FineTime 2.3 User Manual

Silverbean Software

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Chapter 1

Getting Started

In this chapter, we explain how to install FineTime on your computer, and how to start and register the FineTime software. We then go on to explain the basics of opening, saving, and closing timetable files, and show you how to begin creating your own timetable files.

1.1 Installing FineTime

FineTime is available for Microsoft Windows (95, 98, ME, NT, 2000 and XP) and Linux (SUSE 9.0, 9.1, 9.2 and 9.3) operating systems. The system requirements and installation procedures for FineTime under each of the two operating systems are detailed below.

1.1.1 System Requirements

FineTime runs on IBM compatible PCs equipped with a colour monitor capable of a screen resolution of at least 800 by 600 pixels, and a graphics card able to provide at least 16 bit colour at this resolution. We recommend a CPU speed of at least 266MHz and a minimum of 128MB of memory. The program requires about 20MB of hard disk space. A colour printer is recommended for producing timetable printouts.

1.1.2 Installing FineTime for Windows

FineTime for Windows is distributed as a self-extracting executable file named *FineTime-<lang>-<ver>.exe*, where *<lang>* is the two-letter language code, e.g. *EN* for English, and *<ver>* is the program version number. This file is located in the *Windows* directory on the FineTime CD.

Before installing FineTime on your computer, please be sure to uninstall any previous versions of FineTime as detailed in the *Uninstall Instructions* below.

Install Instructions

To install FineTime for Windows, change to the *Windows* directory on the FineTime CD, double-click on the FineTime setup program, and follow the instructions given. Please note that if you are installing FineTime on a computer running the NT, 2000, or XP variants of Windows, you must have administrator access rights. It is *not* necessary to reboot your computer after the install process has completed.

Uninstall Instructions

Should you wish in future to uninstall FineTime, select *Settings* from the Start menu and then *System - Software*. Now double-click on the FineTime entry, and confirm that you wish to remove FineTime. When you click *OK*, FineTime will be removed completely from your computer.

1.1.3   Installing FineTime for Linux

FineTime for Linux is distributed as an RPM (Redhat Package Manager) file named *finetime-<lang>-<ver>-1.i386.rpm*, where *<lang>* is the two-letter language code, e.g. *en* for English, and *<ver>* is the program version number. This file is located in the *Linux* directory on the FineTime CD.

Before installing FineTime on your computer, please be sure to uninstall any previous versions of FineTime as detailed in the *Uninstall Instructions* below.

1.1.3.1   Install Instructions

The simplest way to install FineTime for Linux is to use YaST.

If you are using KDE, start the Konqueror file manager, change to the *Linux* directory on the FineTime CD, and click on the FineTime RPM file to launch KRPMView. Click on the button marked *Install package with YaST* to install FineTime on your computer.

If you are not using KDE, first log on as root, then open a console window, change to the *Linux* directory on the FineTime CD, and enter the command

```
yast -i fineTime-<lang>-<ver>-1.i386.rpm.
```

1.1.3.2   Uninstall Instructions

Should you wish in future to uninstall FineTime, simply launch the YaST Package Manager, find the package fineTime-<lang>, and mark it for removal. When you click *Accept*, FineTime will be removed completely from your computer.

1.2 Starting and Registering FineTime

In this section, we explain how to start and quit the FineTime program, and introduce you to the main features of the FineTime user interface. The last part of the section explains how you can register FineTime for your school.

1.2.1 Starting FineTime

To start FineTime under Windows, simply click on the *Start* button and choose the FineTime entry. If you have accepted the default values during the installation process, the FineTime entry will be located at *Programs - Silverbean - FineTime*.

To start FineTime under Linux, simply open a console window, type `FineTime` and press *Enter*.

When you run FineTime for the first time on your computer, the program starts in its unregistered mode. The full functionality of FineTime is available in this mode, *except* that you cannot save or print any timetable files you create. There is no time limit applicable for the use of FineTime in unregistered mode.

When you have finished using FineTime, choose *File - Quit* from the menu bar to terminate the program. If you are running FineTime in registered mode and have any unsaved work, you will be prompted to save your data as detailed the next chapter.

1.2.2 The FineTime User Interface

The FineTime main window, shown in Figure 1.1, contains a *timetable window* and a *reservoir window*. Once you have opened or created a timetable, cards representing the scheduled lessons are displayed in the timetable window; cards for as yet unscheduled lessons appear in the reservoir window.

Cards in the timetable window may be marked as *selected* (see Section 4.2.4) and/or *attached* (see Section 4.2.5). Selected cards are shown with a black background; attached cards are marked with a grey circle of "glue".

Running down the left edge of the timetable window are the *resource labels*. The resource labels indicate which resource the cards in the corresponding row of the timetable window have in common. The common resource may be a group, a teacher, or a venue.

Commands are normally given to FineTime by choosing a menu item from the menus listed on the *menu bar* at the top of the FineTime main window. Certain, commonly used commands may be executed more conveniently by clicking on the corresponding button in the *tool bar* below the menu bar.
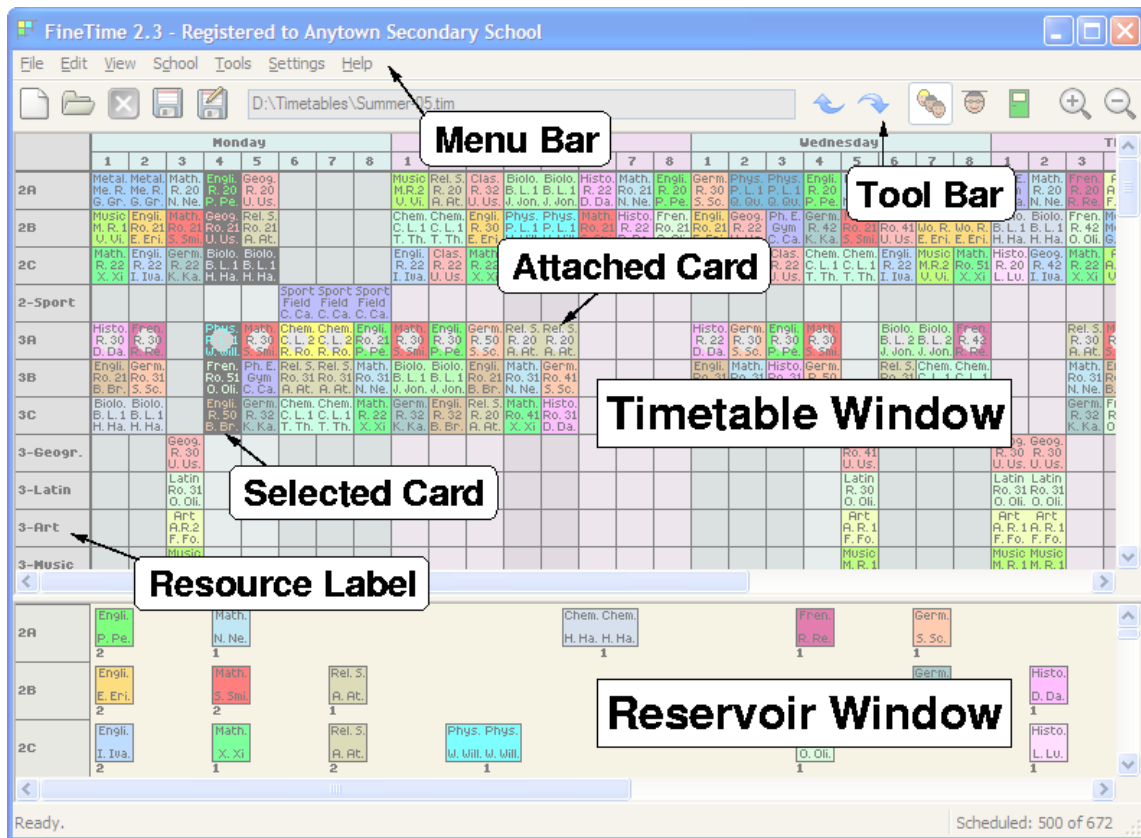
Figure 1.1: The FineTime main window, showing the timetable window, reservoir window, and other features.

1.2.3 Registering FineTime

To register FineTime, you require a licence key (a coded sequence of 8 numbers and letters) which is derived from the name of your school. Please contact Silverbean Software to obtain your licence key if you do not yet have one, or if you would like a new licence key to match a modified school name.

When you have your licence key, start FineTime, and choose *Settings - Register FineTime* to invoke the *Register FineTime* dialog, illustrated in Figure 1.2. Enter your school name and licence key in the fields provided, taking care that what you type matches exactly the information from Silverbean Software. Click *OK* to dismiss the dialog; you should now see the name of your school on the window title bar.

If your school name does not appear on the title bar, repeat the registration procedure, ensuring that the fields are filled in correctly. If the problem is still not resolved, please contact Silverbean Software for advice.

