Code less.
Create more.
Deploy everywhere.

Qt –Dialog-based Application

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CSIE Windows Programming Class
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Qt- Built-in Dialog

- 學習目的
  - 認識Qt各種內建之對話盒視窗
  - 練習使用這些對話盒視窗
  - 學習如何整合內建對話盒視窗於應用程式中

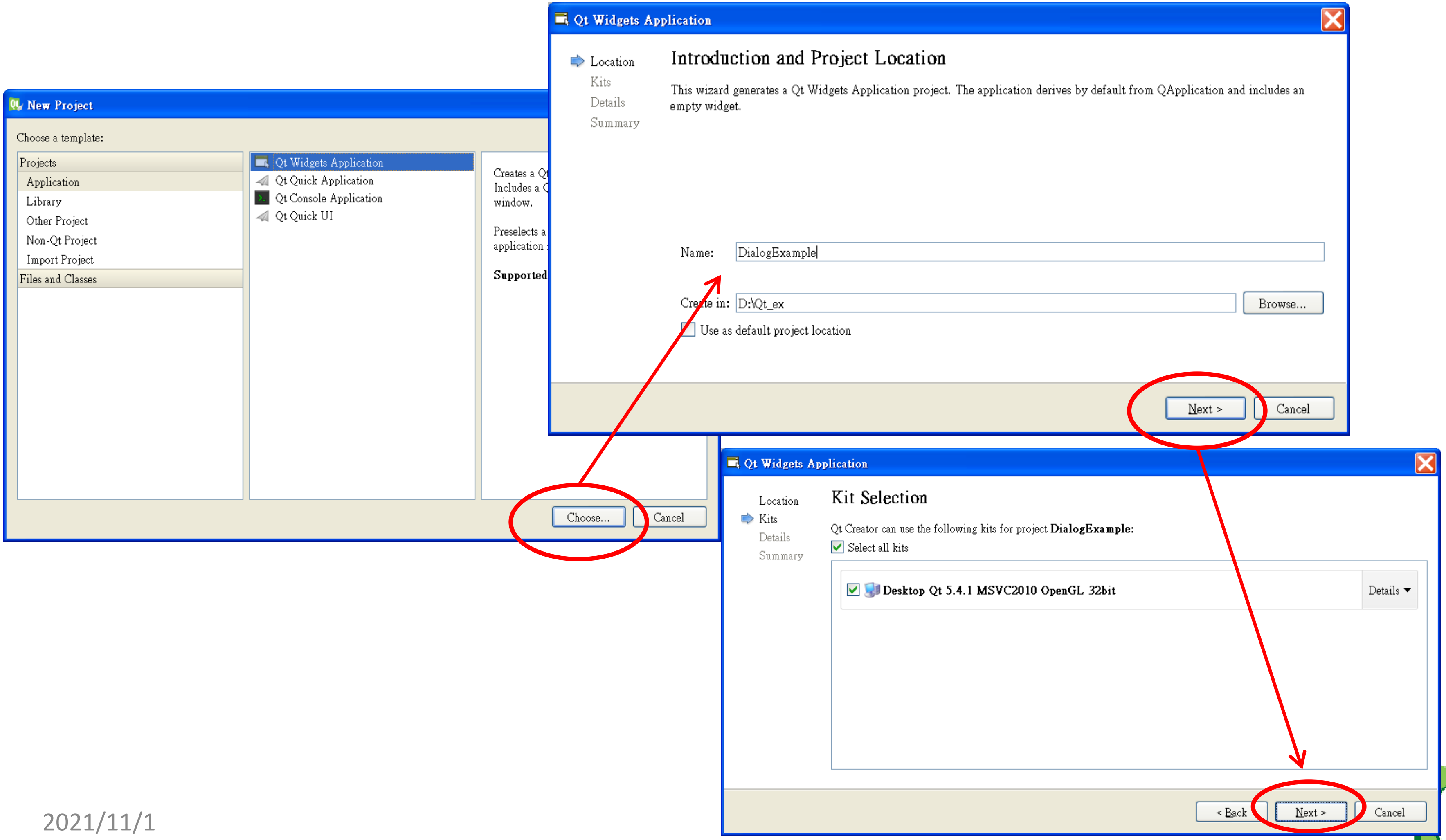
Qt- Dialog Class

- **QDialog Class is the base class of dialog windows:**

Header:	#include <QDialog>
qmake:	QT += widgets
Inherits:	QWidget.
Inherited By:	QColorDialog, QErrorMessage, QFileDialog, QFontDialog, QInputDialog, QMessageBox, QProgressDialog, and QWizard.

