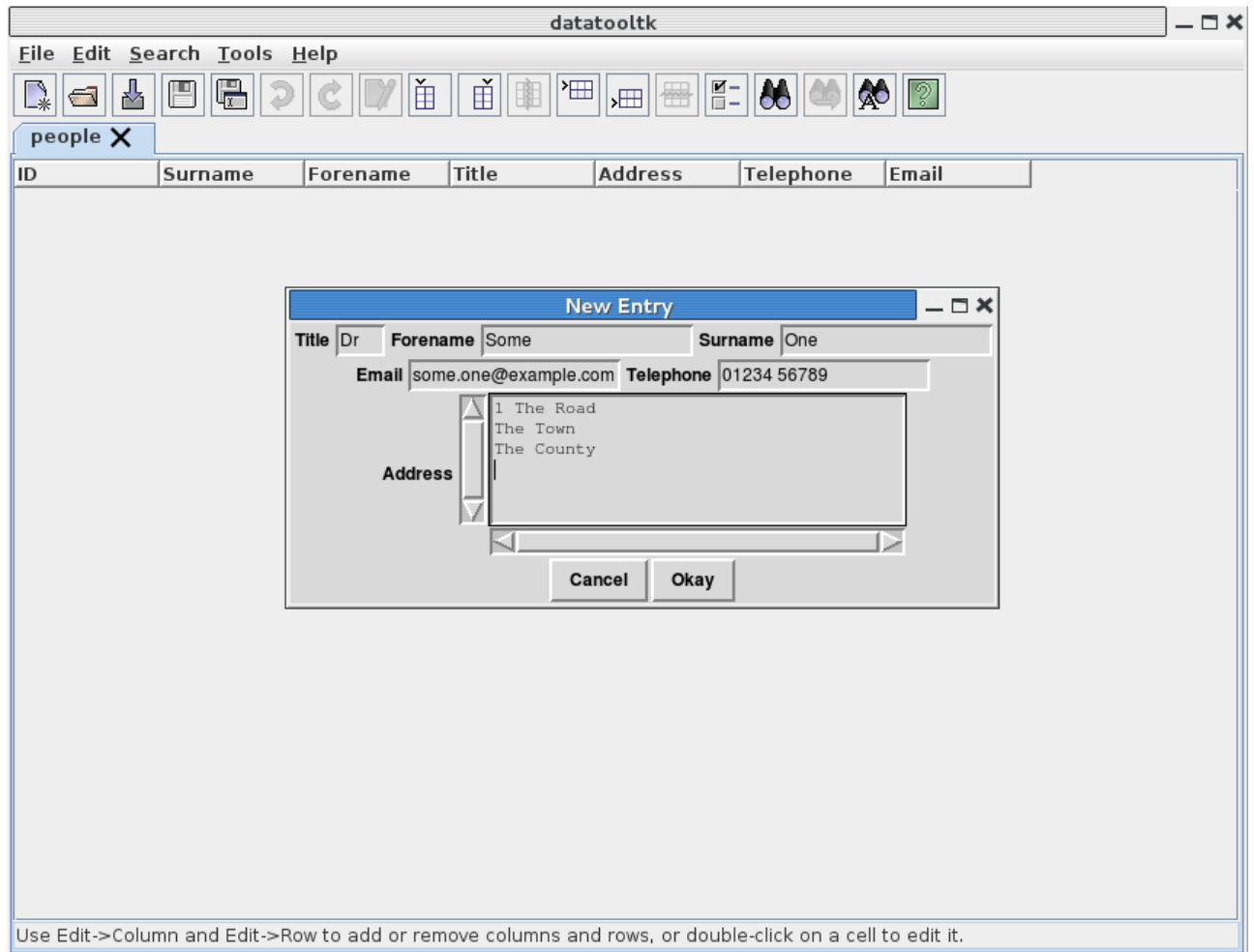


Figure 3.6: The people Plugin Dialog

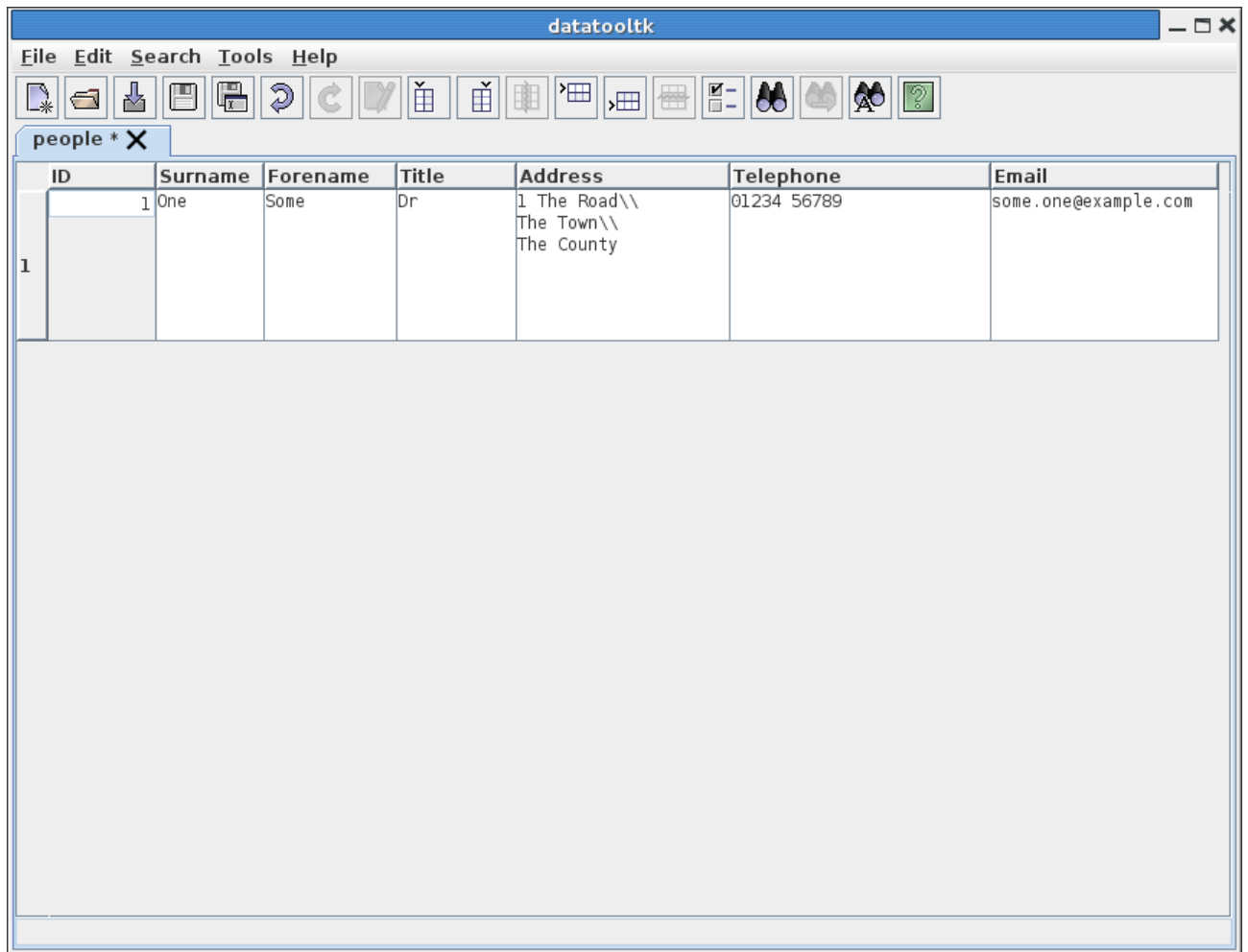


Figure 3.7: A New Row of Data

After entering the data, I can click on **Okay** and a new row of data is added to the database (see [Figure 3.7](#)). Note that the plugin has converted newline characters in the address into `\\`. The ID has automatically been inserted.

