

# Uživatelská rozhraní

## Cvičení 7

Michael Holuša

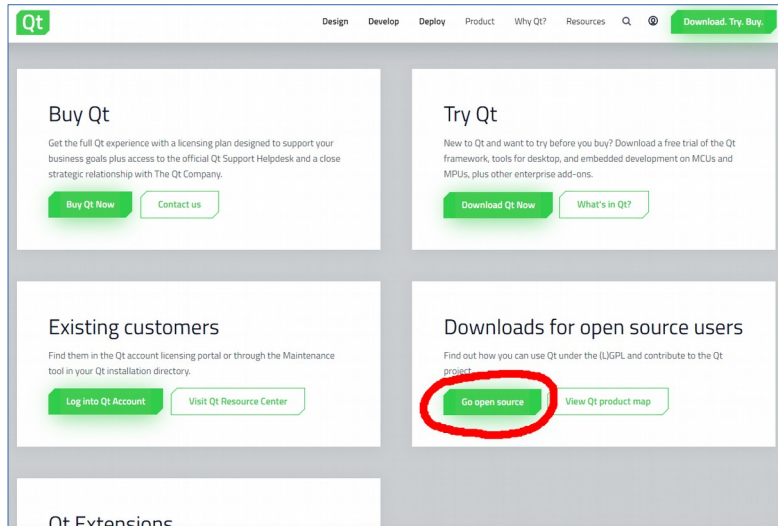
michael.holusa@vsb.cz

[http://mrl.cs.vsb.cz/people/holusa/uro\\_course](http://mrl.cs.vsb.cz/people/holusa/uro_course)

# Qt

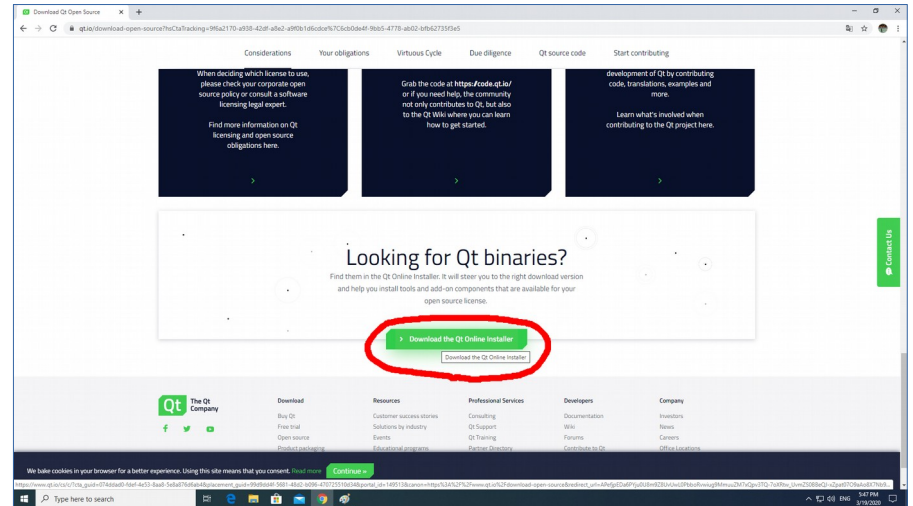
- Trolltech (1994) v Oslu (Norsko) vytváří grafické uživatelské rozhraní (GUI) pro C++
- multiplatformní GUI C++ knihovna
- Hlavní stránky: <https://www.qt.io/>
- Dokumentace: <https://doc.qt.io/>

# Qt – instalace I



The screenshot shows the Qt website home page with a navigation bar at the top containing links for Design, Develop, Deploy, Product, Why Qt?, Resources, and a Download, Try, Buy button. The main content is divided into four quadrants:

- Buy Qt:** Promotes a licensing plan for business goals, with buttons for "Buy Qt Now" and "Contact us".
- Try Qt:** Offers a free trial of the Qt framework, with buttons for "Download Qt Now" and "What's in Qt?".
- Existing customers:** Directs users to a licensing portal or maintenance tool, with buttons for "Log into Qt Account" and "Visit Qt Resource Center".
- Downloads for open source users:** Explains how to use Qt under the LGPL license, with a "Go open source" button circled in red and a "View Qt product map" button.



