

Enterprise Timetabler Training Worksheet 7

Aim of this worksheet: At the end of this worksheet you will be able to:

- *Auto-Schedule* from the object list.
- *Unschedule en bloc*.
- Adjust **Scheduling Preferences**
- Use *Backtracking* as part of the scheduling process.

1. Automatic Scheduling of Multiple Activities

As well as scheduling activities manually, with help from the scheduling engine to check for clashes and constraints, Enterprise Timetabler allows the user, if authorised, to schedule automatically. Activities can be described in terms of a pure requirement; i.e. instead of scheduling at a specific day and time using specific resources, the user can describe the demand for an activity of a specified duration attended by specified student sets and identify the number and type of resources required. The scheduling engine can then be presented with a batch of activities to schedule automatically.

The scheduling engine begins the process by assessing the difficulty of satisfying the requirements of each activity; e.g. an activity that occurs in a single week is easier to schedule than one that repeats over many weeks, and activity that requires a specialised room (of which there are few) is more difficult to schedule than one that requires a general purpose room (of which there are many). Activities are then scheduled in order of difficulty, most difficult first, in order to maximise the likelihood of finding a solution for all the requirements.

When scheduling each activity there may be many possible ways of satisfying the demand. When this is the case, the scheduling engine uses **Scheduling Preference Strengths** to determine the most desirable solution from the user's point of view. It may be desirable to provide full-time students with a timetable that spreads their activities evenly across the week. Staff, on the other hand, may prefer their teaching duties to be clustered so that they have contiguous time free for research. In some cases there may be no scheduling solution that satisfies both requirements. The relative strength of the preference for each will determine the scheduling solution chosen by the engine.

1.1. Exercise 1 – Auto-schedule from the object list

Select the Student Set view from the **Views Pane**. Select the Student Set *BusY1/01* and unscheduled all of their activities. You can do this by selecting *Activity | Unschedule* from the menu or by clicking the unschedule button on the toolbar if you have one. See Worksheet x for details of how to customize the toolbar.

Now select *Activity | Schedule* from the menu or the schedule button on the toolbar. The effect will be to auto-schedule all of the activities of the selected student set.

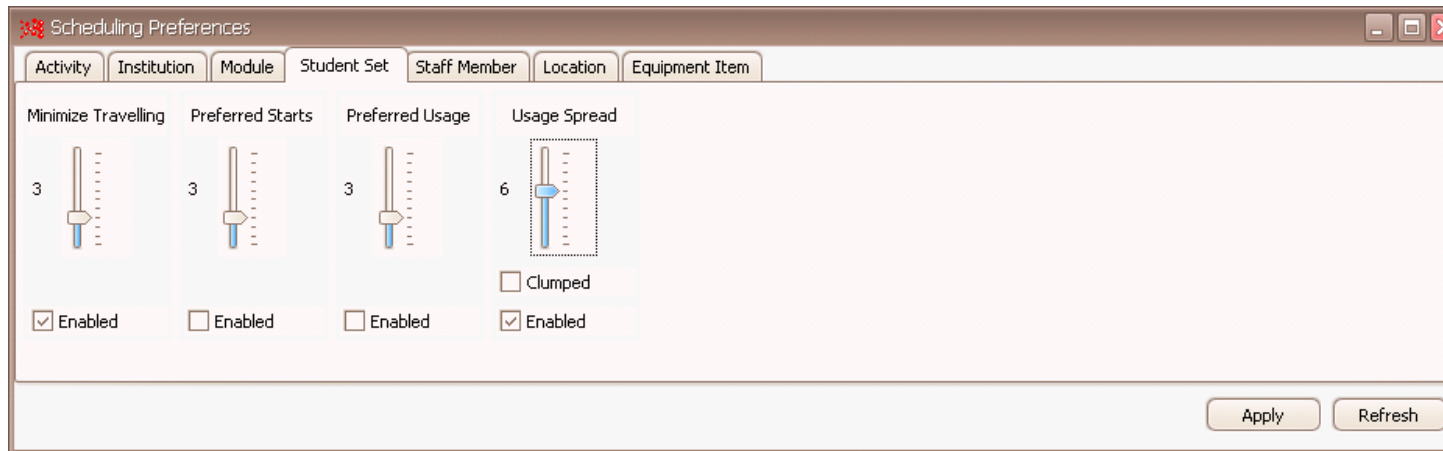
The following points should be noted by the user in relation to this operation:

- If one or more activities is selected then the command to unscheduled or schedule will be applied to the selected activities.
- When no activity is selected but one or more objects is selected in the **Views Pane** then the command to unschedule or schedule will be applied to all of the activities of the selected object(s).