Since the `people` plugin only adds or modifies a single row at a time, if you no longer require an entry, you can delete the unwanted row using **Edit**→**Row**→**Delete Row**.

Example 6.

The `datagidx` package creates its own custom database to store terms, symbols and acronyms. The `datagidx` template will create a database that contains `datagidx`'s required fields. There are a lot of fields, some of which are reserved for `datagidx`'s private use. The `datagidx` plugin, available via the **Tools**→**Plugins** menu, provides a convenient interface to add or edit entries. If no row is selected, the plugin will create a new row. If a row

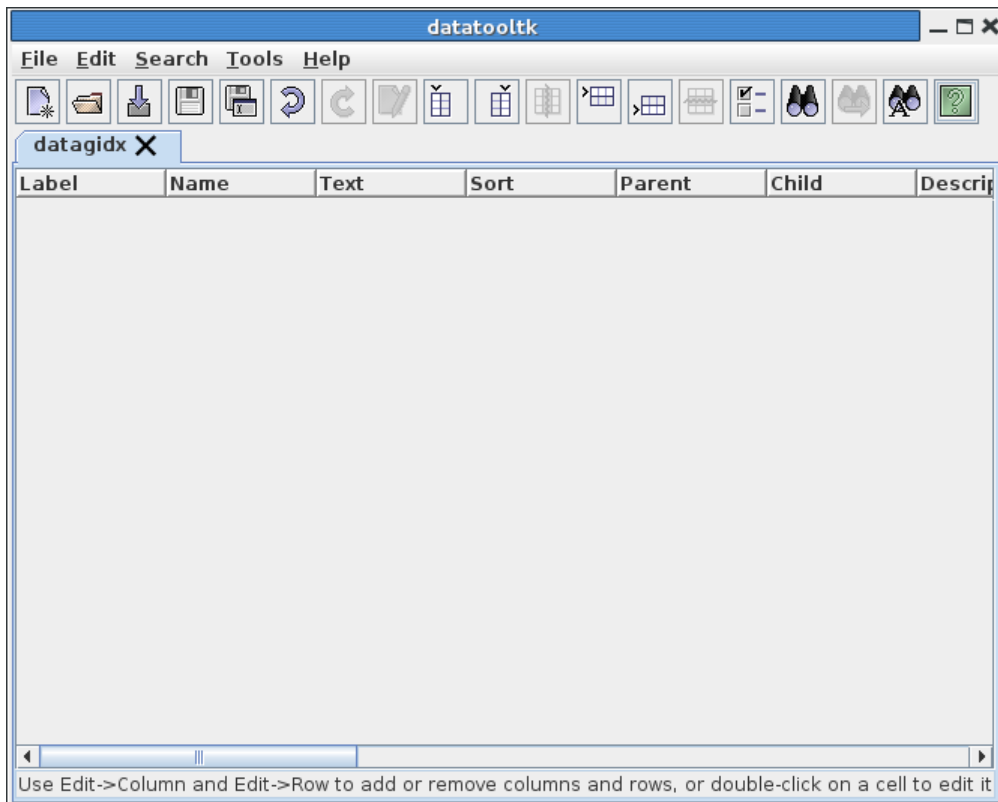


Figure 3.8: A Database Created From the datagidx Template

is selected, the plugin will allow you to edit or remove the row. Since the `datagidx` plugin can modify other rows at the same time (for example, if you set a parent entry or cross-reference) it's recommended that you use the `datagidx` plugin to remove an entry (via the **Remove Entry** button) rather than using `Edit→Row→Delete Row`.

The new database (created via `File→New From Template...`) is shown in [Figure 3.8](#). Once this database has been created, the `datagidx` plugin will open the dialog box shown in [Figure 3.9](#).

Since many of the fields are often duplicated (for example, the **Name** field is often the same as the **Text** field) if you first enter the name in the **Name** field, when you move the focus to another field, default entries will be added to most of the empty fields. For example, in [Figure 3.10](#) I typed “bird” in the **Name** field and then moved the cursor to the **Description** field. This automatically filled in default values for the **Label**, **Sort**, **Text**, **Short**, **Long**, **Plural**, **Short Plural** and **Long Plural** fields. Since this is the first entry, there are no options for the **Parent** and **See** fields.

When I click on **Okay**, a new row is added to the database (see [Figure 3.11](#)).

If I use the `datagidx` plugin to create a new row, there are now options available in the **Parent** and **See** fields (see [Figure 3.12](#)).