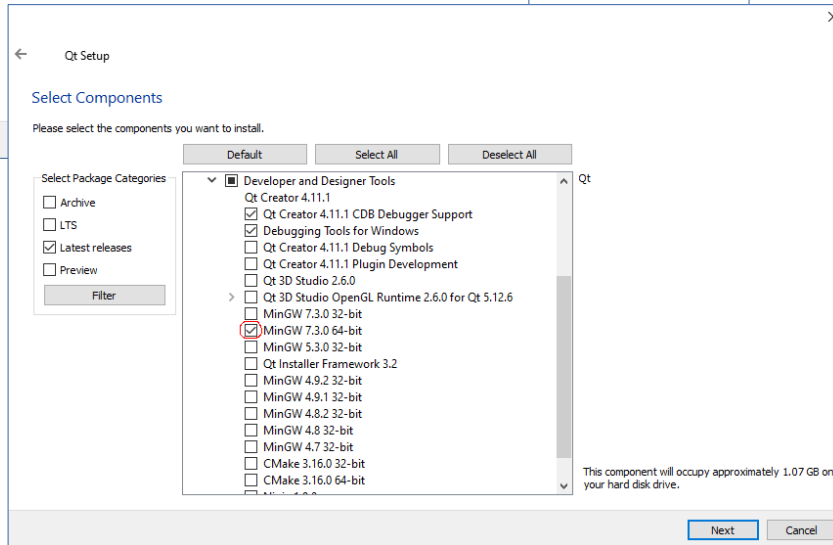
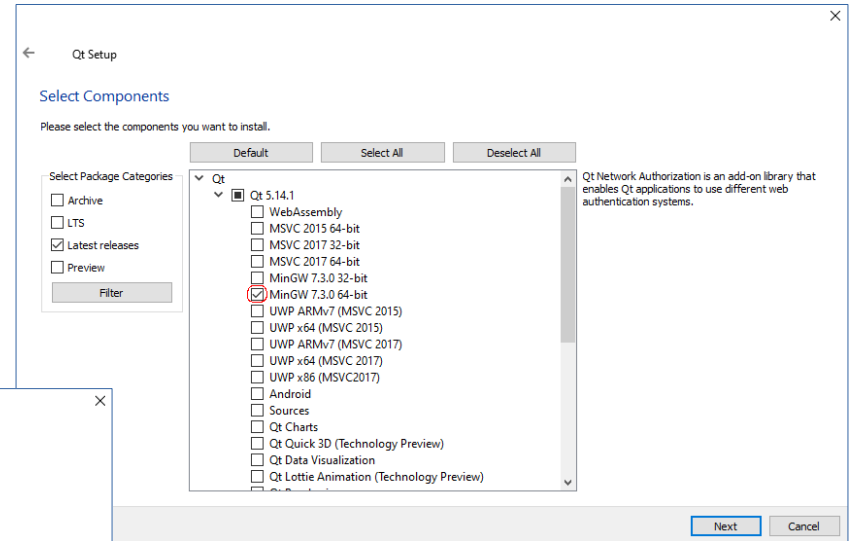
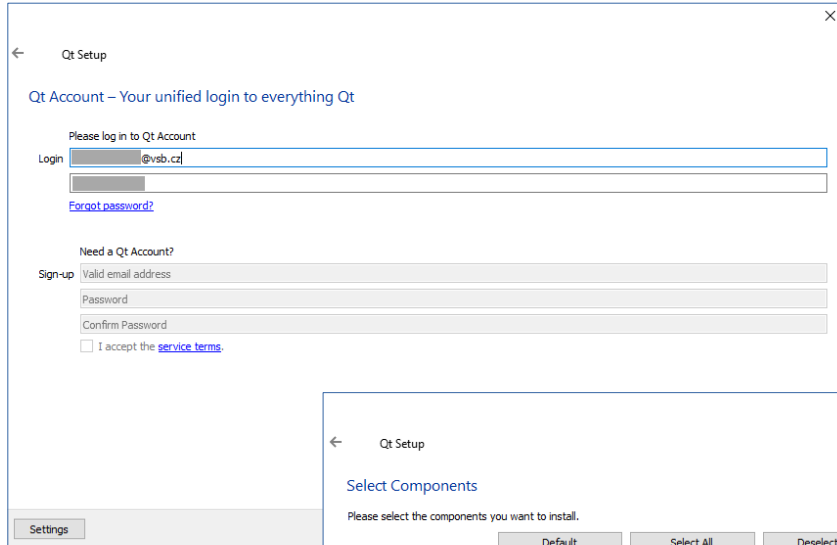
The screenshot shows the Qt Online Installer page. At the top, there are navigation tabs: Considerations, Your obligations, Virtuous Cycle, Due diligence, Qt source code, and Start contributing. Below these are three informational cards:

