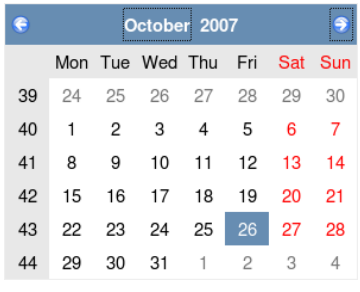
B

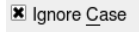
Selected PyQt Widgets

The screenshots shown here were taken on Linux using KDE to provide an eye-pleasing consistency. In the body of the book, screenshots are shown for Windows, Linux, and Mac OS X, generally varying from chapter to chapter.



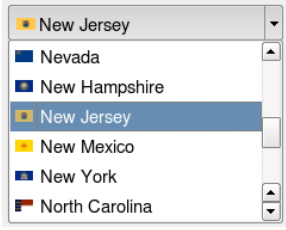
`QCalendarWidget`

This widget can be used as a display widget, although it was designed primarily as an input widget through which the user can choose a particular date. The widget's display is highly configurable; for example, week numbers can be displayed or not, day names can be represented by a single letter, or in short or full forms, the colors and fonts used can be set, and so can which day is treated as the first day of the week. Minimum and maximum allowable dates can also be set. Calling `setCalendarPopup(True)` on a `QDateEdit` or a `QDateTimeEdit` will cause their spin buttons to be replaced by an arrow button. If the user clicks the arrow button, a `QCalendarWidget` will pop up.



`QCheckBox`

A checkbox can be used to present users with a simple yes/no choice. If `QCheckBox.setTristate(True)` is called, the checkbox will have three states: The user checked it, the user unchecked it, or the user did not change it from whatever it was before. The tri-state approach may be useful for representing Boolean database fields where `IS NULL` is allowed.



`QComboBox`

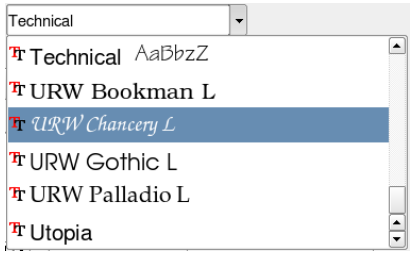
The screenshot shows a `QComboBox` with its list popped down. A combobox is used to present the user with a list of items where too little vertical space is available for a `QListView` to be used. Calling `QComboBox.setEditable(True)` allows the user to either choose one of the items in the list, or to type in their own text instead. Each combobox item has text, an optional icon, and optional data. We can populate a combobox using `QComboBox.addItem()` or `QComboBox.addItems()`, or we can use a custom or built-in `QAbstractItemModel` subclass with `QComboBox.setModel()`.

`QDateEdit`, `QDateTimeEdit`, and `QTimeEdit`

The `QDateEdit` is used for displaying and entering dates, the `QDateTimeEdit` is used for dates and times, and the `QTimeEdit` is used for times. By default, the widgets use locale-specific date and time formats—they are shown here using a U.S. locale. The formats can be changed, and minimum and maximum allowable dates and times can be set.

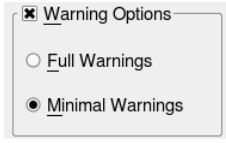
`QDialogButtonBox`

This widget can be used to create a row or column of buttons. The buttons can be standard buttons with predefined roles and text, or can be added with the roles and text of our choice. This widget automatically arranges the buttons according to their roles and the underlying windowing system's user interface guidelines.



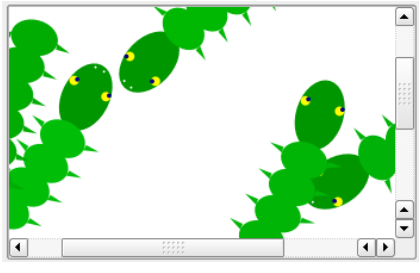
`QFontComboBox`

PyQt provides a pop-up font dialog, using the native font dialog where available. If we want to provide font choices ourselves—for example, in a toolbar—we can use the `QFontComboBox`, shown here popped down. For Qt 4.0 and Qt 4.1, the nearest equivalent (but without font previewing) is to use an ordinary `QComboBox`, populating it with the list returned by `QFontDatabase.families()`.



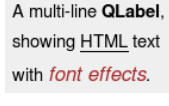
`QGroupBox` and `QRadioButton`

A group box can be used purely as a visual grouping device, or it can be made checkable, as shown here. If checkable, the widgets contained in the group box can be interacted with only when the group box is checked. If a frame is required without a title, a `QFrame` can be used instead. When `QRadioButtons` are put in a group box they automatically behave correctly, that is, the user can choose only one of them. `QComboBoxes` and `QListViews` are often more convenient than `QRadioButtons`.



`QGraphicsView`

This widget is used to view the `QGraphicsItems` in a `QGraphicsScene`. Any number of `QGraphicsViews` can view the same scene, each with its own transformations (e.g., scaling and rotation), in effect. The scrollbars appear automatically if they are needed. Each `QGraphicsView` can provide its own background and foreground, overriding those provided by the scene.



`QLabel`

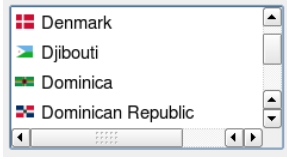
The `QLabel` widget is a display widget that can be used to show an image, a plain text string, a `QTextDocument`, or HTML. A label with an accelerator (a single underlined character) can be associated with a "buddy" widget, passing the keyboard focus to the buddy when the accelerator is pressed.