1.2. Exercise 2 - Adjusting Scheduling Preferences

Select all of the Business Year 1 Students Sets *BusY1/01* to *BusY1/20*. Unschedule all of their activities.

From the menu select *Tools | Scheduling Preferences*. Set the preference for *Usage Spread* to 6 as shown below.

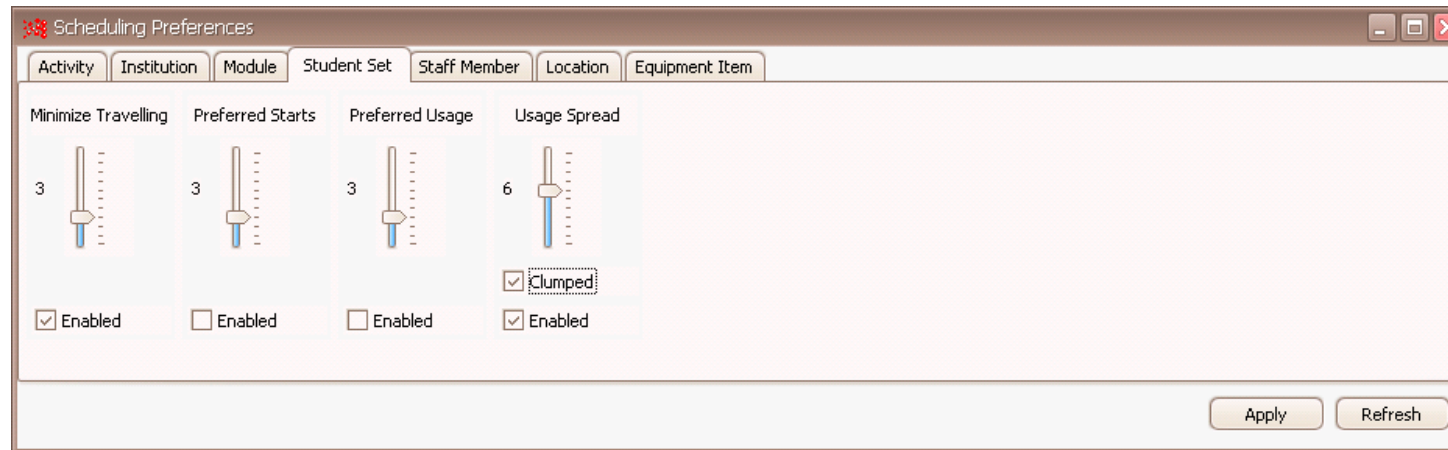


Schedule all the activities by selecting *Activity | Schedule* or the schedule button.

Select each of the Student Sets, *BusY1/01* to *BusY1/20*, one at a time (you can use the cursor key to scroll down the list) and examine the timetable for each set. Note the extent to which the activities of each set are spread evenly across the week.

Now select all of the Student Sets and unschedule all of their activities again.

Now enable the *Clump* option for *Usage Spread*, leaving the preference strength set at 6 as shown below.



Schedule all the activities

Again, select each of the Student Sets, *BusY1/01* to *BusY1/20*, one at a time (you can use the cursor key to scroll down the list) and examine the timetable for each set. Note the extent to which the activities of each set are grouped or clumped together.

The following points should be noted by the user in relation to this operation:

- Having set a high priority against the *Usage Spread* preference the activities will have been scheduled in such a way as to spread the activities of each student set evenly across the week as far as possible.
- When the *Clump* option is enabled the scheduling engine will attempt to group the activities of each set together as far as is possible. Time constraints on the Maximum Hours in a day and the Maximum Span of a working day will impose a limit on the extent of the grouping.

1.3. Exercise 3 – Using Backtracking

Select the Module *BUS101*. You will see all the activities of the module in the **Activity** Viewer. Unschedule all the activities and attempt to schedule them using the normal Schedule command. Because all of the activities are constrained by a complex sequencing constraint, they will not all schedule successfully in a single pass.

To resolve such issues you can use the backtracking method. Unschedule the Module then choose *Activity | Backtrack Schedule* or the appropriate icon on the toolbar if you have one. Using the backtracking method, all the activities will schedule successfully.

The following points should be noted by the user in relation to this operation:

- Because activities are scheduled in order of difficulty of scheduling, most difficult first, it is possible for an activity that is a predecessor in a sequencing relationship to be scheduled into a slot that, later in the scheduling process, does not leave sufficient time to schedule a succeeding activity in the relationship..
- Using the *Backtracking* method, when the scheduling engine finds an activity that cannot be scheduled in the set of activities it is currently scheduling it will unschedule previously scheduled activities and retry until it arrives at a solution.
- The *Backtracking* method works best when the scheduling problem is small in scope. When scheduling a large number of activities in one operation, *Backtracking* can take a long time since there are so many permutations to be considered.