- Considerations:** Discusses license selection and legal obligations.
- Virtuous Cycle:** Encourages contributing code to the community.
- Due diligence:** Provides information on Qt licensing and open source obligations.

The main heading is "Looking for Qt binaries?" with a sub-heading: "Find them in the Qt Online Installer. It will steer you to the right download version and help you install tools and add-on components that are available for your open source license." A prominent green button labeled "Download the Qt Online Installer" is circled in red. Below it is a smaller button labeled "Download the Qt Online Installer".

The footer contains a navigation menu with categories: The Qt Company, Download (Qt, Free trial, Open source, Product partners), Resources (Customer success stories, Solutions by industry, Events, Educational programs), Professional Services (Consulting, Qt Support, Qt Training, Partner Directory), Developers (Documentation, Wiki, Forums, Contributors to Qt), and Company (Investors, News, Careers, Qt in Locations). A cookie consent banner is visible at the bottom.

# Qt – instalace II (Win)



# Qt Creator

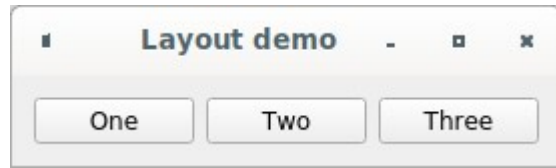


```
1 #include "mainwindow.h"
2
3 MainWindow::MainWindow(QWidget *parent)
4     : QWidget(parent)
5 {
6     this->setWindowTitle(tr("Převodník teplot"));
7     QHBoxLayout *hbox = new QHBoxLayout();
8     QVBoxLayout *vbox = new QVBoxLayout();
9
10    QFrame *frame_left = new QFrame();
11    frame_left->setLayout(vbox);
12
13    QGroupBox *groupBox = new QGroupBox(tr("Směr převodu"));
14    QHBoxLayout *radioLayout = new QHBoxLayout();
15    radio1 = new QRadioButton(tr("°C -> F"));
16    radio2 = new QRadioButton(tr("°F -> °C"));
17    radio1->setChecked(true);
18
19    radioLayout->addWidget(radio1);
20    radioLayout->addWidget(radio2);
21    radioLayout->setAlignment(Qt::AlignCenter);
22    groupBox->setLayout(radioLayout);
23    vbox->addWidget(groupBox);
24
25    hbox->addWidget(frame_left);
26
27    setLayout(hbox);
28
29 }
30
31 void MainWindow::compute()
32 {
33     double val = this->txtVstup->text().toDouble();
34     double newVal = 0.0;
35     if(radio1->isChecked())
36     {
37         newVal = 9*val/5 + 32;
38     }
39     else
40     {
41         newVal = 5*(val-32)/9;
42     }
43     int dec_nums = this->spinbox->text().toInt();
44     double pow_10 = pow(10.0f, dec_nums);
45     newVal = round(newVal * pow_10) / pow_10;
46
47     QString q = QString::number(newVal);
48     this->txtVystup->setText(q);
49 }
50
51 MainWindow::~MainWindow()
52 {
53 }
54
55 }
```