New Entry

Name Label Sort

Description

Text Short Long

Plural Short Plural Long Plural

Symbol Parent

☐ Cross-Reference

Cancel Okay

Figure 3.9: The datagidx Plugin Dialog

New Entry

Name Label Sort

Description

Text Short Long

Plural Short Plural Long Plural

Symbol Parent

☐ Cross-Reference

Cancel Okay

Figure 3.10: Most Fields Are Auto-Filled From the Name Field

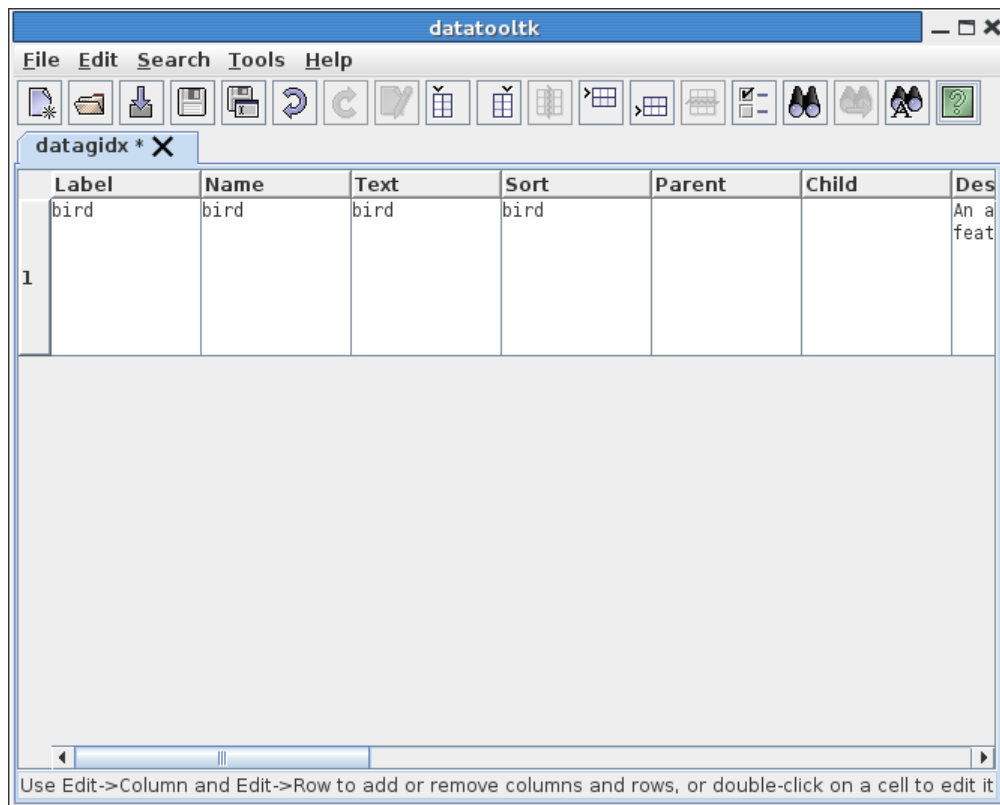


Figure 3.11: New Row Added to the Database

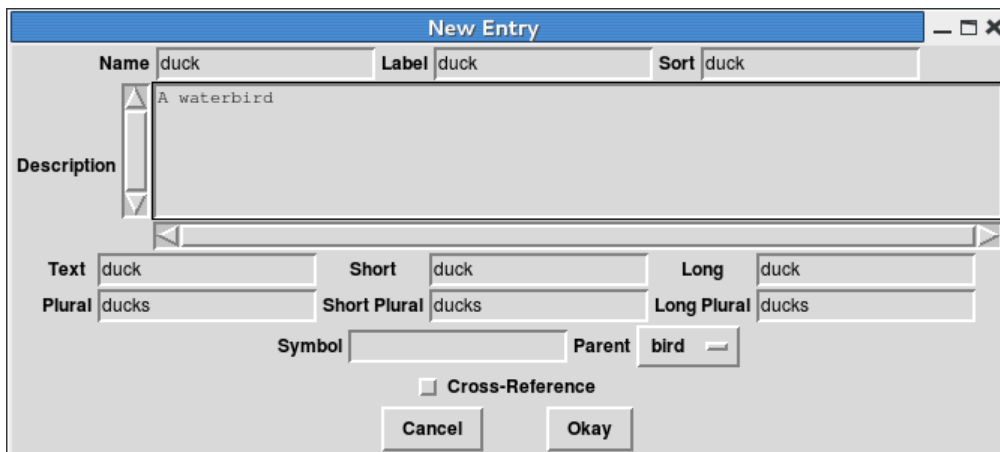


Figure 3.12: Parent Field Lists Other Entry Labels

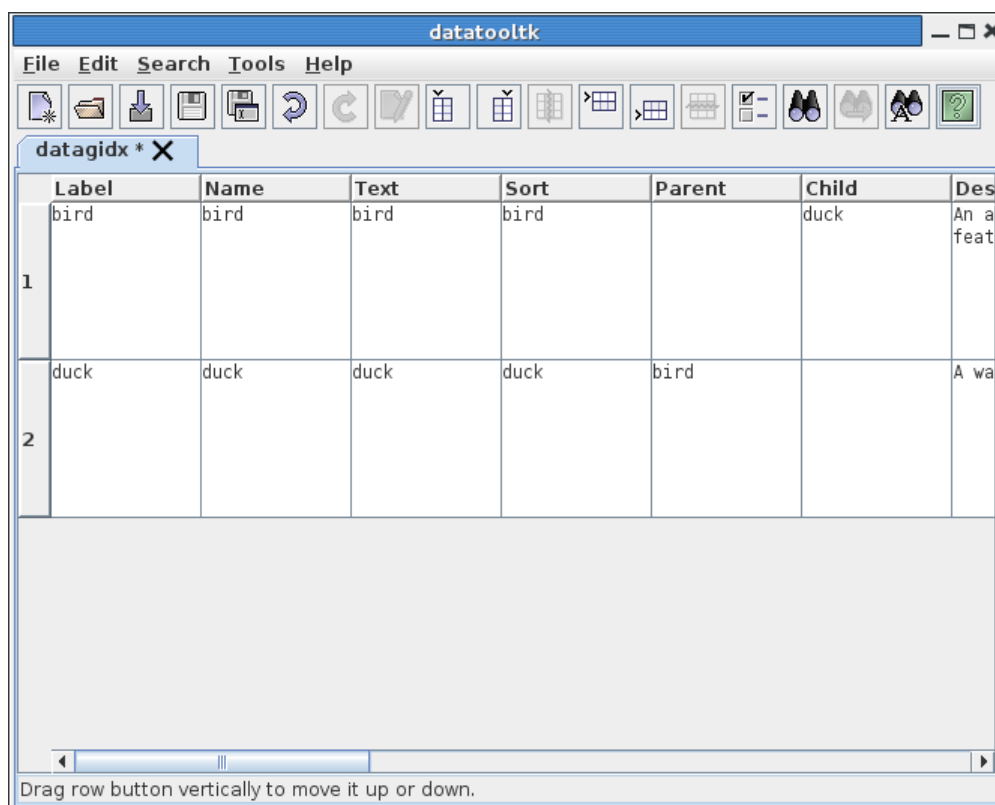


Figure 3.13: Child Entry of Automatically Adjusted

In [Figure 3.12](#) I have set the parent to `bird`. When the new row is added, the plugin automatically adjusts the `bird` entry to include the new `duck` label as one of its children (see [Figure 3.13](#)).

It's also possible to cross-reference another entry. There are two ways of cross-referencing an entry: (1) using **See** which redirects the reader to a synonym that has the location list; (2) using **See Also** which in addition to the location list refers the reader to one or more related topics. (See the `datagidx` section of the `datatool` user manual for further details.) To enable either form of cross-referencing, make sure the **Cross-Reference** button is selected. This will display extra options, shown in [Figure 3.14](#).

Either select the **See** button and choose the synonym from the drop-down box next to it, or select the **See Also** button and select the related cross-reference from the drop-down box to the right and either click on **Add "See Also" Entry** to append it to the **See Also** list or click on **Remove "See Also" Entry** to remove it from the list. For example, in [Figure 3.14](#) I've added the `chicken` and `turkey` entries to the **See Also** list.

The 'New Entry' dialog box is shown with the following fields and controls:

- Name:** fowl
- Label:** fowl
- Sort:** fowl
- Description:** A large text area for the entry's description.
- Text:** fowl
- Short:** fowl
- Long:** fowl
- Plural:** fowls
- Short Plural:** fowls
- Long Plural:** fowls
- Symbol:** (empty field)
- Parent:** (empty field)
- Cross-Reference:** ☒ (checked)
- See:** ☐ (unchecked)
- See Also:** chicken,turkey
- turkey:** (field with a dropdown arrow)
- Buttons:** 'Add "See Also" Entry', 'Remove "See Also" Entry', 'Cancel', and 'Okay'.

Figure 3.14: Cross-Referencing Entries

4 Importing Data

Data can be imported from **CSV** files (see [section 4.1](#)), **SQL** databases (see [section 4.2](#)) or from files that can be imported with the **probsoln** package's `\loadallproblems` command (see [section 4.3](#)). In the case of the first two, **datatooltk** can automatically convert **T_EX**'s special characters if the `--map-tex-specials` command line option is used or the **Map TeX characters when importing data from CSV or SQL** option has been selected in the Preferences dialog box (see [chapter 6](#)).

4.1 Import CSV Data

Data can be imported from a **CSV** file using the `--csv` command line option or (in **GUI** mode) using the **File**→**Import**→**Import CSV...** menu item. The default separator is a comma and the default delimiter is the double-quote character. These can be changed using the `--sep` and `--delim` command line options or in the Preferences dialog box (see [chapter 6](#)). Unlike **datatool**'s `\DTLloaddb` command, **datatooltk** can import data with multilined entries (via the Open CSV library <http://opencsv.sourceforge.net/>). Multiple blank lines within entries are automatically converted to `\DTLpar` (although you won't see this in **GUI** mode).

