Graduation Outliner User Manual

Introduction

The Graduation Outliner application facilitates the creation of quarterly schedules for students.

It allows students to avoid the chore of determining which courses to take in order to graduate in

a timely manner each quarter by creating a schedule once and referring to it when registering for

courses. Quarters, represented as columns, contain courses, represented as labeled boxes. Each

course may be associated with a name, title, number of units, list of prerequisites, corequisite,

completed boolean, and grade. Flowcharts may be associated with a list requirements which

correspond to university graduation requirements for a particular major. The flowchart may be

validated against this list of requirements to produce a list of possible errors. Faculty

administrators may also find the application useful for developing flowcharts with an associated

list of requirements to distribute to students; however, students will have to customize the list of

requirements to fit their needs due to the way requirements are represented.

Installation and Setup

The Graduation Outliner application is distributed as a zip file. Unzipping it will produce a

folder named "dist" containing a JAR file named "GraduationOutliner.jar" in addition to a folder

named "lib" and a file named "README.TXT". Most operating systems will launch the

application when the JAR file is opened (for instance, by double-clicking it). However, in some

cases it may be necessary to execute the command "java -jar GraduationOutliner.jar".

Flowcharts

The main window contains a flowchart control which represents quarters as columns and courses

as boxes within those columns. The course inspector on the right side of the main window's split

view contains labeled fields for all of the data that may be associated with a course, including its name and title, number of units, prerequisites, corequisite, whether it is completed, and grade.
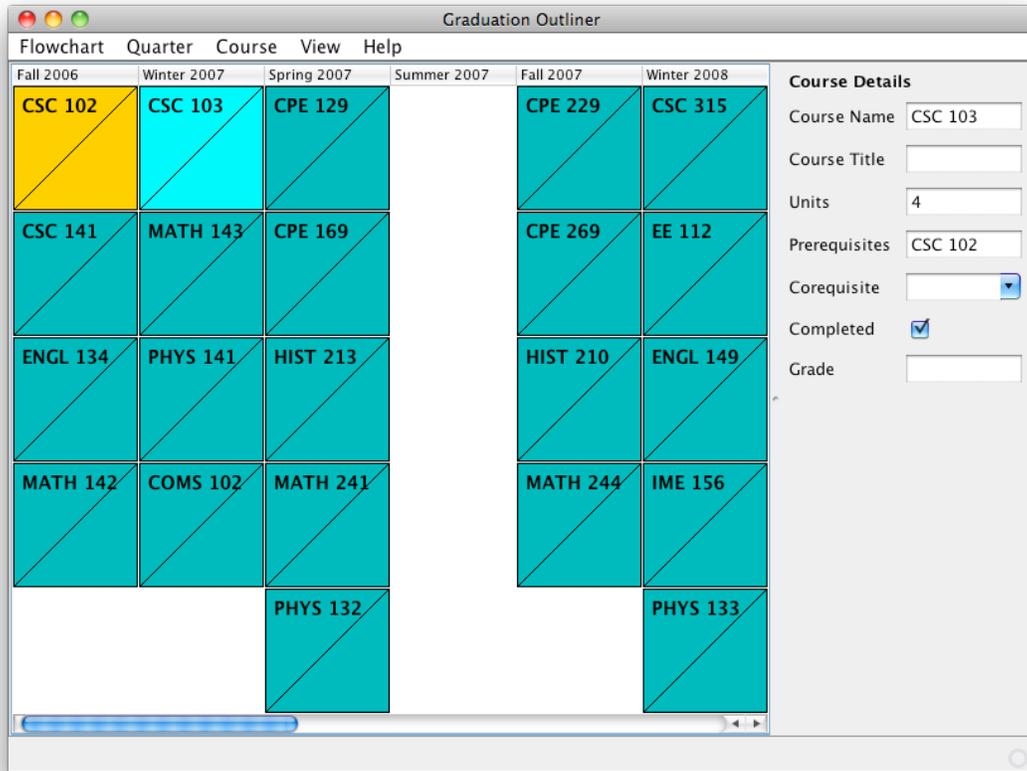
New, Open, and Save

Flowcharts may be created, opened, and saved via the corresponding menu items in the Flowchart menu. These operations behave analogously to most other document-based applications. However, only one flowchart document may be open at a time.
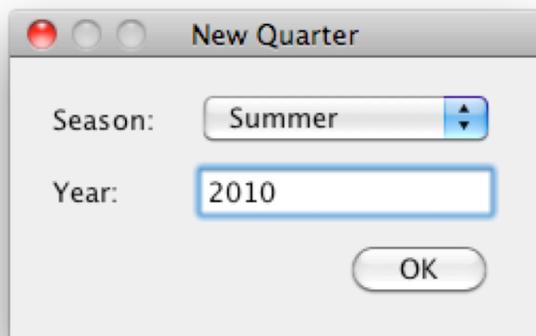
Quarters

Adding a Quarter

There are two methods of creating new quarters. The first is to select "New Quarter After Last" from the "Quarter" menu, which will append the quarter chronologically following the rightmost quarter in the flowchart. For instance, if the rightmost quarter is "Fall 2010," "Winter 2011" will

be added.