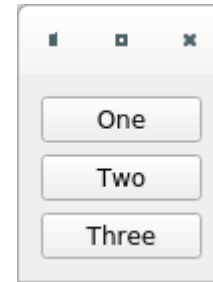
Lze využít i jiné IDE, např. Visual Studio (pak je třeba při instalaci Qt zvolit MSVC komponentu)

# Layouty v Qt

QHBoxLayout



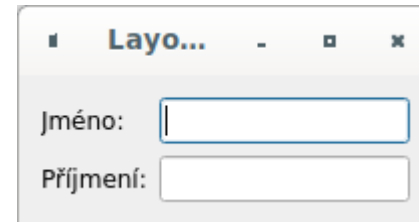
QVBoxLayout



QGridLayout



QFormLayout



# QHBoxLayout

```
// vytvoříme horizontální layout - prvky se budou vkládat vedle sebe  
(můžeme i nastavit rodiče - this)
```

```
QHBoxLayout *layout = new QHBoxLayout();  
// QHBoxLayout *layout = new QHBoxLayout(this);
```

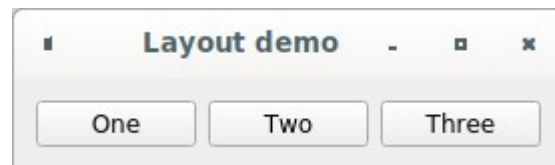
```
// vytvoříme 3 tlačítka
```

```
QPushButton *btn1 = new QPushButton("One");  
QPushButton *btn2 = new QPushButton("Two");  
QPushButton *btn3 = new QPushButton("Three");
```

```
// přidáme tlačítka do layoutu
```

```
layout->addWidget(btn1);  
layout->addWidget(btn2);  
Layout->addWidget(btn3);
```

```
// pokud jsme nenastavili rodiče layoutu, nastavíme layout hlavnímu oknu  
setLayout(layout);
```



# QGridLayout

```
// vytvoříme grid layout - prvky se budou vkládat do mřížky
```

```
QGridLayout *layout = new QGridLayout(this);
```

```
// vytvoříme 3 tlačítka
```

```
QPushButton *btn1 = new QPushButton("One");
```

```
QPushButton *btn2 = new QPushButton("Two");
```

```
QPushButton *btn3 = new QPushButton("Three");
```

```
// přidáme tlačítka do layoutu
```

```
// prvek, row, column, rowspan, colspan (stejně jako v Pythonu)
```

```
layout->addWidget(btn1, 0, 0);
```

```
layout->addWidget(btn2, 0, 1);
```

```
layout->addWidget(btn3, 1, 0, 1, 2);
```





# QFormLayout

// vytvoříme form layout - každý řádek bude obsahovat dvojici widgetů

```
QFormLayout *layout = new QFormLayout();
```

// vytvoříme 2 tlačítka a 2 vstupní textová pole

```
QPushButton *btn1 = new QPushButton("One");
```

```
QPushButton *btn2 = new QPushButton("Two");
```

```
QLineEdit *edit1 = new QLineEdit();
```

```
QLineEdit *edit2 = new QLineEdit();
```

// přidáme dvojice do layoutu

```
layout->addRow(btn1, edit1);
```

```
layout->addRow(btn2, edit2);
```

```
setLayout(layout);
```



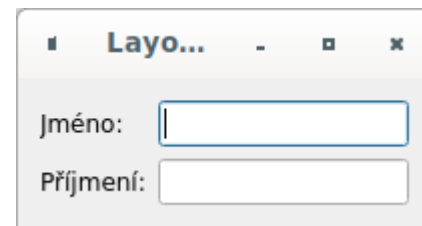
# QFormLayout

```
// vytvoříme form layout - každý řádek bude obsahovat dvojici widgetů  
QFormLayout *layout = new QFormLayout();
```