Figure 1.2: The *Register FineTime* dialog.

1.3   Managing Timetable Files

FineTime stores each timetable you create on your computer's hard disc as a single file with the extension *.tim*. An example of a partially completed timetable, called *School.tim*, can be found on the FineTime CD in the *Examples* directory. The following sections explain how to open a timetable file so that you can work on it, how to save the modified timetable, and how to close the timetable file.
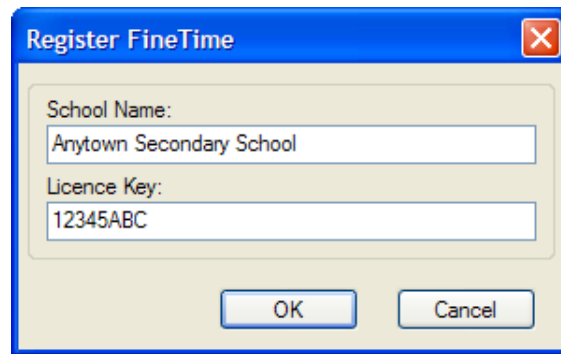
1.3.1   Opening a Timetable

The example timetable may be opened as follows. Start FineTime, and then choose *File - Open* from the menu bar to invoke the *Open File* dialog. Navigate to the *Examples* directory on the FineTime CD, and select the file named *School.tim*. Click *OK* to open that timetable file. The name of the timetable, in this case *School.tim*, appears in the text box embedded in the tool bar.

When the example timetable has opened, you can see the scheduled lessons depicted as lesson cards in the timetable window making up the upper section of the FineTime window. The lesson cards are arranged in columns according to the time of day and week when the lessons are given, and in rows according to the current timetable view (see Section 4.1.1). The timetable view is initially set such that the lesson cards are ordered by venue.

The lessons which have not yet been scheduled are shown in the reservoir section below in rows according to group. The names of the groups taking each set of lessons are shown on the labels displayed at the left edge of the reservoir window.

1.3.2   Saving a Timetable

After you have created or modified a timetable, you can save it to disc by choosing *File - Save* from the menu bar. If the timetable already has a name, it is saved under that name. If the

timetable does not yet have a name, the *Save File* dialog appears so that you can select a name and location for the new timetable. The timetable is saved under the name you enter.

Should you wish to save a named timetable under a different name, choose *File - Save As* from the menu bar, and enter the new name in the *Save File* dialog.

1.3.3   Closing a Timetable

When you have finished working on a timetable, you can close its file by choosing *File - Close* from the menu bar. If the timetable has unsaved changes, the *Save File* dialog appears so that you can save your work. After you have closed the file, the timetable and reservoir windows are cleared.

1.4   Creating a New Timetable

In this section, we explain how to begin creating a new timetable file with reference to the following chapters of this manual.

1.4.1   Starting a Timetable

After starting FineTime, as explained in section 1.2, choose *File - New* from the menu bar. This invokes the *Teaching Periods* dialog, shown in Figure 1.3, for you to tell FineTime how the teaching weeks and days at your school are structured.

The check boxes on the left side of the dialog allow you to specify which days of the week are teaching days at your school. Check the boxes corresponding to the days for which you want to schedule lessons.

Now, enter the number of teaching periods per day in the top field on the right, and a number of check boxes appear in the region below. Mark the boxes corresponding to those periods which are followed by a break so that FineTime knows that multi-period lessons may not extend beyond these periods.

When you click the *OK* button, the dialog is dismissed and you see that the headings for your new timetable have appeared in the timetable window. The teaching days and number of periods per day match your entries in the *Teaching Periods* dialog.

Should you wish at a later time to change the structure of the school week or days used for your timetable, you can invoke the *Teaching Periods* dialog by choosing *School - Periods* from the menu bar and change the fields accordingly. The structure of the displayed timetable changes to reflect the new settings.
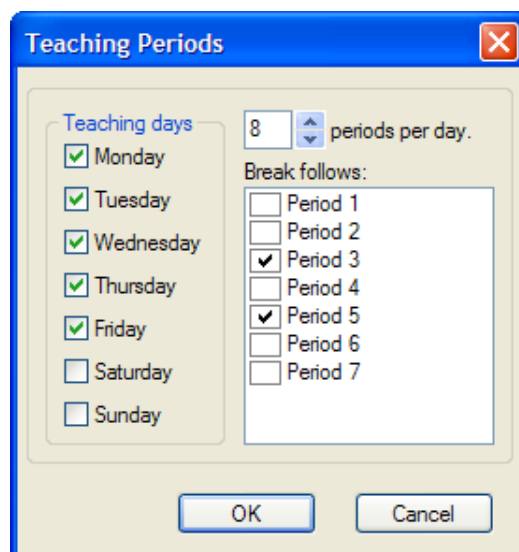
Figure 1.3: The *Teaching Periods* dialog for a school with lessons Monday to Friday. Each day has 8 periods, with breaks after the 3rd and 5th periods.

1.4.2   Continuing your Timetable

FineTime needs to be given information about your school, such as details about staff and teaching venue availability, to use when devising your timetable. Chapter 2 explains how to enter these details into a new timetable using FineTime.

Alternatively, FineTime can import this information from a so-called school resource file as explained in chapter 3. School resource files have a simple text format, and may be generated by a spreadsheet program such as Microsoft Excel, or by a text editor.

Chapter 4 explains how to go about devising your timetable once you have specified your school details. Note however that you can still alter your school details while devising a timetable. In that case FineTime will alter the timetable to maintain consistency. If, for example, a venue is deleted from the list, FineTime will remove all lessons that were scheduled to take place at this venue from the timetable, and move them back to the reservoir of lessons which have not yet been scheduled.

Finally, chapter 5 shows how you can print out the complete timetable. It also explains how individualised timetables for student groups, teachers and rooms can be printed, or exported as HTML files.

Chapter 2

Specifying your School Details

In addition to the details entered in the *Teaching Periods* dialog, FineTime requires you to enter six lists of school resource data. The common properties of these school resource lists are detailed in section 2.1.

Section 2.2 describes the particular attributes of each school resource type, and explains how to use the resource dialogs to enter and modify school resource items.

The group, teacher and venue dialogs each use a special table in which you can specify for which periods a particular item is available. The use of these *Availability Tables* is explained in section 2.3.

2.1 School Resource Lists

Each of the resource lists is accessed from a dialog invoked by one of the menu items under the *School* menu. The resource list dialogs all have the same format, consisting of a *list window* showing the resource items, a set of *list modification buttons* (*New*, *Edit*, etc.) to the right of this window, and a set of *dialog control buttons* (*OK*, *Apply*, and *Cancel*) below it. Figure 2.1 shows a resource list dialog, in this case the dialog used to edit the course list.

The following sections describe how to use the list window, list modification buttons and dialog control buttons to enter or change your school resource details.

2.1.1 The List Window

The list window allows you to select resource items by clicking on them with the mouse, or by navigating using the cursor keys. You can select more than one item at a time by holding the shift or control keys down while selecting additional items. Selected items are shown with a dark background.
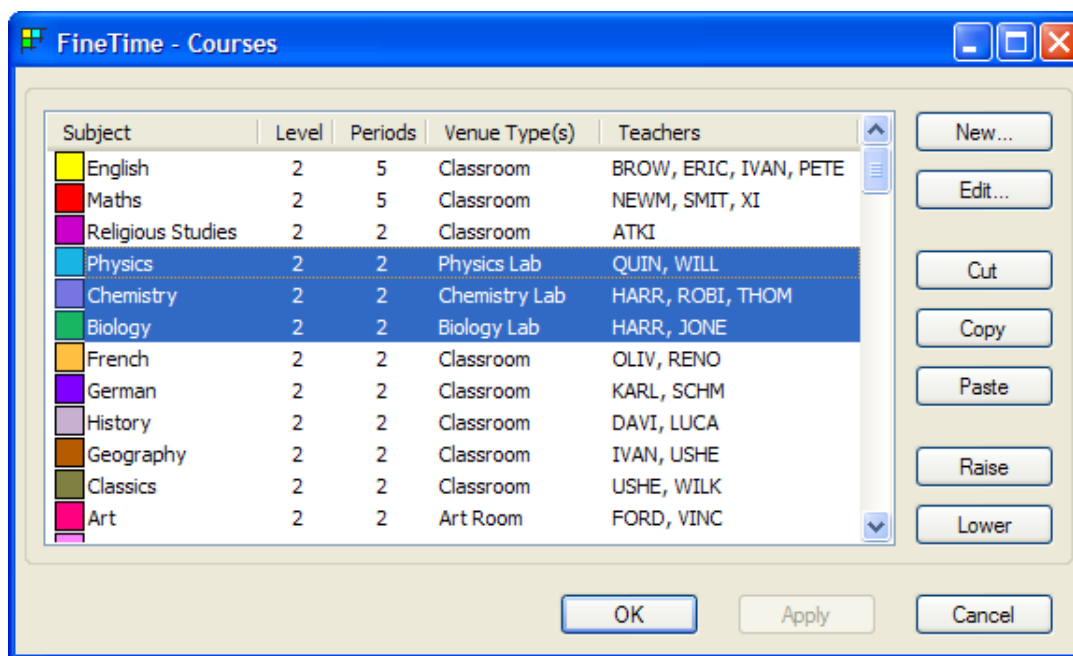
Figure 2.1: The *Courses* dialog is a typical resource list dialog. The courses are listed in the list window, the buttons to the right allow you to edit the course list, and the buttons at the bottom are used to confirm your changes. Here, courses *Physics 2*, *Chemistry 2,* and *Biology 2* are selected, and course *Physics 2* also has the focus.