If the **CSV** file has a header row, you must make sure the `--csvheader` option is used or the **Has Header Row** option is checked in the Preferences dialog box. If the **CSV** file has no header row, you must make sure the `--nocsvheader` option is used or the **Has Header Row** option is unchecked in the Preferences dialog box.

Example 7.

Consider the **CSV** file shown below:

```
Number,Notes
1,"A sample entry with several lines of text and here's some more
text.
```

```
This is supposed to be the start of a new paragraph. Here's the
next sentence."
2,A short note.
```

This has a cell with multiple lines. When it's imported into **datatooltk**, the paragraph break is converted to `\DTLpar`. However, this isn't visible when you look at the file in **GUI** mode (see [Figure 4.1](#)).

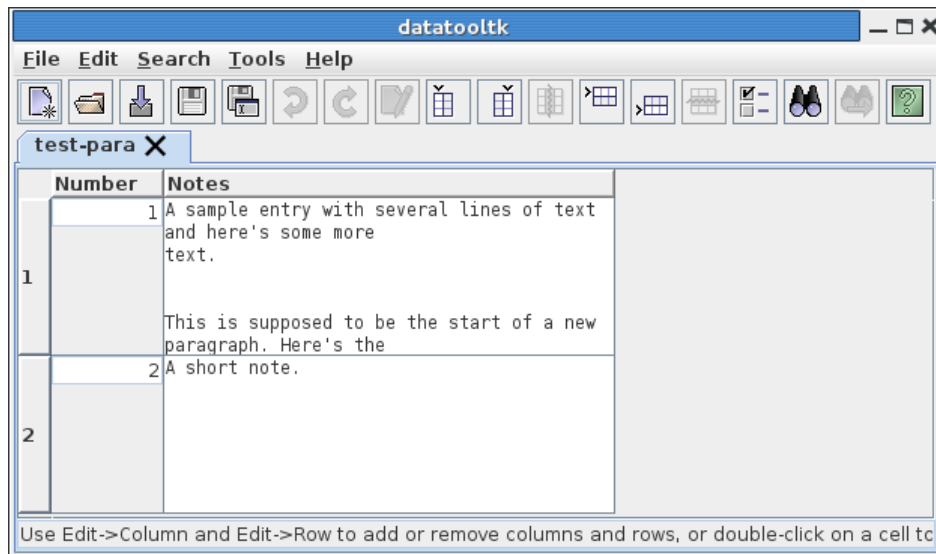


Figure 4.1: Paragraph Breaks Appear as a Single Blank Line

Note that the redundant second blank line in the **CSV** file has gone as multiple blank lines are replaced by a single `\DTLpar`.

4.2 Import SQL Data

Data can be imported from an **SQL** database using the `--sql` command line option or the **File**→**Import**→**Import SQL...** menu item. You additionally need to supply the database, port, prefix, host, user name and password. In batch mode, you can use the command line options `--sqldb`, `--sqlport`, `--sqlprefix`, `--sqlhost` and `--sqluser`. You can specify the password with `--sqlpassword`, but that isn't secure. If you don't use that, you will be prompted for the password, where the text you enter won't be visible. See **chapter 1** for more details about command line options.

In **GUI** mode, when you use **File**→**Import**→**Import SQL...** the dialog box shown in **Figure 4.2** will be displayed, where you can enter the settings. In addition to the above named settings, you must also specify the **SQL** **SELECT** statement that identifies the required data to import. (This manual assumes that if you have data in an **SQL** database, then you have a basic knowledge of **SQL** syntax.)

For example, in **Figure 4.2** I want to import all data from the table called **customers** in the **MySQL** database called **myshop**. (I've created a user called **shopadmin** with **SELECT** privileges for this database.) Once I've entered this information, I then click on **Okay** and the password dialog box will appear (see **Figure 4.3**).

Alternatively, I can use batch mode to import and save the data from the command prompt:

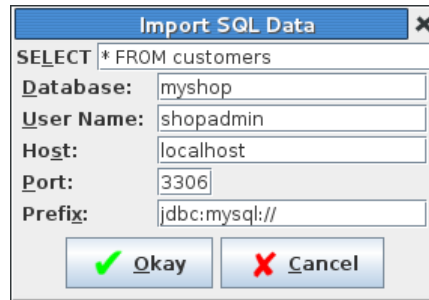


Figure 4.2: SQL Import Dialog Box

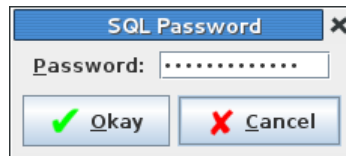


Figure 4.3: Password Dialog Box

```
datatooltk --out customers.dbtex --sql "SELECT * FROM customers" ↵
--sqldb myshop --sqluser shopadmin
Password:
```

(The symbol ↵ above indicates a line wrap. Don't insert a line break at that point.) The password should be entered at the **Password** prompt. Remember that it's more efficient to get the **SQL** database to do any sorting. For example (assuming the table has a column called **Surname**):

```
datatooltk --out customers.dbtex --sql "SELECT * FROM customers ORDER BY ↵
Surname" --sqldb myshop --sqluser shopadmin
Password:
```

4.3 Import probsoln Data

The **probsoln** package allows you to define problems (and optionally their solutions) using `\newproblem` or the `defproblem` environment. **datatooltk** can load a file containing these definitions and convert the **probsoln** data into a **datatool** database containing three columns with keys: **Label**, **Question** and **Answer**. You can import one of these files using the `--probsoln` command line option or (in **GUI** mode) using the **File→Import→Import probsoln File...** menu item.

T_EX is a difficult language to parse, so `datatooltk` uses L^AT_EX to help gather the data from the imported file. The `datatooltk` application creates a temporary L^AT_EX file and runs L^AT_EX on it in the background. It assumes that the `latex` application is on your path. If this isn't the case, you will have to specify the location of the `latex` executable in the Preferences dialog box (see [chapter 6](#)). The temporary files are deleted when you quit `datatooltk` unless you have used the `--nodelete-tmp-files` option.

Note: `datatooltk` doesn't support problems that require arguments. Any instance of `#⟨n⟩` will be replaced with `##⟨n⟩`, but you will have to replace those with something else. Also, recall from [section 1.3](#) that you can't have verbatim text in a `datatool` database, but you can use `\verbatiminput` (from the `verbatim` package) or `\lstinputlisting` (from the `listings` package). Since L^AT_EX is used to gather the data, pretty-printing spaces and comments won't be imported.

Example 8.