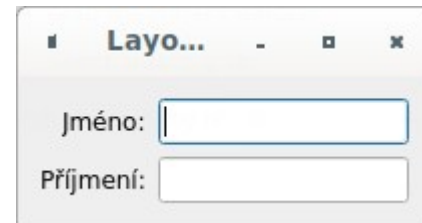
```
// často vytváříme dvojice popisek-vstup, lze takto:  
QLineEdit *edit1 = new QLineEdit();  
QLineEdit *edit2 = new QLineEdit();
```

```
layout->addRow("Jméno:", edit1);  
layout->addRow("Příjmení:", edit2);
```

```
// jak zarovnat popisky doprava?  
layout->setLabelAlignment(Qt::AlignRight);
```

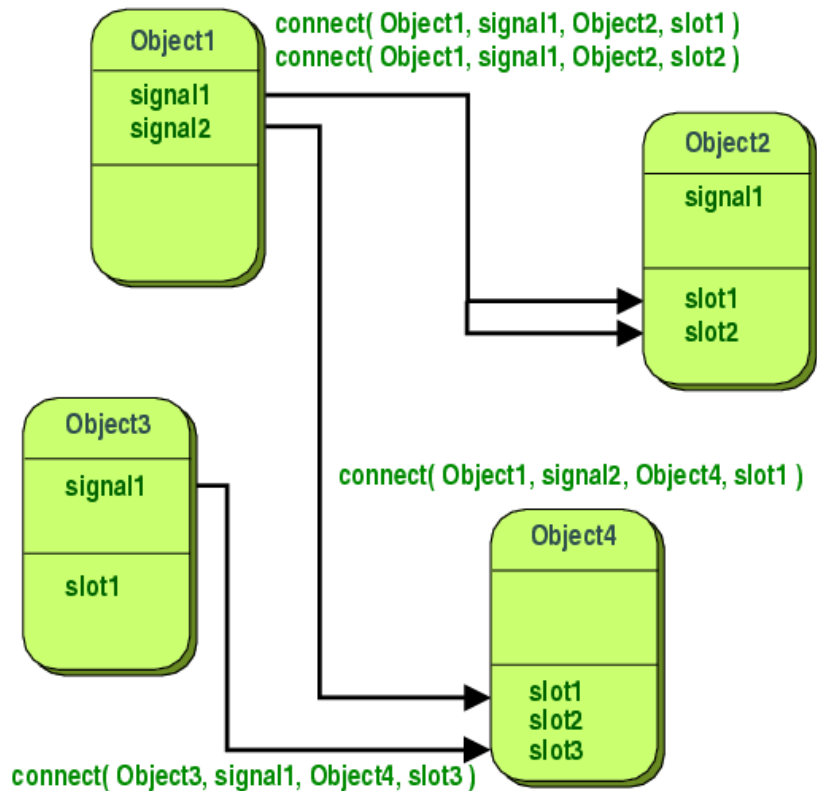


Window titled "Layo..." showing a form layout with two rows. The first row contains the label "Jméno:" followed by a text input field. The second row contains the label "Příjmení:" followed by a text input field. The labels are left-aligned.



Window titled "Layo..." showing a form layout with two rows. The first row contains the label "Jméno:" followed by a text input field. The second row contains the label "Příjmení:" followed by a text input field. The labels are right-aligned.