The list window also provides the facility to sort the displayed resource items according to any of their fields. Simply click on the field header at the top of the window to sort the items according to that field in increasing order. Click on the same field header again to reverse the order.

2.1.2 The List Modification Buttons

The list modification buttons are split into three groups. The first two buttons (*New* and *Edit*) allow you to create or modify resource items. The second group (*Cut*, *Copy* and *Paste*) are used to remove, copy or insert resource items; the last two buttons (*Raise* and *Lower*) give you fine control over the order of items in the list.

Creating and Modifying Resource Items

To add a new item to a resource list, click the *New* button to invoke a resource dialog through which you can specify the properties of the new item. The new item will be added to the resource list when you click *OK* in the resource dialog.

You can change the properties of the resource item with the focus by clicking the *Edit* button, or by double-clicking on the item. This invokes the same dialog as clicking the *New* button does,

except that the dialog fields are filled with the current resource property values. Change the fields to the desired values and click *OK* to return to the resource list dialog.

Deleting, Copying and Moving Resource Items

The *Cut*, *Copy* and *Paste* buttons make use of a temporary, hidden store called the *resource list clipboard*, which exists as long as the resource list dialog is open.

The *Cut* button removes the selected resource items from the resource list and stores them in the clipboard; the *Copy* button creates copies of the selected items in the clipboard. Both operations cause any previous contents of the clipboard to be overwritten.

The *Paste* button copies the resource items currently in the clipboard to the resource list at the position of the focused item. Repeated use of the *Paste* button results in multiple copies of the clipboard contents being inserted into the resource list. If necessary, resource names are modified upon pasting to preserve their uniqueness.

Changing the Order of Resource Items

The last two list modification buttons, *Raise* and *Lower* are used change the order of the list items. Click the *Raise* button to raise the selected items by one place; click the *Lower* button the lower them by one place.

Note that you can order the list items by any of their properties by clicking on the header for that property in the list window, as described in Section 2.1.1.

2.1.3 The Dialog Control Buttons

When you have finished changing the resource list, click the *OK* button to make your changes permanent in FineTime and close the resource list dialog. If you wish to make your changes permanent, but do not want to close the resource list dialog yet, click the *Apply* button.

Click the *Cancel* button to discard any changes you have made to the resource list dialog. Note that you cannot discard any changes which have been made permanent by clicking the *Apply* button!

2.2 School Resource Dialogs

In this section, we describe the particular attributes of each type of resource used by FineTime. In particular, we illustrate how items of each resource type can be added or modified using appropriate input dialogs.

2.2.1 Venue Types

Teaching venues may be defined as being of one or more particular types in FineTime. This information is used by FineTime to determine which courses may be taught at a particular venue. For example, you may wish to specify that the course *Biology (Year 4)* may be taught only in a biology lab, of which there are three, called *Lab 1*, *Lab 2* and *Lab 3*. In this case, you might specify a venue type *Biology Lab* and specify that *Lab 1*, *Lab 2* and *Lab 3* are of type *Biology Lab*. You would also specify that course *Biology (Year 4)* requires a venue of type *Biology Lab*.
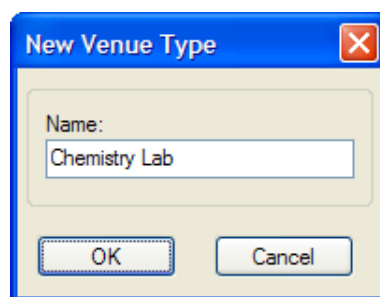

Figure 2.2: A *New Venue Type* dialog specifying the *Chemistry Lab* venue type.

Choose *School - Venue Types* from the menu bar to invoke the (initially empty) *Venue Types* dialog. You can add, modify and delete items from the list of venue types as explained in section 2.1. The *New Venue Type* dialog (see Figure 2.2) has just a single field for you to enter the name of the venue type.

2.2.2 Venues

FineTime defines a venue as any place where a lesson may take place. Examples of venues might be *Room 42*, *Field 3*, or *Chemistry Lab 1*.

Choose *School - Venues* from the menu bar to invoke the *Venues* dialog. You can add, modify and delete items from the list of venues as explained in section 2.1.

The *New Venue* dialog, shown in Figure 2.3, has fields in which you can enter the name and capacity of the venue. The venue capacity determines the maximum number of students who can attend a lesson at the venue. In addition, the venue may be identified as being of a particular type by checking the relevant boxes under *Venue type(s)*, and its availability may be limited to certain periods by modifying the *Availability* table (See section 2.3.) The type of the venue determines which courses may be taught there.

After you have confirmed or applied the *Venues* dialog, you see that the timetable display changes to reflect your additions or modifications to the list of venues. Each venue is represented by its own row of boxes in the timetable window.
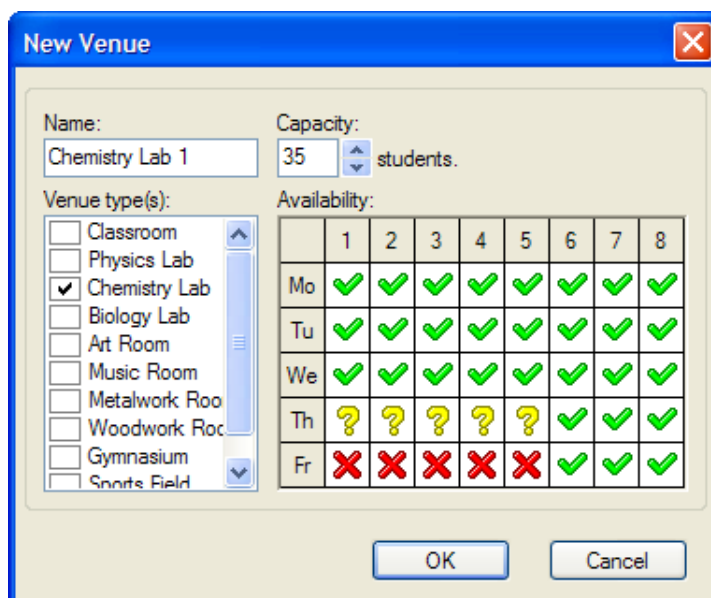
Figure 2.3: This *New Venue* dialog shows a chemistry lab with a capacity of 35 students. The lab is not available on Friday mornings, and has limited availability on Thursday mornings.

2.2.3 Subjects

FineTime needs to know what subjects are taught at your school. Examples of subjects are *Maths* and *History*. The subjects you enter here are used when specifying the courses offered by your school (see section 2.2.5).

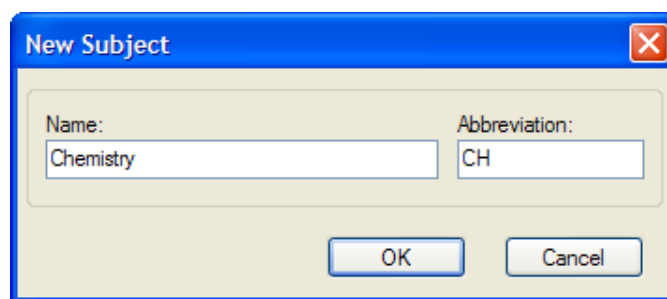Figure 2.4: A *New Subject* dialog in which the subject *Chemistry* is defined. The abbreviation *CH* is used for this subject in exported files.

Choose *School - Subjects* from the menu bar to invoke the *Subjects* dialog. You can add, modify and delete items from the list of subjects as explained in section 2.1.

The *New Subject* dialog, shown in Figure 2.4, has fields in which you can enter the full and

abbreviated names for the subject. The abbreviated name is used when exporting the school resource data in certain formats. Both the full and abbreviated names must be unique.

2.2.4 Levels

FineTime needs information on the levels of instruction in which subjects are taught at your school. Levels of instructions might, for example, be *3* for third year level, or *U6* for upper sixth level.