Consider the file called `prob-mixed.tex` that contains the following:

```
\newproblem*{oop}{%
  % This is an essay style question.
  Describe what is meant by object-oriented programming.%
}

\begin{defproblem}{inheritance}
  % This is an essay style question.
  Describe what is meant by the term \emph{inheritance} in
  object-oriented programming. Use examples.
\end{defproblem}

\begin{defproblem}{weightedcoin}%
  \begin{onlyproblem}
    A coin is weighted so that heads is four times as likely
    as tails. Find the probability that:
    \begin{textenum}
      \item tails appears,
      \item heads appears
    \end{textenum}%
  \end{onlyproblem}%
  \begin{onlysolution}
    Let  $p=P(T)$ , then  $P(H)=4p$ . We require  $P(H)+P(T)=1$ ,
    so  $4p+p=1$ , hence  $p=\frac{1}{5}$ . Therefore:
    \begin{textenum}
      \item  $P(T)=\frac{1}{5}$ ,
      \item  $P(H)=\frac{4}{5}$ 
    \end{textenum}
  \end{onlysolution}
\end{defproblem}
```

```

\end{defproblem}

\begin{defproblem}{validprobspaces}
\begin{onlyproblem}%
Under which of the following functions does
 $S=\{a_1,a_2\}$  become a probability space?
\par
\begin{textenum}
\begin{tabular}{ll}
\item  $P(a_1)=\frac{1}{3}$ ,  $P(a_2)=\frac{1}{2}$ 
&
\item\label{validprobspacescorrect1}  $P(a_1)=\frac{3}{4}$ ,
 $P(a_2)=\frac{1}{4}$ 
\\
\item\label{validprobspacescorrect2}  $P(a_1)=1$ ,  $P(a_2)=0$ 
&
\item  $P(a_1)=\frac{5}{4}$ ,  $P(a_2)=-\frac{1}{4}$ 
\end{tabular}
\end{textenum}
\end{onlyproblem}%
\begin{onlysolution}%
\ref{validprobspacescorrect1} and \ref{validprobspacescorrect2}%
\end{onlysolution}
\end{defproblem}

\begin{defproblem}{digraph}
% This problem requires the tikz package
\begin{onlyproblem}\label{ex:digraph}
Identify, if any, the sinks and sources of the digraph shown
in Figure~\ref{fig:digraph}.

\begin{figure}[tbh]
\centering
\begin{tikzpicture}[every node/.style={draw,circle}]
\path (0,0) node (A) {A}
(1,0) node (B) {B}
(0,1) node (C) {C};
\draw[->] (A) -- (B);
\draw[->] (B) -- (C);
\draw[->] (A) -- (C);
\end{tikzpicture}
\par
\caption{Digraph for Question~\ref{ex:digraph}}
\label{fig:digraph}
\end{figure}

```

```

\end{figure}
\end{onlyproblem}
\begin{onlysolution}
 $A$  is a source and  $C$  is a sink.
\end{onlysolution}
\end{defproblem}

```

This contains a mixture of `\newproblem` and `defproblem`. It also has comments and spaces to make the code more readable. As can be seen in [Figure 4.4](#) these have gone in the import.

	Label	Question	Answer
2		programming. Use examples.	
3	weightedcoin	A coin is weighted so that heads is four times as likely as tails. Find the probability that: \begin {textenum} \item tails appears, \item heads appears \end {textenum}	Let $p=P(T)$, then $P(H)=4p$. $P(H)+P(T)=1$, so $4p+p=1$, $p=\frac{1}{5}$. Therefore: \begin {textenum} \item $P(T)=\frac{1}{5}$, \item $P(H)=\frac{4}{5}$ \end {te
4	validprobspaces	Under which of the following functions does $S=\{a_1, a_2\}$ become a probability space?	\ref {validprobspacescorrect} {validprobspacescorrect2}
5	digraph	\begin {textenum} \begin {tabular}{ll} \item $P(a_1)=\frac{1}{3}$, $P(a_2)=\frac{1}{2}$ & \item \label {ex:digraph} Identify, if any, the sinks and sources of the digraph shown in Figure~\ref {fig:digraph}. \end {tabular} \end {textenum}	A is a source and C is

Figure 4.4: Pretty Printing and Comments are Lost When Importing Data from probsoln

See also:

- [Shuffling the Data](#)
- [Sorting and Shuffling](#)

5 Templates

Templates that come with `datatooltk` are located in the `resources/templates` subdirectory of the `datatooltk` installation directory. You can also write your own templates and store them in the user templates directory (see [section 5.1](#)). Each template defines a set of column headers. To create a new database with a particular set of column headers, use the `File→New From Template...` menu item, which opens the dialog box shown in [Figure 5.1](#).

The `datatooltk` application comes with the following templates: `datagidx` (creates a database with the same structure as used by the `datagidx` package) and `people` (creates a database suitable for storing records about people, including columns for forenames, a surname, title and address.) For example, [Figure 5.2](#) shows a database created from the `people` template.

Rows can now be added to this database using the `Edit→Row` menu or via corresponding plugins (see [section 3.4](#)).

5.1 Writing a Template File

If you want to write your own template, you need to create an XML file and store it in a subdirectory of the `datatooltk` user properties directory (see [chapter 6](#)) called `templates`. You will need to create this directory, if it doesn't already exist. For example, on a UNIX-like system, the user template directory will be `~/.datatooltk/templates/`. The template file must have the extension `.xml` for it to be listed in the “New From Template” dialog box. (The base name of the file is used in the list.)

The template file must have one `<datatooltktemplate>` element. This element may contain one or more `<header>` elements. Each `<header>` element must contain one `<label>` element and optionally one `<title>` and/or one `<type>` element.

The `<label>` element contains the uniquely identifying header label. The `<title>` element contains the header title. If omitted, the title is set to the label, unless there