The second method of adding a quarter is more flexible but less convenient. Selecting "New Quarter…" from the "Quarter" menu will prompt the user for the season and year of the quarter to be added. An error message will be presented if the specified quarter is already in the flowchart. Otherwise, the quarter will be added before the first quarter or after the last quarter in the flowchart. Any "gap" between this quarter and the first or last quarter will be populated with missing quarters: for instance, adding "Spring 2011" after "Fall 2010" will also create "Winter 2011."


Deleting a Quarter

Selecting "Delete Empty Edge Quarters" from the "Quarter" menu is the only way to delete quarters. Any quarters that precede (appear to the left of) the first quarter containing a course will be deleted, as will any quarters the follow the (appear to the right of) the last quarter containing a course. All quarters will be deleted if there are no courses present in the flowchart.

Courses

Adding a Course

A new course may be created in two ways. The preferred method is to right-click on the flowchart in the grid square where the course should appear and select "New Course" from the pop-up menu. The alternative is to select the "New Course…" from the "Course" menu and select the desired quarter in the dialog that is presented. Each quarter can hold up to 5 courses.
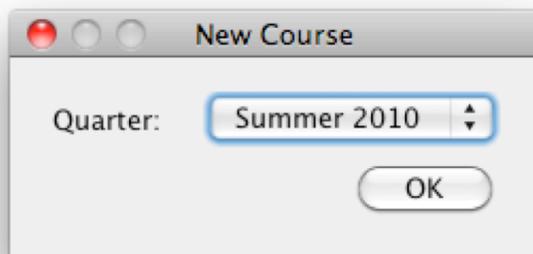
Selecting a Course

Clicking on a course selects it. In addition, a course will be selected automatically when it is first created. The currently selected course is highlighted to distinguish it from the others.

Deleting a Course

A course may be deleted either by right-clicking on it and selecting "Delete Course" from the pop-up menu. Alternatively, selecting "Delete Selected Course" from the "Course" menu will delete the currently selected course. Both menu items are disabled when no course is selected.

Editing a Course

After selecting a course in the flowchart, its data may be edited in the course inspector on the right side of the main window's split view. All fields are optional; leaving the name field blank

will create an unnamed course. The title, completed, and grade fields are not used in the requirements verification process. As text is input into each field it will appear red. The moment a valid value is present, it will become black to indicate that the data model has been updated with the new value. So as soon as the last character of "CSC 101" is typed, it will appear in black and white indicating that this value has been saved. The course name also appears as a label on the corresponding box in the flowchart.

Course Details
Course Name CSC 10

Course Details
Course Name CSC 101

The course name and corequisite fields must contain a string consisting of a 2 to 4 character case-insensitive prefix, followed by an optional space, followed by a 3 digit number greater than or equal to 100. The prerequisites field must consist of comma-separated course names with an optional space after each comma; for instance, "CSC 101, CSC 102". The grade field must contain a valid grade as defined by Cal Poly; this excludes the grade "A+".

The corequisite field is unidirectional; if course A designates course B as a corequisite, course B is not required to designate course A as a corequisite. Even so, it follows that course B is a corequisite of course A. This has no effect on the verification of the flowchart.