The levels of instruction are used when defining courses (see section 2.2.5), and also when specifying the courses which may be taken by each teacher as explained in section 2.2.6.
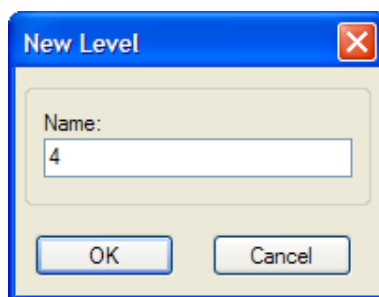

Figure 2.5: A *New Level* dialog in which the level *4* is defined for use in specifying courses to be taught at 4th year level.

Choose *School - Levels* from the menu bar to invoke the *Levels* dialog. You can add, modify and delete items from the list of levels as explained in section 2.1. The list should be in order of increasing difficulty. The *New Level* dialog, shown in Figure 2.4, has a single field in which you can enter the level name.

2.2.5 Courses

A course is defined in FineTime as a series of lessons in the same subject, and at the same level, which take place a certain number of times per week. An example of a course might be *Biology (Year 4)*. Note that there may be multiple instances of the same course, taught by different teachers to different groups of students, e.g. if all classes in year four take the course *Biology (Year 4)*.

Choose *School - Courses* from the menu bar to invoke the *Courses* dialog. You can add, modify and delete items from the list of courses as explained in section 2.1.

The *New Course* dialog allows you to choose the subject (mandatory) and level (optional) of the course. You can also specify one or more venue type(s) required for any venue at which the
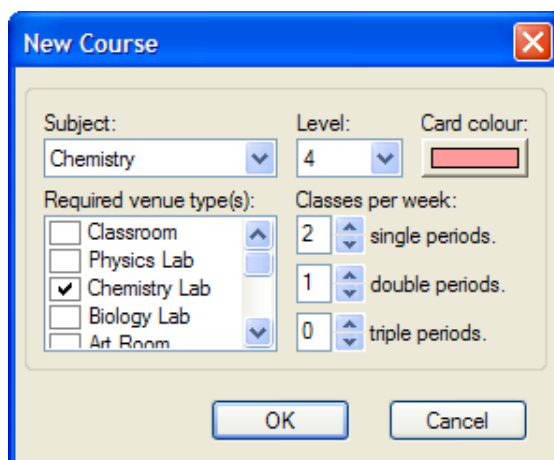
Figure 2.6: A *New Course* dialog in which a 4th year chemistry course is defined. The course has two single period lessons and one double period lesson per week. The lessons must take place in a chemistry lab.

course may be taught (see subsection 2.2.1). The *Card Colour* button invokes the *Colour* dialog for you to specify the colour which is to be used to draw the cards representing lessons for this course. The button colour reflects your current choice of colour for this course.

The boxes below the *Card Colour* button are for you to enter the number of classes per week for this course, with separate fields for single period, double period, and triple period classes.
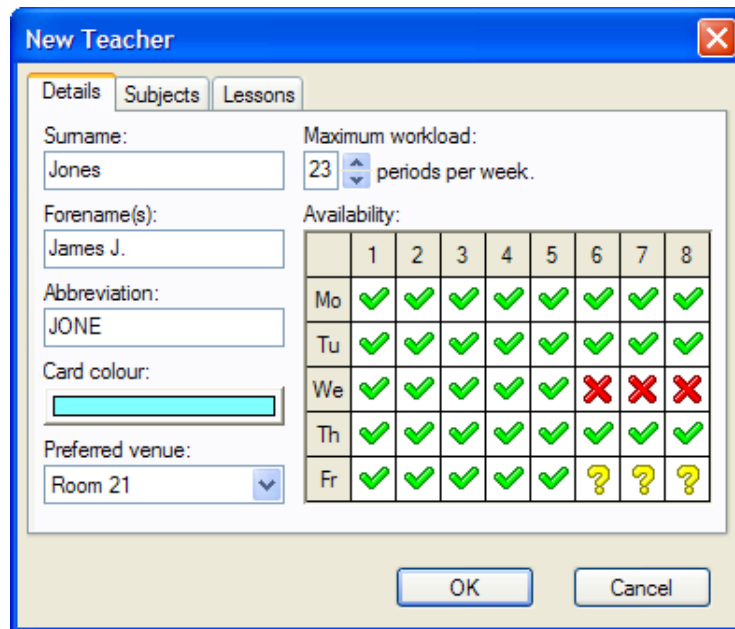
2.2.6 Teachers

FineTime needs to know which teachers are available to teach the courses as defined above. Choose *School - Teachers* from the menu bar to invoke the *Teachers* dialog. You can add, modify and delete members of staff from the list of teachers as explained in section 2.1.

The *New Teacher* dialog has three pages, labelled *Details*, *Subjects* and *Lessons*. The *Details* page (Figure 2.7) allows you to enter or change the basic information on the teacher, while the *Subjects* (Figure 2.8) page lets you specify the subjects which may be taught by the teacher. The *Lessons* page (Figure 2.9) is used to assign lessons by group / course combination to this teacher.

Each teacher is identified on the *Details* page by their surname, first names, and unique abbreviation. This page also allows you to specify the card colour, a preferred venue, and the maximum number of teaching periods per week for the teacher. The teacher's availability for teaching may be additionally limited modifying the *Availability* table (See section 2.3.)

The *Subjects* page allows you to specify which subjects may be taught by the teacher. You can also define minimum and maximum levels of instruction in each subject. Mark each subject which this teacher may take by clicking on the corresponding check box on the left side of the dialog. Then, if you wish, choose the minimum and/or maximum level at which the teacher may teach that subject from the corresponding choice boxes to the right of the check box.
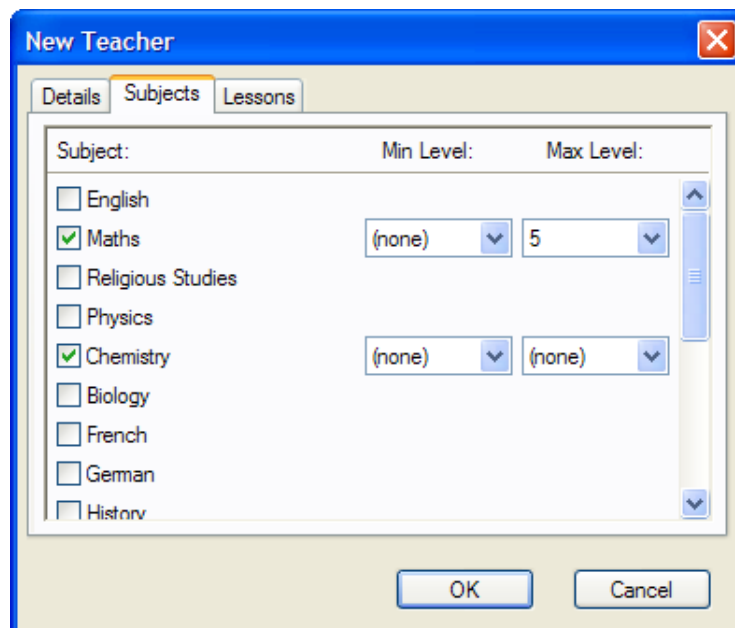
Figure 2.7: *New Teacher* dialog, *Details* page. This teacher, James Jones (abbreviation JONE), teaches for a maximum 23 periods per week. He prefers to teach in Room 21 if possible. He is not available on Wednesday afternoons, and prefers not to teach on Friday afternoons.

Figure 2.8: *New Teacher* dialog, *Subjects* page. Mr. Jones may take courses in maths and in chemistry. He teaches chemistry at all levels, but teaches maths only at the lower levels.
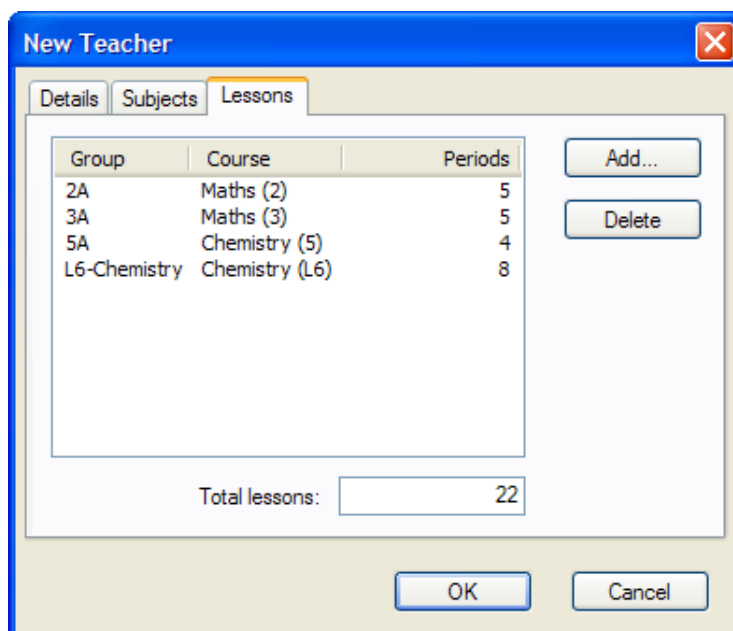
Figure 2.9: *New Teacher* dialog, *Lessons* page, showing the list of lessons by group / course combination assigned to the teacher.