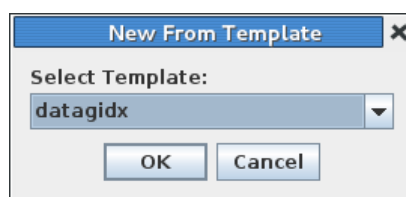


Figure 5.1: New From Template Dialog

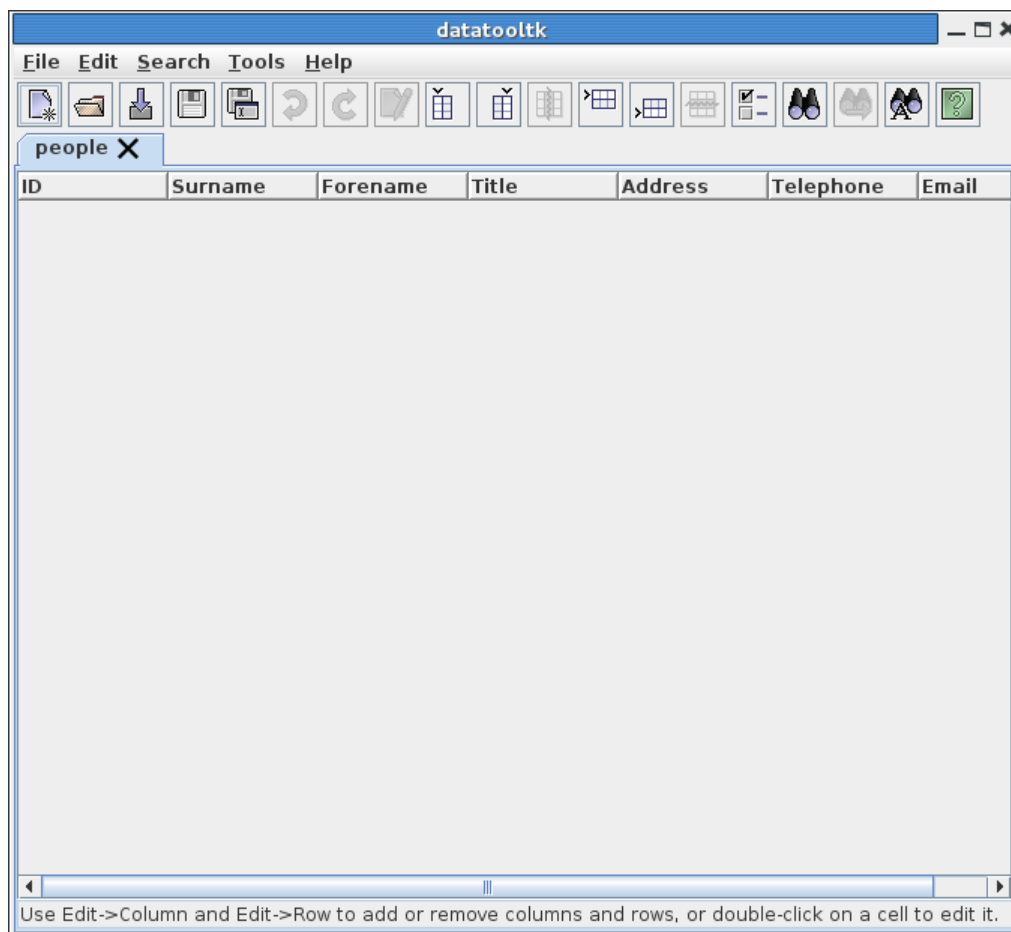


Figure 5.2: New Database Created from people Template

is an entry in the resource dictionary file that matches `plugin.<template name>.<label>`, in which case that property is used. The `<type>` element must be one of: -1 (unknown type), 0 (string type), 1 (integer type), 2 (real type) or 3 (currency type). If omitted the type is set to -1.

Example 9.

Suppose I want to write a template to create a database for a list of products. The database needs three columns: one for the product name, one for the product code and one for the product price. The name should be a string, the price column could either be set to “real” if you don’t need to worry about the currency unit or “currency” if you need a currency unit for each product. Let’s suppose that the code must be an integer. Here’s a template file (the price column is set to “real” rather than “currency”):

```
< datatooltktemplate>
  < header>
    < label> Name< /label>
    < type> 0< /type>
  < /header>
  < header>
    < label> Code< /label>
    < type> 1< /type>
  < /header>
  < header>
    < label> Price< /label>
    < type> 2< /type>
  < /header>
< /datatooltktemplate>
```

6 Application Properties

When `datatooltk` is run, either in batch or **GUI** mode, the application settings are read in from the user properties file, if it exists. Any command line options override those settings. If `datatooltk` is run in **GUI** mode, the application properties are saved on exit. They are not saved in batch mode.

The user properties directory depends on the operating system. On Windows, it is a folder called `datatooltk-settings` in the folder given by the Java system property `user.home`. This is usually the user's home folder but in some versions of Java this can be `%userprofile%`. On other operating systems, the user properties directory is called `.datatooltk` and is in the user's home directory.

In **GUI** mode, the settings can be changed using `Edit→Edit Preferences...`. This opens the **Preferences** dialog box, which has the following tabs:

General (Figure 6.1)

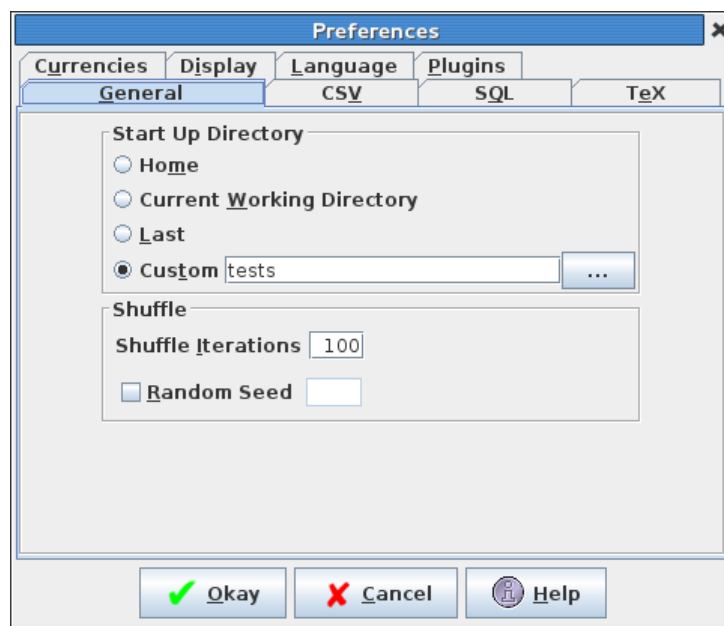


Figure 6.1: General Tab

In this tab you can specify the start up directory. (The default directory when you first load, save or import data via the **File** menu.) You can set this to your

home directory, the **current working directory**, the directory you last used on the previous run of **datatooltk** or you can specify a directory of your choice.

In this tab you can also specify the number of iterations to use in a shuffle operation (equivalent to `--shuffle-iterations`) and, optionally, a seed for the random number generator (equivalent to `--seed`).

CSV (Figure 6.2)

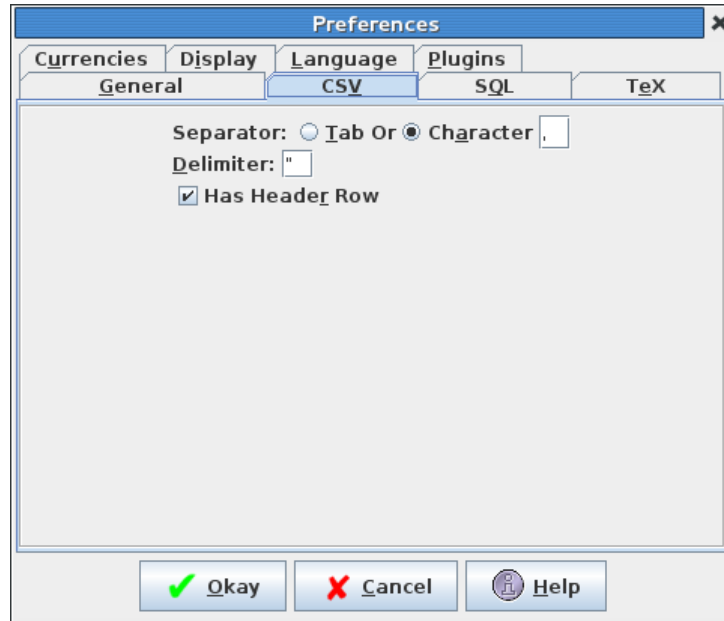


Figure 6.2: CSV Tab

In this tab you can specify the separator character. If the separator is a tab character, select the **Tab** radio button. Otherwise select the **Character** radio button and enter the character in the neighbouring text box. Set the delimiter in the **Delimiter** field. Check the **Has Header Row** button if your **CSV** files have a header row otherwise uncheck it.