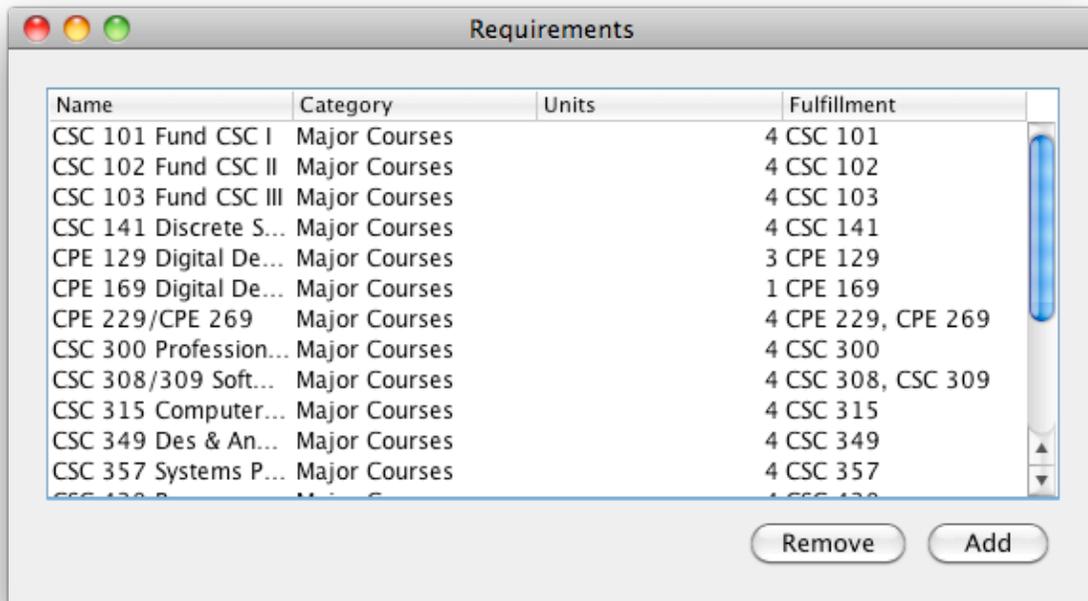## *Highlighting of Prerequisites and Corequisite*

When a course is selected, its prerequisites will appear in orange and its corequisite, if any, will appear in brown.

Completed Courses

Completed courses appear crossed out in the flowchart.

Requirements

Requirements may be viewed by selecting Requirements from the View menu.

Adding and Deleting Requirements

Clicking the "Add" button appends an empty requirement row to the table. Clicking the

"Remove" button removes the selected requirement row from the table.

Editing a Requirement

Double-clicking a cell in the table allows its contents to be edited. Typing enter/return or

clicking outside of the cell ends editing. If a non-numeric value is entered in the units column,

the cell will be outlined in red and it will not allow editing to end. In contrast, entering an

invalid value in the fulfillment column will cause it to disappear when editing ends.

The name and category fields are for organizational purposes and as a result there are no formal restrictions on their contents (see below for an example). The units field must contain a numeric value and the fulfillment field must contain a list one or more of course name.

Understanding Requirements

A requirement consists of a name, category, number of units, and fulfillment. For instance:

> **Name:** **Software Engineering**
> **Category:** **Major Courses**
> **Units:** **4**
> **Fulfillment:** **[CSC 308, CSC 309]**

Only the units and fulfillment fields are used in the flowchart validation algorithm, although the name field is used to identify the requirement in validation errors. It is possible to represent most, but not all, requirements in this manner. A requirement is valid if items 1 and 2 in the list below are satisfied.

Validating the Flowchart

The flowchart validation window appears when Validator is selected from the View menu. The flowchart may be validated by clicking the "Validate Against Requirements" button in the lower right of this window. The following five validations will be performed and appear in the list of error messages as pictured below:

1. All courses listed in the fulfillment field appear in the flowchart.

2. The sum of the number of units of all of the courses listed in the fulfillment field is greater than or equal to the number of units in the requirement's units field.