The *Lessons* page shows which lessons you have pre-assigned to this teacher. Click the *Add* button to assign additional lessons, or click the *Delete* button to remove the selected lessons from the allocation list. Note that lessons do not have to be pre-assigned to a teacher - FineTime will allocate any unassigned lessons to available teachers during planning.

2.2.7 Groups

A FineTime student group is made up of students who attend a particular set of courses together, either as a class, or as a special course set. Examples of groups might be a *Class 3A* or the *4th Year Latin Set*.

Choose *School - Groups* from the menu bar to invoke the *Groups* dialog. You can add, modify and delete student groups from the list of groups as explained in section 2.1.

Each group must be identified by a unique name, specified in the *Name* field in the *New Group* dialog (Figure 2.10). The dialog also provides the *Courses* field for you to specify the courses attended by this group and allows you to specify a preferred venue for the group; this venue is automatically selected for the group's lessons if possible.

The availability of the group for teaching may be limited to certain periods by modifying the *Availability* table (See section 2.3.) Check the *Avoid timetable holes* box if the automatic scheduler should try to generate a timetable that has no "holes" between lessons for members of the group.
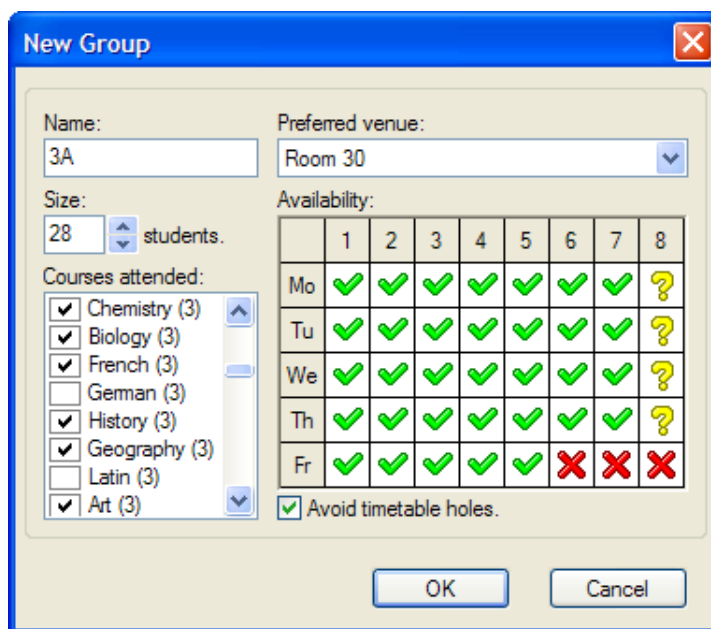
Figure 2.10: The *New Group* dialog. The 28 students of class 3A take all the 3rd year courses except German and Latin, preferably in Room 30. No lessons can be scheduled for this class on Friday afternoons. The automatic scheduler tries to avoid scheduling lessons for the last period of the day, and does not permit "holes" between lessons for members of this class.

After you have confirmed your group definitions, you see that the reservoir area of the main window contains a number of cards. Each of these cards represents a lesson to be scheduled for a particular student group.

2.2.8   Couplings

Lastly, FineTime needs to know which student groups have students in common, and therefore cannot be scheduled for the same time slot. We do this by defining so-called *couplings*.

A coupling is a list of group option sets, which represent student options, and each of which contains one or more student groups. Each student's group membership must be derivable from one coupling. The student is a member of just one group in each group option set of the coupling.

This leads to the following constraints for the timetable. Within a coupling, a student group belonging to a particular group option set *cannot* be scheduled for the same time as a student group from a different group option set. The student groups making up a group option set are normally (but not necessarily) scheduled for the same time.

Choose *School - Couplings* from the menu bar to invoke the *Couplings* dialog. You can add, modify and delete couplings from the list of couplings as explained in section 2.1.

Figure 2.11: This *New Coupling* dialog shows a coupling which specifies that students of class 3A may also be members of any one of the third-year geography, latin, art or music sets. These sets may be taught simultaneously, but cannot be scheduled for the same time as class 3A.
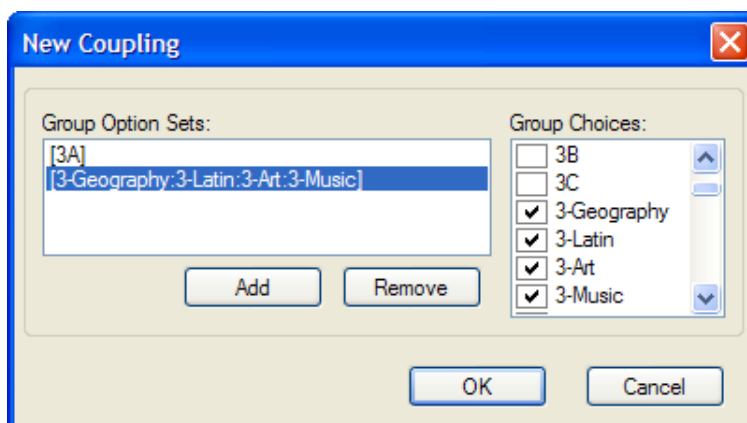
The dialog used to create or modify couplings is illustrated in Figure 2.11. Click the *Add* button to create an additional group option set. You can modify a group option set by highlighting it in the list and selecting the required groups from the *Group Choices* list to the right. Click the *Remove* button to remove the highlighted entry.

Note that although a particular student group may appear only once *within* a coupling, the same student group can belong to an arbitrary number of *different* couplings. Indeed, for the higher grades, the couplings might well correspond to the courses followed by single students, with certain student groups appearing in many of the couplings.

2.3 Availability Tables

Venues, teachers, or groups may not be available for teaching at certain times during the scheduling period. It is also possible that there are times when these resources should not be scheduled, but may be scheduled if absolutely necessary. This information is entered using the availability table for the resource.

This table has, for each period of each scheduling day, a field which contains a symbol representing the availability of the resource at that time. A green tick means that the resource is available, a yellow question mark indicates that the resource may be available if absolutely necessary, while a red cross means that the resource is not available at the corresponding time.

Each symbol can be changed from tick to question mark to cross, and then back to tick, by clicking repeatedly on the field with the left mouse button. Clicking on a weekday abbreviation changes the symbol for every period of that day in the same fashion, while a click on a period number changes similarly the symbol for that period of each day. A click in the upper left corner of the table changes every symbol in the table.

Chapter 3

Importing and Exporting School Details

In this chapter we describe how FineTime can import the school details from a text based school resource file, as well as export the school details as such a file.

3.1   Importing School Details

FineTime is able to import the school details it needs from a suitably structured text file, which we call a school resource file. These files have the extension *.csv,* which stands for *character separated value.* Files of this type can be generated by a wide range of applications, including Microsoft Excel and other spreadsheet programs.

As an alternative to the school detail entry process described in section 2.1, you might therefore enter your school details using a spreadsheet or other program, export your data as a *.csv* file, and then import this file into FineTime. The exact format of the school resource file is described in appendix A. An example can be found in the file *School.csv*, which contains the resources used in the timetable *School.tim* and can be found on the FineTime CD in the *Examples* directory.

To import a school resource file into FineTime, choose *School - Import Data* from the menu bar. Select the required file, and click *OK*. You should now see the lesson cards corresponding to the imported school resource data in the reservoir area of the FineTime window.

3.2   Exporting School Details

In addition to reading the *.csv* files described previously, FineTime is able to generate such files for further processing by other applications. You might also wish to create a school resource file for use as a base for creating a set of alternative timetables for the same resources.

To export a school resource file, choose *School - Export Data* from the menu bar. Select *School resource file* from the file type drop-down list, and enter a file name ending with *.csv.* Click *OK* to export the current school details under your chosen name.

Chapter 4

Devising your Timetable

Once you have entered your school details as described in chapter 2 you can begin the work of devising your timetable. In the reservoir area of the FineTime window you can see the lesson cards which have been generated for each student group according to the courses they are taking. Your task is to schedule the lessons by moving these cards to the appropriate locations in the timetable area of the FineTime window.

You may choose to schedule all the lessons yourself by dragging lesson cards from the reservoir to the timetable using the mouse, or you can use FineTime's automatic scheduling feature to considerably ease your task. It is also possible to combine the manual and automatic approaches to create your optimum timetable while still saving a great deal of time and effort.