# Signály a sloty



**Signál** je vyslán v případě aktivování nějaké události na objektu (např. stisknutí tlačítka).

**Slot** je funkce, která je zavolána po vyslání signálu (např. zavření okna)

```
connect(btn, SIGNAL(clicked()), this, SLOT(close()));
```

# Signály a sloty

Ukázka – po kliknutí na tlačítko se text popisku nastaví dle textového vstupního pole

## mainwindow.h

```
class MainWindow : public QWidget {
    Q_OBJECT

public:
    MainWindow(QWidget *parent = 0);
    ~MainWindow();

private:
    QLineEdit* edit;
    QPushButton* btn;
    QLabel *lbl;

private slots:
    void mySlot();
};
```



## mainwindow.cpp

```
MainWindow::MainWindow(QWidget *parent)
    : QWidget(parent)
{
    QVBoxLayout *layout = new QVBoxLayout(this);
    edit = new QLineEdit();
    btn = new QPushButton("Click");
    lbl = new QLabel("None");

    layout->addWidget(edit);
    layout->addWidget(btn);
    layout->addWidget(lbl);

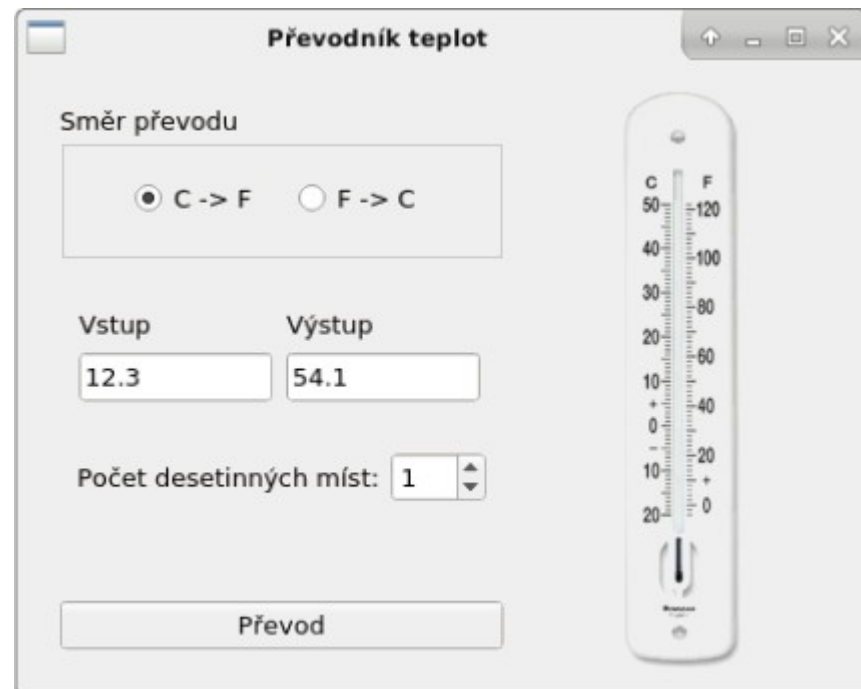
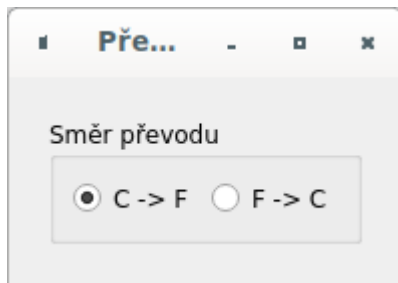
    // nějaká nastavení
    edit->setMaximumWidth(50);
    layout->setAlignment(edit, Qt::AlignCenter);
    layout->setAlignment(lbl, Qt::AlignCenter);

    connect(btn, SIGNAL(clicked()), this, SLOT(mySlot()));
}

void MainWindow::mySlot() {
    this->lbl->setText(this->edit->text());
}
```