SQL (Figure 6.3)

In this tab, you can specify the **SQL** connection information. Enter the host name and port number the **SQL** server is running on in the **Host** and **Port** fields. Currently, the only available prefix is “`jdbc:mysql://`”, which is the JDBC driver for **MySQL**. If you are using another driver or **SQL** database, you’ll have to add the relevant library to the **lib** directory and add it to the class path used by **datatooltk.jar**. Enter the name of the database you want to connect to in the **Database** field and the associated user name in the **User Name** field. If you want

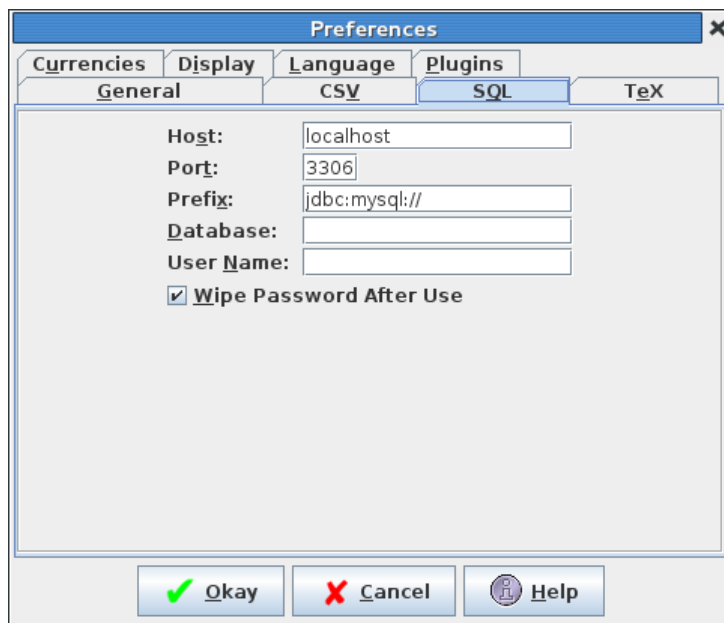


Figure 6.3: SQL Tab

the password wiped from memory as soon as a connection has been made, make sure the **Wipe Password After Use** box has been selected.

TeX (Figure 6.4)

In this tab you can specify whether or not to map T_EX special characters when you import data from CSV or SQL. If you want the mapping, make sure the **Map TeX characters when importing data from CSV or SQL** box is checked. If it is checked, the performed mappings are listed in the table in the tab. To add another mapping, click on the **Add** button, which opens the dialog box shown in Figure 6.5.

To remove a mapping, select the unwanted mapping and click on **Remove**. To edit a mapping, select the mapping and click on **Edit**.

L^AT_EX is used to help datatooltk import data from a probsoln dataset. If the latex executable isn't on the system path, you will have to specify its full location in the **LaTeX Executable** field. You can use the ellipsis button next to the field to browse your filing system.

Currencies (Figure 6.6)

If you want to identify a column as a currency type, you must make sure that datatooltk recognises the L^AT_EX command to typeset your currency. Known currency commands are listed in the **Currencies** tab. If you add any currencies to the list, remember to add them in your document as well with `\DTLnewcurrencysymbol`.

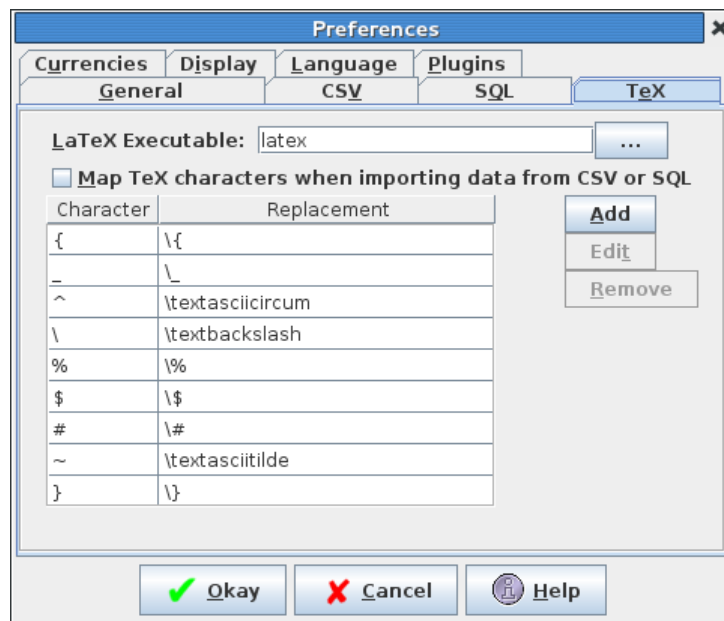


Figure 6.4: TeX Tab

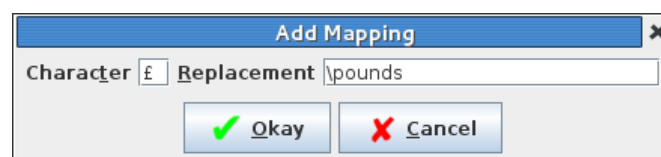


Figure 6.5: Add Mapping Dialog

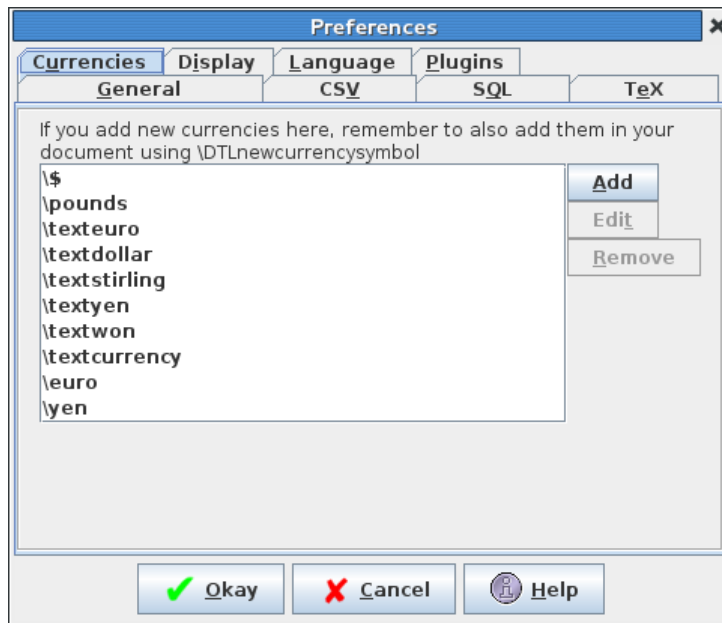


Figure 6.6: Currencies Tab

Display (Figure 6.7)

The default font used in cell entries is a monospaced font. This can be changed using the **Font** drop-down menu. You can also set the font size in the **Font Size** field. By default, each string cell has a maximum of four lines visible in the main window. (Real and integer columns only have a single line visible.) This number can be changed in the **Cell Height** field. Each column has a default width that depends on the data type for that column. The values are listed in the **Cell Widths** area. These can be changed as required.

Language (Figure 6.8)

The language used by the manual accessed via **Help**→**Manual** can be set from the **Manual Language** drop-down list. The language used in the messages, menu items, buttons and **GUI** labels can be set from the **GUI Language** drop-down list. Note that you have to restart **datatooltk** for these changes to take effect.

Plugins (Figure 6.9)

In order to use **datatooltk** plugins, you must have Perl installed (and the Perl Tk module). If the Perl executable is on your path, you can just specify it as **perl** in the **Perl** field of the Plugins tab. If it's not on your path, you will have to specify the full path name in this tab. You can use the ellipsis button to browse your filing system.