In section 4.1 of this chapter we describe how you can set the timetable view to highlight different aspects of your timetable, and to facilitate lesson scheduling. Section 4.2 explains how to schedule lessons by dragging lesson cards with the mouse and how to use automatic scheduling.

4.1   Setting the Timetable View

4.1.1   Viewing by Lesson Property

After you have loaded a timetable, or imported a school resource file into FineTime, you see that the timetable window shows a list of the student groups for whom lessons are to be scheduled down the left edge of the window. The lessons currently scheduled for each group are depicted in the timetable row adjacent to each venue label.

As you shall see in the following sections of this chapter, it is also very useful to be able to view the timetable with the lessons arranged according to properties other than the student groups. FineTime allows you to change the timetable view to so that the lessons are ordered by either group, teacher, or venue. To order the lessons by teacher, choose *View - Teachers* from the menu bar, and the timetable window changes so that the teachers are listed at the left edge of the

window, and the lessons are ordered accordingly. Choose *View - Venues* from the menu bar to see the lessons ordered by venue. To return to the group view, choose *View - Groups* from the menu bar.

4.1.2   Setting the Zoom Level

The lessons cards appearing in the timetable and reservoir windows show information about the properties of the lessons, depending on the current view setting. This information is abbreviated to fit on the lesson cards.

FineTime allows you to change the size of the lesson cards using a zoom function to provide eight levels of detail. Choose *View - Zoom In* from the menu bar to increase the card size. This allows more information to be displayed on each card – the disadvantage is that fewer cards can be show on the screen at once. For an a better overview of the timetable, but with less information shown on each card, choose *View - Zoom Out* from the menu bar.

4.1.3   Setting the Card Colouring

The lesson cards displayed in the FineTime windows can be coloured according to their teacher or course. Choose *View - Colour by Teacher* if you would like the lesson card colours to reflect their teachers; otherwise choose *View - Colour by Course* to see the cards coloured according to their courses.

If you do not want the cards to be coloured, choose *View - No Colours* from the menu bar. All the cards are then left white. Choose this option before printing out or exporting timetables if you do not want the card colours to appear in the output.

Note that, when the cards are coloured by teacher, lesson cards in the reservoir take the colour of the teacher assigned to lessons of that type. If no teacher is assigned to that lesson's group / course combination, the card appears white.

4.2   Scheduling the Lessons

4.2.1   Dragging Lesson Cards

To schedule or reschedule a lesson, simply drag the card representing that lesson from the reservoir or timetable window to the appropriate position in the timetable window using the mouse. When you release the left mouse button, the lesson is assigned to the slot at the drop position as long as this would not violate the integrity of the timetable. For example, FineTime will not allow you to schedule the same group for two simultaneous lessons, or to exceed the capacity of a venue. If you attempt to schedule a lesson at a disallowed slot, FineTime shows a message

informing you why the lesson cannot be assigned, and the lesson card is dropped back where it was picked up from.

As you drag a lesson card over the timetable window, you see that FineTime highlights the slot at the current cursor position depending on whether the lesson card might be dropped there. Valid slots for the lesson card are highlighted in green; slots which are not suitable for the lesson card are highlighted in red. Sometimes FineTime highlights a slot in yellow; this means that you are permitted to drop the lesson card at that slot, but a soft restriction (see Section 4.2.7) would be violated. If you drop the lesson card on a yellow-highlighted slot, FineTime shows a warning message, but allows you to drop the lesson card there if you wish.

To remove a lesson from the timetable, simply drag the corresponding card from the timetable window to the reservoir window.

4.2.2 Allocating Resources

The current view setting (see subsection 4.1.1) determines how resources are allocated to a lesson when it is scheduled by dropping a lesson card on the timetable window. If the current view setting is *Venues,* then the venue is set according to the timetable row corresponding to the drop position, and a teacher is allocated automatically; if the view setting is *Teachers,* then the teacher is set by the drop position, and a suitable venue is allocated automatically. If the view setting is *Groups,* then both the teacher and venue are set automatically by FineTime.

There may be occasions when more than one teacher or venue would be equally suitable for a particular lesson. In such cases, FineTime shows a list of the most suitable candidates for the lesson so that you can choose yourself which resource should be assigned to the lesson.

Should you wish to change a resource for a lesson, for example because you do not agree with FineTime's automatic choice, you can do this by moving the card to a different row in the appropriate view. For example, to change the teacher for a lesson, select the teacher view and move the card to the desired timetable slot.

4.2.3 Reversing Changes

If you change your mind about scheduling or removing a lesson, don't worry! FineTime keeps an internal record of all your manual timetable changes, and is able to reverse them on command.

Simply choose *Edit - Undo* from the menu bar, and the last manual change you made is immediately reversed. Additional *Undo* operations allow you to make further backward steps until the desired timetable state is reached.

After you have made a backward step by choosing *Undo*, it is possible to reverse *that* change by choosing *Edit - Redo*. This results in a forward step though your manual change history. Any number of *Undo* operations can be cancelled by the same number of *Redo* operations.

4.2.4 Selecting Lesson Cards

FineTime allows you to select a subset of the cards displayed in the timetable view for operations such as attaching, detaching or removal (see Section 4.2.5). To select single cards, simply right-click on them in turn. The selected cards are displayed with light writing on a black background.

You can deselect cards by right-clicking on them a second time. Each right-click of the mouse toggles the selection state of the card under the mouse cursor.

It is also possible to select or deselect certain groups of cards at once. You can (de-)select a complete row of cards by right-clicking on the resource label for that row. To (de-)select all the cards for one day, right-click on the corresponding day heading; to (de-)select the cards for all lessons taking place at a particular time, right-click on the corresponding period number heading.

In addition, you can choose *Edit - Select All* from the menu bar to select all the cards in the timetable view or *Edit - Clear Selection* to deselect all cards. Choose *Edit - Invert Selection* to select currently unselected cards while deselecting currently selected cards. The latter is useful when, for example, you want select all cards except those for a certain day or teacher.

4.2.5 Lesson Card Operations

Selected lesson cards (see Section 4.2.4) can be attached, detached or removed. These operations are described below.

Attaching and Detaching Cards

Attached cards cannot be moved, either manually, or by the automatic Timetable Solver. The lessons they represent have a fixed teacher and venue. Attached cards are identified by a grey circle (which is intended to represent the glue holding them to the timetable board.)

Choose *Edit - Attach Selected* from the menu bar to attach the selected cards in the timetable view. To detach the selected cards so that they can be moved or removed, choose *Edit - Detach Selected*.

Removing Cards

Choose *Edit - Remove Selected* from the menu bar to remove the selected lesson cards from the timetable. The removed cards are placed in the reservoir area below the timetable view. Note that attached cards are not removed - they must be detached first.

4.2.6   Automatic Scheduling

The FineTime Timetable Solver uses an algorithm that mimics a successive manual approach to optimally schedule the remaining unallocated lessons while observing the relevant hard and soft restrictions. Choose *Tools - Timetable Solver* from the menu bar to invoke the Timetable Solver (see Figure 4.1).
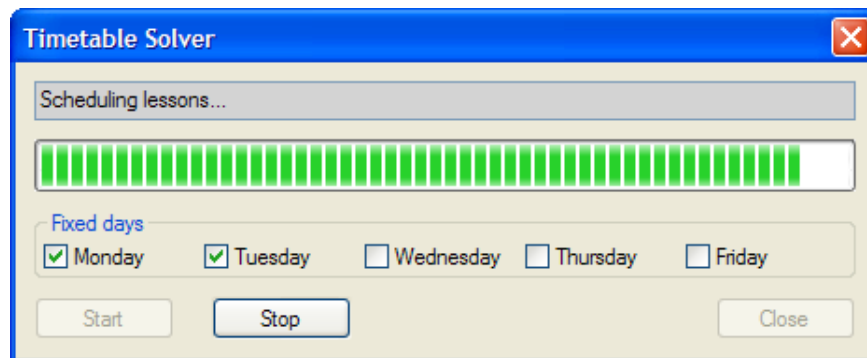

Figure 4.1: The *Timetable Solver* dialog allows you to start and stop the FineTime Timetable Solver. In this example, Monday and Tuesday have have been marked as *Fixed days* - the Solver will not add lessons to, remove lessons from, or change lessons on these days.

4.2.6.1   Running the Solver

Before running the Solver, you may specify that the teaching schedule for certain days should not be changed. For example, you may wish to fix the schedule for Monday and Tuesday when planning a substitute timetable to cover for teacher absence reported on Wednesday morning.