# Úkol

- Převodník teplot



# Úkol

- Rozložení

HBoxLayout ←

VBoxLayout ←

GroupBox ←

GridLayout ←

FormLayout ←

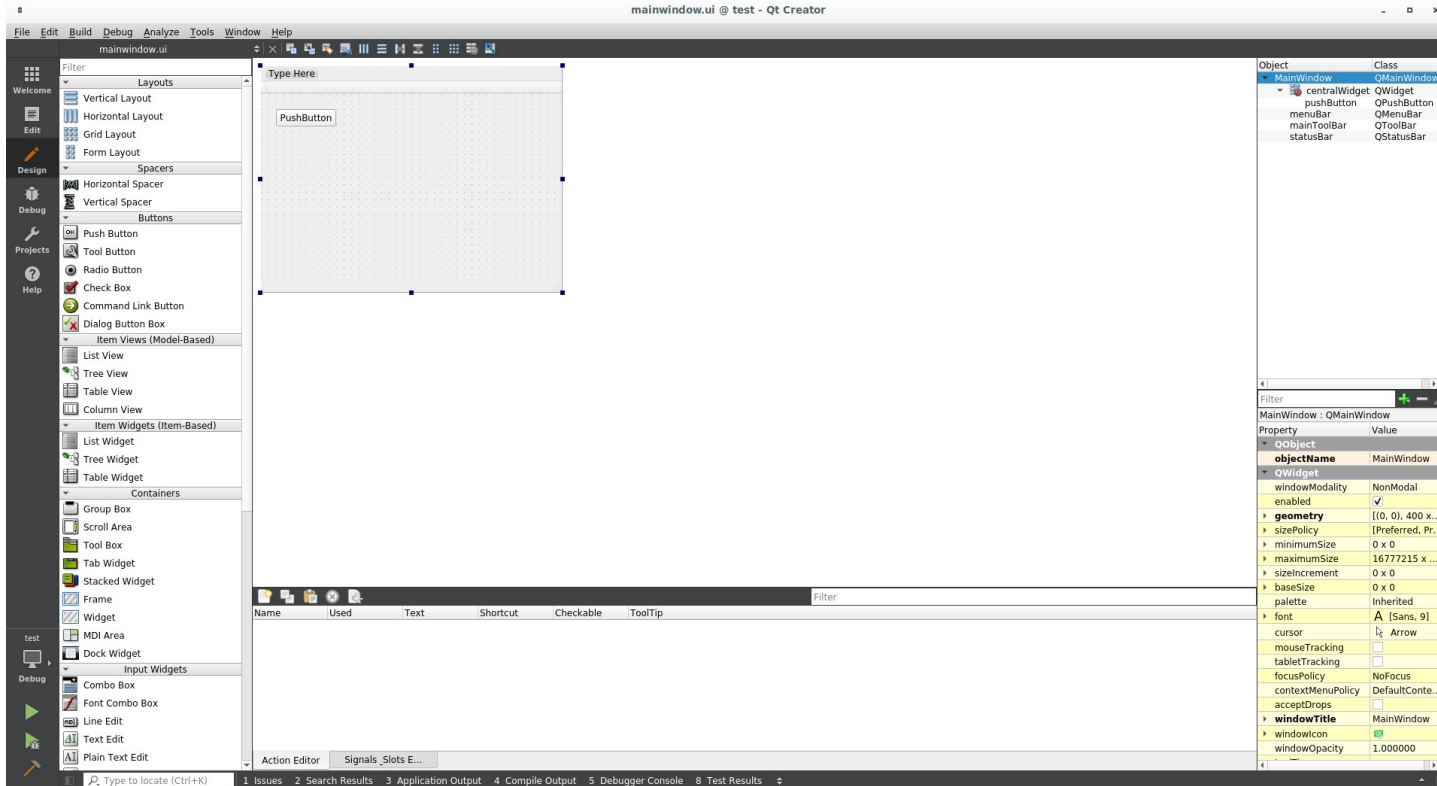
The screenshot shows a window titled "Převodník teplot" with a standard Linux-style title bar. The main content area is enclosed in a green border. On the left side of this area, an orange border highlights a vertical stack of components: a "Směr převodu" section with two radio buttons ("C -> F" and "F -> C"), a "Vstup" field with the value "12.3" and a "Výstup" field with the value "54.1", a "Počet desetinných míst:" label with a spinner set to "1", and a "Převod" button at the bottom. Dotted horizontal lines separate these sections. On the right side of the window, there is a vertical thermometer graphic with two scales: Celsius (0 to 50) and Fahrenheit (0 to 120). The Celsius scale is currently showing a value of approximately 12.3, and the Fahrenheit scale shows approximately 54.1. Arrows from the text on the left point to these elements: a green arrow to the window border, an orange arrow to the orange-bordered section, and black arrows to the radio buttons, input fields, spinner, and button.