`QLCDNumber`

This is a display widget for showing numbers in the style of a seven-segment LCD.

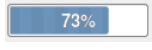
`QLineEdit`

This widget can accept one line of text from the user. The text can be constrained by using a validator (e.g., a `QIntValidator` or a `QRegExpValidator`), or by setting an input mask, or both. The echo mode can be set to show "*"s (or nothing) instead of the text entered.



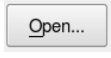
`QListView` and `QListWidget`

Through these widgets users can choose an item, or with a suitable selection mode, multiple items. The widgets can be in list mode (as shown), or icon mode, where the icons appear larger and the text is displayed under the icons. A `QListView` must be used in conjunction with a custom or built-in `QAbstractItemModel` subclass using `QListView.setModel()`. A `QListWidget` has a built-in model, so items can be added to it directly using `QListWidget.addItem()` and `QListWidget.addItems()`. Where vertical space is at a premium, a `QComboBox` can be used instead.



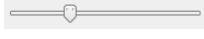
`QProgressBar`

This widget can be used to show users the progress of long-running operations. It is often put in a `QMainWindow`'s status bar using `QStatusBar.addWidget()` or `addPermanentWidget()`. An alternative is to pop up a `QProgressDialog`.



`QPushButton`

Buttons are used to invoke actions. If a button click will lead to a dialog being popped up, we normally add an ellipsis (…) to the end of the button's text. Buttons can also be set to have pop-up menus (in which case, PyQt will add a little triangle indicator), or they can be set as toggle buttons, staying down when clicked an odd number of times and coming back up when clicked an even number of times. Since Qt 4.2, most applications use `QDialogButtonBoxes` rather than individual `QPushButtons`.

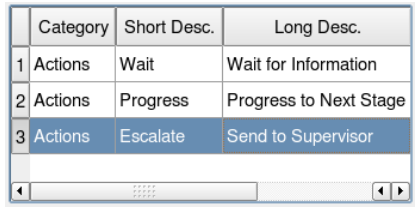


`QSlider`

A slider is often used to show proportionality, and is commonly used in conjunction with a `QLabel` or `QLCDNumber` that shows an actual amount. Sliders can be aligned vertically or horizontally. A `QScrollBar` could be used for a similar purpose.

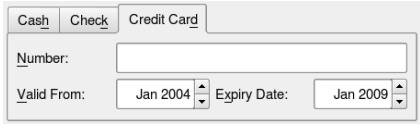
`QDoubleSpinBox` and `QSpinBox`

These widgets are used to accept and display numbers. The number can be shown with a prefix or suffix and with a particular alignment. (The `QDoubleSpinBox` shown here has a "$" prefix.) They can have minimum and maximum values set, and for the `QDoubleSpinBox`, the number of digits shown after the decimal point can be set. An alternative is to use a `QLineEdit` in conjunction with a `QIntValidator` or a `QDoubleValidator`.



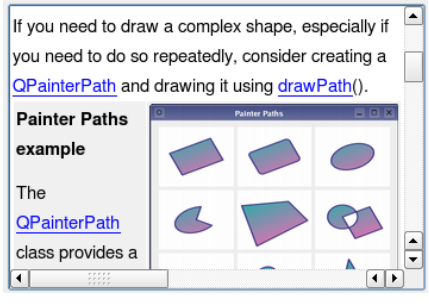
`QTableView` and `QTableWidget`

These widgets are used to present data in tabular form. A `QTableView` must be used in conjunction with a custom or built-in `QAbstractItemModel` subclass, such as `QSqlTableModel`, using `QTableView.setModel()`. A `QTableWidget` has a built-in model, so items can be added to it directly—for example, using `QTableWidget.setItem()`. Both widgets can show icons as well as text in every cell, including in the header cells.



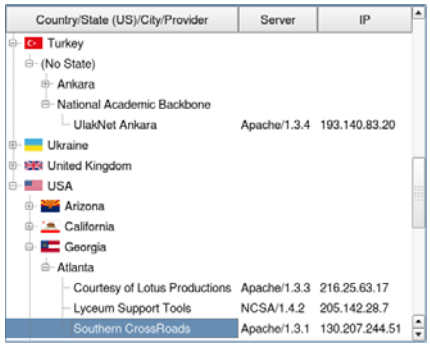
`QTabWidget`

This widget is used when space is at a premium, or simply as a means of logically grouping widgets. The tabs have two shape settings and can appear at the top, left, right, or bottom, with the text rotated when shown left or right.



`QTextEdit` and `QTextBrowser`

These widgets can display HTML, including lists, tables, and images. The `QTextEdit` can also be used as an editing widget, either for plain text or for PyQt "rich text" (essentially HTML, although a custom subclass would be needed to provide table and image editing). The `QTextBrowser` supports clickable links, so it can be used as a simple Web browser. Both widgets have support for CSS (Cascading Style Sheets).



`QTreeView` and `QTreeWidget`

These widgets are used to present hierarchical data. A `QTreeView` must be used with a custom or built-in `QAbstractItemModel` subclass using `QTreeView.setModel()`. Like all widgets that use a model, only the data that is visible to the user is retrieved, so even large datasets are very fast. A `QTreeWidget` has a built-in model, so items can be added to it directly using `QTreeWidget.insertTopLevelItem()` and `insertTopLevelItems()`, or by creating `QTreeWidgetItems` as children of other items.