Specify fixed days by checking the corresponding boxes, and click *Start* in the *Timetable Solver* dialog. The solver then runs until either all the remaining lessons are scheduled, or it determines that it cannot find a complete solution under the current constraints. You may safely terminate the solving process at any time by clicking the *Stop* button in the *Timetable Solver* dialog if you wish.

Click the *Close* button to dismiss the Timetable Solver when you have finished with it.

4.2.6.2   The Solving Process

The Timetable Solver applies the soft restrictions as described in Section 4.2.7 in that lessons may be scheduled to violate restrictions which are marked as allowed, but will not violate restrictions marked as forbidden. If it is not otherwise possible to schedule all the lessons, the Timetable

Solver may schedule lessons such that restrictions which are not marked as either definitely allowed or definitely forbidden may be violated, but it will try not to.

If FineTime's Timetable Solver is used to integrate additional lessons into an existing timetable, it attempts to do so without moving those lessons already scheduled. If this fails, the Solver will attempt to move the minimum number of the scheduled lessons necessary to allow the timetable to be completed. The Timetable Solver never moves attached lessons though, even when doing so would allow it to solve an otherwise insoluble timetable.

A timetable created by adding lessons to a pre-existing timetable will be similar to the initial timetable, but may not be the best achievable. If you would like to find a better solution from scratch, choose *Edit - Select All* followed by *Edit - Remove Selected* to move all the lesson cards to the reservoir before invoking the Timetable Solver.

4.2.7 Restrictions

As we have mentioned earlier in this section, FineTime does not allow lessons to be scheduled such that they would be in conflict with other lessons. For example, lessons with the same student or teacher may not be scheduled at the same time. The rules governing this behaviour are called *hard* restrictions; they are always applicable.

In addition to the hard restrictions, FineTime implements a number of so-called *soft* restrictions whose applicability may be set as desired. An example of a soft restriction is the rule that only one lesson of a particular type may take place per day. You can instruct FineTime to either ignore this rule, to regard it as a recommendation, or to strictly enforce it, according to your requirements.

To specify how you would like FineTime to treat the soft restrictions, choose *Settings - Restrictions* from the menu bar to invoke the *Restrictions* dialog, as shown in Figure 4.2. Now use the mouse to drag the sliders to positions corresponding to the degree to which you would like FineTime to enforce each of the soft restrictions.

4.3 Substitution Timetables

It may often be necessary to modify your normal timetable to take account of temporary circumstances, such as an unavailable teacher or venue. The resulting substitution timetable is then used to cover this exceptional period.

To create a substitution timetable based on your normal timetable, load the normal timetable and change the school resources to reflect the changed circumstances. You will now typically find lessons that need rescheduling in the reservoir. Then reschedule the displaced lessons manually (see section 4.2.1) or automatically (see section 4.2.6). You may have to relax your restriction settings (see section 4.2.7) to allow, for example, teachers other than the assigned ones to take displaced lessons.
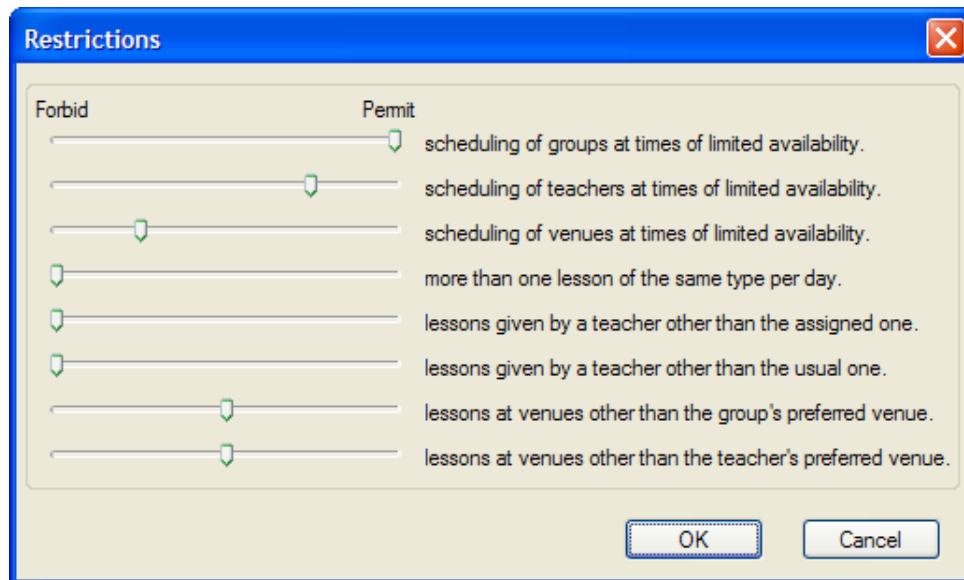
Figure 4.2: The *Restrictions* dialog, showing settings which include allowing groups to be scheduled at times of limited availability, forbidding more than one lesson of a type per day, and discouraging lessons at venues other than the group's preferred one.

When you are satisfied with your substitution timetable, choose *Tools - Show Substitutions* to invoke the *Substitutions* dialog (Figure 4.3). Now click the button marked *Choose normal timetable*, and select the file containing your normal timetable from the *Normal Timetable* dialog. The main window of the *Substitutions* dialog should now show a list of the substitutions made to create the substitutions timetable.

The substitutions are initially displayed according to the student groups affected. Click on the appropriate *View by* radio button to see the substitution list displayed according to affected teachers or venues.

Click the *Print* button at the bottom of the dialog to make a printout of the displayed substitutes list, or click the *Export* button to export the list as an HTML file. The HTML file can then be published on your local intranet, or viewed and printed using an HTML browser such as *Microsoft Internet Explorer* or *Mozilla Firefox*.

Click the *Close* button when you have finished viewing your substitutions.
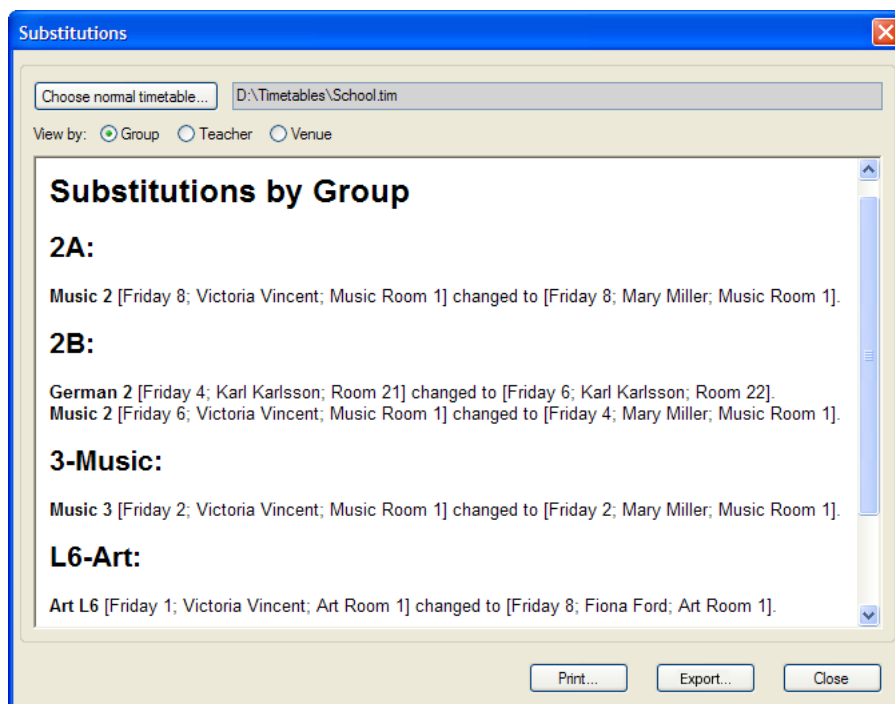
Figure 4.3: In this case, art and music teacher Ms. Vincent cannot teach on Friday this week. The Timetable Solver has generated a new timetable using data which takes that into account; the *Substitutions* dialog shown here lists the resulting changes according to student group.

Chapter 5

Printing and Exporting Timetables

In this chapter, we explain how you can generate a printout of the entire master timetable. We also show how individualised timetables for particular teachers, groups, or venues can be printed or exported as HTML files.

5.1   Printing the Whole Timetable

To print the complete timetable, first select the desired view setting (see subsection 4.1.1), and then choose *File - Print* from the menu bar to invoke the *Print* dialog. Select the range of pages you would like to print, and then click *OK* to start printing.

If you do not want the cards to appear coloured in your printout, choose *View - No Colours* from the menu bar before printing. Should you wish to check the printout appearance before actually printing, choose *File - Print Preview* from the menu bar to view the printout.

5.2   Printing and Exporting Resource Timetables

To print or export a timetable for a particular venue, teacher, or student group, first change the view setting (see subsection 4.1.1) to show the lessons ordered by that resource, and then choose the card colouring from the *View* menu.