# Obrázek v Qt

```
QString *imgFilename = new QString( PATH_TO_IMAGE );
QPixmap *imgPixmap = new QPixmap( *imgFilename );
QLabel *imgLbl = new QLabel;
imgLbl->setPixmap( *imgPixmap );
hbox->addWidget( imgLbl );
```

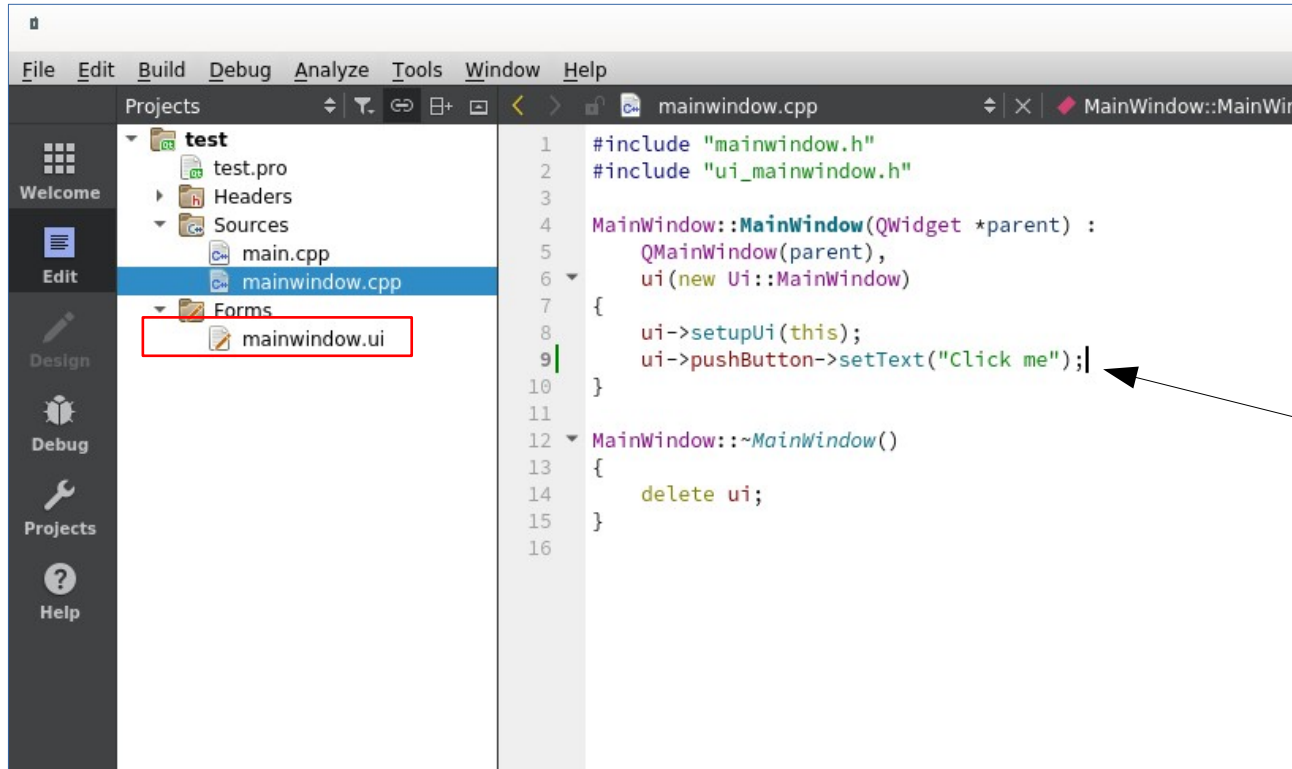
# Qt Creator

- Vyzkoušejte si také práci s Qt Designerem





# Qt Creator



pushButton v designeru