

GUI Programming I

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Programming for Scientists

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How to Write a GUI

Many options:

- tk
- wxWindows
- Gtk
- Qt
- ...

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Main Elements

- Widgets
- Event loop
- Signals & Slots

What's a widget?

Everything you see on your screen is a widget.

Event Loop

Traditional Program

```
tracks = generate_tracks()
video = generate_video(tracks)
recovered = track(video)
statistics = compare(tracks, recovered)
print_statistics(statistics)
```

Event Loop

```
while True:
    event = get_next_event()
    handle_event(event)
```

Hollywood Principle

Don't call us, we'll call you.

- Commercial software from Trolltech (now owned by Nokia).
- Used to be GPL, now LGPL.
- Very complete.
- C++ toolkit with Python bindings.

Actually Writing An Application

- 1 Code it from scratch
- 2 Use a dialog editor

Simple Example

```
import sys
from PyQt4 import QtGui
app = QtGui.QApplication(sys.argv)

widget = QtGui.QLabel('Hello World')
widget.setWindowTitle('Hello')
widget.show()

sys.exit(app.exec_())
```

Variation

```
import sys
from PyQt4 import QtGui
app = QtGui.QApplication(sys.argv)

button = QtGui.QPushButton('Press Me')
button.setWindowTitle('Hello')
button.show()

sys.exit(app.exec_())
```

Signals & Slots

```
bigger = True
def resize():
    global bigger
    w = button.width()
    h = button.height()
    if bigger:
        button.resize(w*2, h*2)
    else:
        button.resize(w//2, h//2)
    bigger = not bigger
```

Signals & Slots (II)

```
import sys
from PyQt4 import QtGui, QtCore
app = QtGui.QApplication(sys.argv)

button = QtGui.QPushButton('Press Me')
button.setWindowTitle('Hello')
button.show()

app.connect(button, QtCore.SIGNAL('clicked()'), resize)
sys.exit(app.exec_())
```

Some Builtin Widgets

- QLabel
- QPushButton
- QRadioButton
- QCheckBox
- QLineEdit
- QComboBox
- QListView
- QGroupBox
- ...

Widget Properties & Methods

- size & resize()
- show() & hide()
- ...