Now click on the appropriate label at the left edge of the timetable window to invoke the *Resource Timetable* dialog. This dialog (Figure 5.1) shows a preview of the timetable to be printed or exported.

Click the *Print* button to define your printer settings and start the printout.

To export the timetable as an HTML file, click the *Export* button and choose a name for the HTML file to be produced. The timetable is then saved as a file with the extension *.htm* which

Figure 5.1: The *Resource Timetable* dialog, showing the weekly timetable for group 2A.

can be published on your local intranet, or viewed and printed using an HTML browser such as *Microsoft Internet Explorer* or *Mozilla Firefox*.

When you have finished with this resource timetable, click *Close* to dismiss the dialog.

Appendix A

School Resource File Format

In this appendix we describe the format of the school resource files used to import resource data into, and export resource data from FineTime.

A school resource file consists of a number of lines of text, each of which is made up of one or more *text fields* separated by semicolons. Each text field is bounded by double quotes.

An example of a school resource file, which contains the resources used in the timetable *School.tim* can be found on the FineTime CD in the file *School.csv* in the *Examples* directory.

A.1   Tokens in the Format Description

In this appendix, expressions in italics are tokens which are to be replaced by the described text in a school resource file. The token *group-name* might thus be replaced by `3A`.

If a token is followed by a delimiter in square brackets and a number, or description of a number, in curly brackets, the token will be repeated the corresponding number of times, where the single tokens are separated by the given delimiter. The token *group-name[,]{number of groups}* might thus be replaced by `3A,3B,3C,3D`.

A.2   The First Two Lines

The school resource file begins with a line that specifies the FineTime version number, e. g. `2.3,` for the file, and is defined as follows:

        `"FineTime";"`*version-number*`".`

The second line has two text fields, which represent the structure of the school week and day:

"*is-teaching-day[,]{7}*";
"*break-follows[,]{number of lessons per day}*".

The tokens *is-teaching-day* in the first field specify whether each day of the week is a teaching day or not, starting with Monday. The token is 1 if the day is a teaching day, otherwise it is 0.

The second field defines the number of periods and breaks per teaching day. The tokens *break-follows* are replaced by the digit 1 if a period is followed by a break and 0 otherwise. For a school with 4 lessons per day and a break halfway through the school day, the text field would thus be "0,1,0,1".

Please consult section 1.4.1 for a more detailed description of the effect of this input on scheduling.

A.3 Format of the Resource Sections

The remainder of the school resource file is divided into six sections, one for each of the FineTime resource types. The first line of each section has a single text field:

"*resource-type*",

where the *resource-type* token is replaced by the keywords VENUETYPES, VENUES, SUBJECTS, LEVELS, COURSES, TEACHERS, GROUPS, and COUPLINGS for the different sections. Each subsequent line in a section describes a resource of the type corresponding to the initial keyword. Note that the sections must appear in the order listed above.

In the following sections we define for each of the sections the format of a single line describing a single resource.

A.4 Venue Type Line Format

The line describing a venue type contains a single text field

"*venue-type*",

which gives the venue type a unique name, e. g. gym, for later reference. Please consult section 2.2.1 for a description of the role of venue types in FineTime.

A.5   Venue Line Format

The line describing a venue, with line breaks between text fields added for clarity, is specified as follows:

"*venue*";
"*venue-type[,]{number of venue types}*";
"*capacity*";
"*availability-for-one-day[,]{5 (= teaching days per week)}*"

The single tokens stand for the following entries:

- *venue* is the unique name of the venue.

- *venue-type* specifies a venue type (possibly one of several) for this venue.

- *capacity* is the number of students that can be taught in this venue.

- *availability-for-one-day* is a sequence of as many letters `Y`,`N`, and `X` as there are periods in one day, where `Y` means available, `N` means not available, and `X` stands for limited availability. In a school with four periods per day, a room that has limited availability for a certain day would be labelled `XXXX` for that day.

Please consult section 2.2.2 for a description of the effect of the various entries on scheduling.

A.6   Subject Line Format

The line describing a subject, with line breaks between text fields added for clarity, is specified as follows:

"*subject*";
"*subject-abbr*"

The single tokens stand for the following entries:

- *subject* is the unique name of the subject e. g. `Chemistry`.

- *subject-abbr* is a unique short form e. g. `CH`, used in exported files.

Please consult section 2.2.3 for a description of the role of subjects in FineTime.

A.7   Level Line Format

The line describing a level contains a single text field

> "*level*",

which gives the level a unique name, e. g. 4 , for later reference. Please consult section 2.2.4 for a description of the role of levels in FineTime.

A.8   Course Line Format

The line describing a course, with line breaks between text fields added for clarity, is specified as follows:

> "*subject-abbr*";
> "*level*";
> "*colour-key[,]{3 (=rgb)}*";
> "*number-of-lessons[,]{3 (= single, double, and triple periods)}*";
> "*venue-type[,]{number of venue types required}*"

The single tokens stand for the following entries:

- *subject-abbr* is the abbreviation for the subject of the course, e. g. E for English.

- *level* is the level of instruction, e. g. 3 for 3rd year.

- *colour-key* stands for a number between 0 and 255. The combination of the three numbers indicating the intensity of red, green and blue components define the card colour for the course.

- *number-of-lessons* is the number of single, double or triple periods. A course taught as two single periods and one double period per week would thus be described by the text field "2,1,0".

- *venue-type* specifies a venue type (possibly one of several) required for the venue where this course is taught.

Please consult section 2.2.5 for a description of the effect of the various entries on scheduling.

A.9 Teacher Line Format

The line describing a teacher, with line breaks between text fields added for clarity, is specified as follows:

> "*surname*";
> "*forename(s)-or-initial(s)*";
> "*teacher-abbr*";
> "*venue*";
> "*colour-key[,]{3 (=rgb)}*";
> "*periods-maximum*";
> "*subject.min-level.max-level[,]{number of possible subjects}*";
> "*availability-for-one-day[,]{5 (= teaching days per week)}*"

The single tokens stand for the following entries:

- *surname* is the teacher's surname.

- *teacher-abbr* is a unique abbreviated version of the teacher's name, used in exported files.

- *forename(s)-or-initial(s)* are optional and must in conjunction with *name* yield a full name that uniquely specifies the teacher. The full name of a teacher is made up of the teacher's *forename(s)-or-initial(s)* and *name*, with a space between them. If *forename(s)-or-initial(s)* is blank, the full name is simply *name*.

- *venue* is the preferred venue for the teacher. May be blank.

- *colour-key* stands for a number between 0 and 255. The combination of the three numbers indicating the intensity of red, green and blue components defines the card colour for the teacher.

- *periods-maximum* is the maximum number of teaching periods per week allowed for the teacher.

- *subject.min-level.max-level* defines a subject which the teacher may teach together with the names of the minimum and maximum levels of instruction in this subject. The *min-level* and *max-level* tokens may be omitted.

- *availability-for-one-day* is a sequence of as many letters `Y`, `N`, and `X` as there are periods in one day, where `Y` means available, `N` means not available, and `X` stands for limited availability. In a school with four periods per day, a teacher that is not available on a certain day would be labelled `NNNN` for that day.

Please consult section 2.2.6 for a description of the effect of the various entries on scheduling.

A.10   Group Line Format

The line describing a group, with line breaks between text fields added for clarity, is specified as follows:

> "*group*";
> "*size*";
> "*venue*";
> "*avoid-holes*";
> "*subject-abbr.level:teacher-abbr[,]{number of courses}*";
> "*availability-for-one-day[,]{5 (= teaching days per week)}*"

The single tokens stand for the following entries:

- *group* is the unique name of the group.

- *size* is the number of students in the group.

- *venue* is the preferred venue for the group. May be blank.

- *avoid-holes* is single letter, `Y` if the automatic scheduler should avoid holes in the timetable for the group, and `N` otherwise.

- *subject-abbr.level:teacher-abbr* define the subject and level of a course to be taken be the group, optionally followed by a colon and the abbreviation for the teacher who is to give the course. Examples might be `M.3:JONE` for 3rd year maths with Jim Jones, or just `M.3` for 3rd year maths with an undefined teacher.

- *availability-for-one-day* is a sequence of as many letters `Y`, `N`, and `X` as there are periods in one day, where `Y` means available, `N` means not available, and `X` stands for limited availability. In a school with four periods per day, a group that is fully available on a certain day would be labelled `YYYY` for that day.

Please consult section 2.2.7 for a description of the effect of the various entries on scheduling.

A.11   Coupling Line Format

The line describing a coupling contains a single text field:

> "*group-option-set[,]{number of group option sets}*".

Each group option set is a colon-separated list of group names, e. g. `Latin 3:Spanish 3`. Please consult section 2.2.8 for a detailed explanation group option sets and couplings.