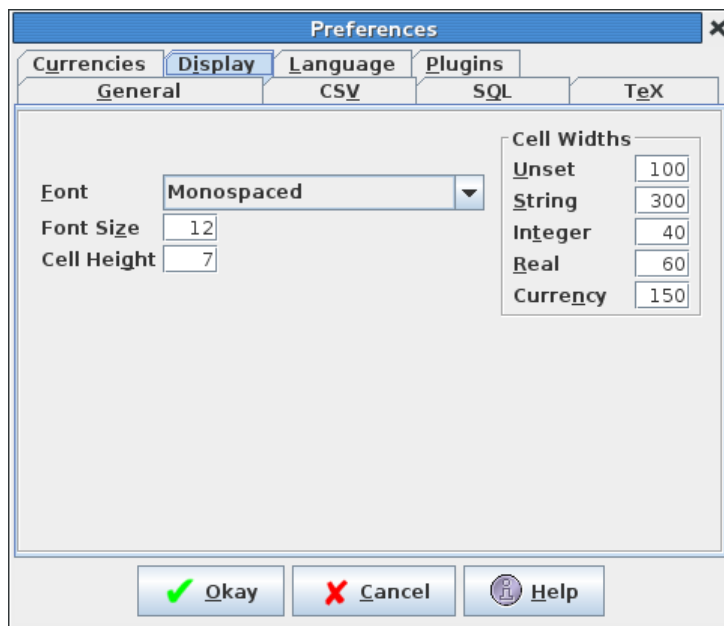


Figure 6.7: Display Tab

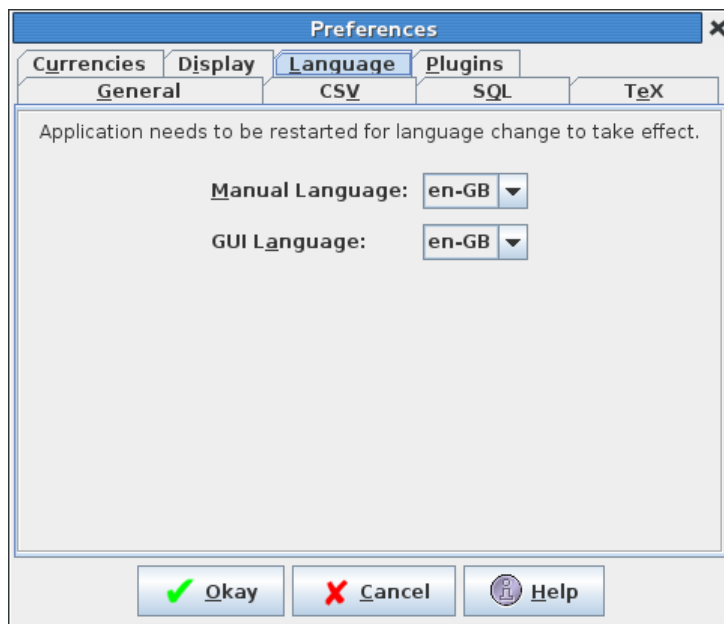


Figure 6.8: Language Tab

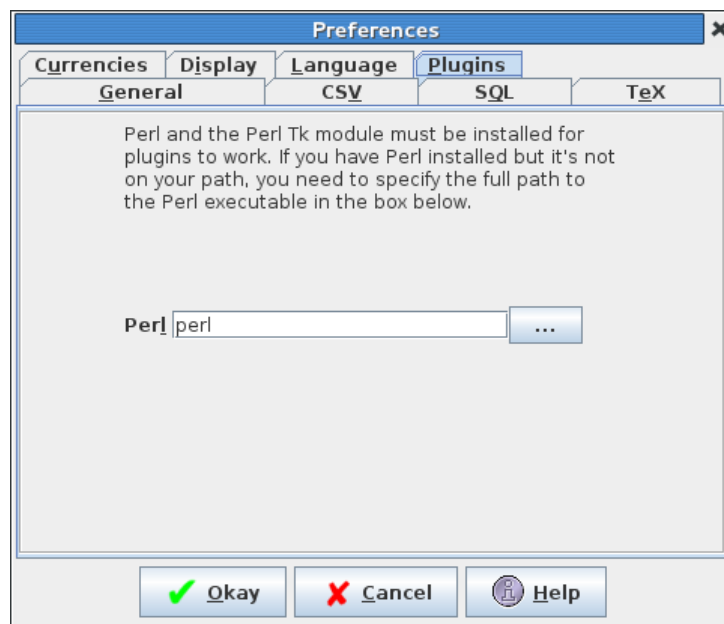


Figure 6.9: Plugins Tab

7 Licence

datatooltk is licensed under the terms of the GNU General Public License. datatooltk depends on the following third party libraries whose jar files are in the `lib` directory: Java Help (<https://javahelp.java.net/>), Open CSV (<http://opencsv.sourceforge.net/>), MySQL connector (<http://dev.mysql.com/downloads/connector/j/>) and the Java Look and Feel Graphics Repository (<http://www.oracle.com/technetwork/java/index-138612.html>).

GNU GENERAL PUBLIC LICENSE Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
Everyone is permitted to copy and distribute verbatim copies
of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you

distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program

is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you

distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the

operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then

the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free

programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

Glossary

current working directory The directory in which the application was started. [43](#)

MySQL An open source SQL database. [5](#), [34](#), [43](#)

Acronyms

CSV comma-separated values. 3–6, 33, 34, 43, 44

GUI graphical user interface. 3, 5, 11, 14, 33–35, 42, 46

SQL structured query language. 3–6, 13, 33–35, 43, 44

Index

- batch, 3
- csv, 3–5, 33
- csvheader, 4, 33
- debug, 3
- delete-tmp-files, 4
- delim, 4, 33
- gui, 3, 9
- help, 3
- in, 3, 5, 13, 21
- map-tex-specials, 4, 33
- name, 3, 5
- nocsvheader, 4, 33
- nodebug, 4
- nodelete-tmp-files, 4, 36
- nomap-tex-specials, 4
- noshuffle, 4
- nowipepassword, 5
- out, 3, 21
- probsoln, 3, 5, 35
- seed, 4, 17, 21, 43
- sep, 4, 33
- shuffle, 4, 13, 16, 21
- shuffle-iterations, 4, 16, 43
- sort, 4, 13, 14, 21
- sort-case-insensitive, 4, 14
- sort-case-sensitive, 4, 14
- sql, 3–5, 34
- sqldb, 4, 34
- sqlhost, 5, 34
- sqlpassword, 5, 34
- sqlport, 5, 34
- sqlprefix, 5, 34
- sqluser, 5, 34
- version, 3
- wipepassword, 5
- \\, 27

- database, 3
- datagidx package, 27, 31, 39
- datatool package, 3, 5, 9, 10, 13, 24, 31, 33, 35, 36
- defproblem environment, 35, 38
- \DTLdisplaydb, 11
- \DTLforeach, 6, 11, 20
- \dtlgetrow, 20
- \DTLloaddb, 33
- \DTLnewcurrencysymbol, 44
- \DTLnewdb, 5, 9
- \DTLpar, 10, 33, 34
- \DTLsaverawdb, 3, 10, 21
- \DTLsort, 13
- Edit
 - Column
 - Edit Header, 10
 - Edit Cell..., 10
 - Edit Database Name..., 5
 - Edit Preferences..., 42
 - Row, 25, 39
 - Delete Row, 27, 28
- \euro, 14, 15
- File, 9, 42
 - Import
 - Import CSV..., 33
 - Import probsoln File..., 35
 - Import SQL..., 34
 - New From Template..., 28, 39
 - Open..., 9
- Help
 - Manual, 46
- \input, 5, 9

listings package, 6, 36
\loadallproblems, 33
\lstinline, 6
\lstinputlisting, 6, 36
lstlisting environment, 6

\newproblem, 35, 38

\pounds, 14, 15
probsoln package, 3, 5, 33, 35, 44

Tools, 13
 Plugins, 25, 27
 Shuffle, 16
 Sort..., 14

\verb, 6
verbatim environment, 6
verbatim package, 6, 36
\verbatiminput, 6, 36

\write18, 13