3. All prerequisites of a course appear in previous quarters.

4. The corequisite of a course appears in the same quarter.

5. A course is not used to fulfill multiple requirements.
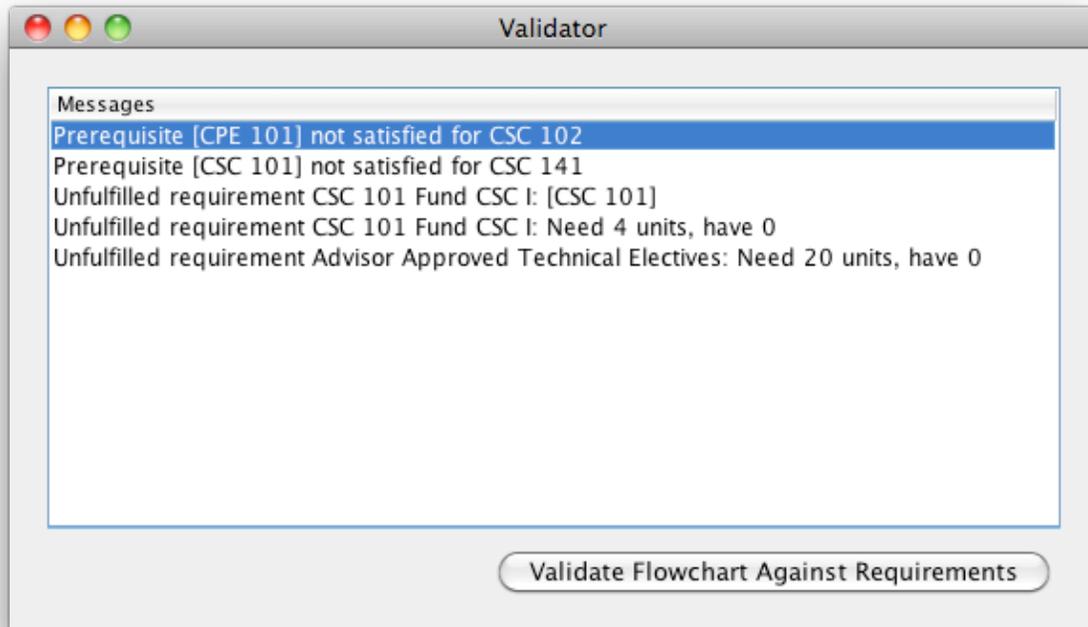
Walkthrough

When the application is launched, a new flowchart is created containing the current quarter, i.e. Summer 2010. In this walkthrough, we will create a flowchart spanning from Fall 2006 to Spring 2010. Summer 2010 should not appear in the final flowchart, so select "Delete Empty Edge Quarters" from the Quarters menu to delete it. Select "New Quarter…" from the Quarter menu and click the "OK" button after selecting Fall from the Season drop-down menu and entering 2006 in the Year text field. Select "New Quarter After Last" from the Quarter menu (or type its shortcut which is visible on the right side of the menu item) 14 times until Spring 2010 is the last quarter in the flowchart.

To add a course to Fall 2006, scroll to the left until that quarter is visible. Right-click on any empty cell in the column representing the Fall 2006 quarter and select "New Course" from the pop-up menu. The course box should appear in bright turquoise to indicate that it is selected. Enter the course name (2-4 letters, followed by a space, followed by a number between 100 and 999) in the inspector panel on the right. The text in the field will appear red until a valid course is entered at which point it will become black to indicate that the value has been recorded. If you deselect the course while the text in a field is red, its current value will be discarded. For this exercise, enter "CSC 101" in the course name field.

We will create the next course by selecting "New Course…" from the "Course" menu. Click "OK" after selecting "Winter 2007" (the quarter following Fall 2006) from the pop-up menu. Enter "CSC 102" in the course name field. In addition, enter "CSC 101" in the prerequisites field. The box representing CSC 101 in the flowchart will turn orange to indicate that it is a prerequisite of the currently selected course.

Repeat this process to create two (using either or both of the processes described above) more courses in Winter 2007 named CPE 229 and CPE 269. Set the number in the units field to 3 and 1, respectively. In order to designate these courses as corequisites of each other, select CPE 229 and choose the CPE 269 from the corequisite drop-down menu. The box representing CPE 269 will turn brown to indicate that it is a corequisite of the currently selected course. (You may optionally repeat this process for CPE 269.)

Select Requirements from the View menu. A new, empty requirement may be added by clicking

the "Add" button, then editing each of its fields by double-clicking. Use this process to enter the following 3 requirements:

> **Name:**   **CSC 101 Fund CSC I**
> **Category:**   **Major Courses**
> **Units:**   **4**
> **Fulfillment:**   **CSC 101**
>
> **Name:**   **CSC 102 Fund CSC II**
> **Category:**   **Major Courses**
> **Units:**   **4**
> **Fulfillment:**   **CSC 102**
>
> **Name:**   **Digital Design**
> **Category:**   **Major Courses**
> **Units:**   **4**
> **Fulfillment:**   **CPE 129, CPE 169**

Return to the main window and select Save from the Flowchart menu to save the flowchart and requirements to disk.

Select Validator from the View menu and click the "Validate Flowchart Against Requirements" button. The empty errors list indicates that there the validation algorithm has not identified any potential errors in the current flowchart.

You may add more courses and requirements using the processes described in this walkthrough. To trigger a validation error, bring up the Requirements window and change the units field to 5 to the requirement named "Digital Design". Bring up the Validator window and click the only button and an error will appear in the table: "Unfulfilled requirement Digital Design: Need 5 units, have 4". The four other types of errors which may occur when validating the flowchart are described in the "Validating the Flowchart" section of this manual.