Qt- Dialog Class

- **Create a number converter dialog-based application:**



Qt Widgets Application

Introduction and Project Location

This wizard generates a Qt Widgets Application project. The application derives by default from QApplication and includes an empty widget.

Name: DialogExample

Create in: D:\Qt_ex

☐ Use as default project location

Qt Widgets Application

Kit Selection

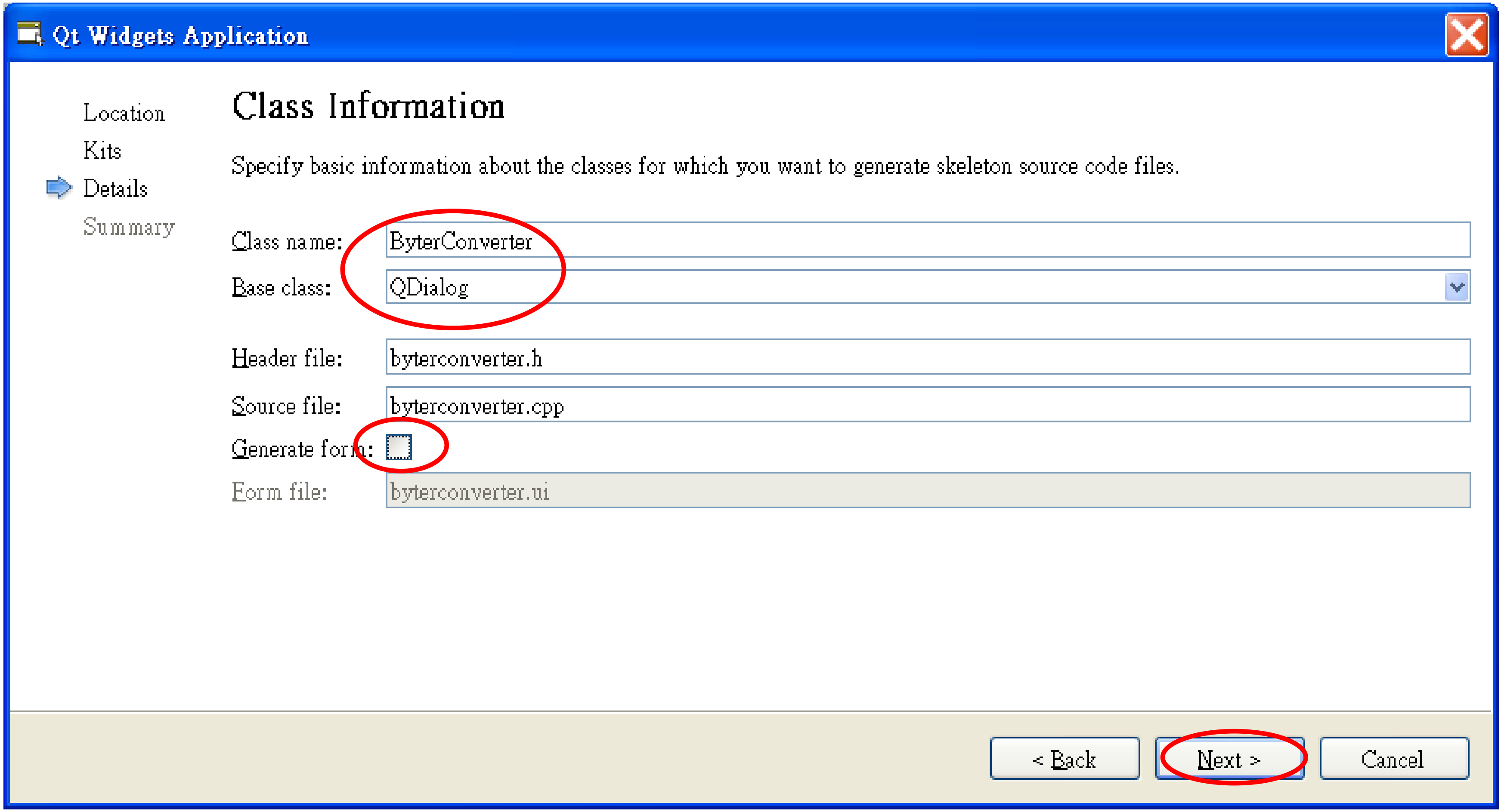
Qt Creator can use the following kits for project **DialogExample:**

☑ Select all kits

☑ **Desktop Qt 5.4.1 MSVC2010 OpenGL 32bit**

Qt- Dialog Class

- **Create a number converter dialog-based application:**



Qt Widgets Application

Class Information

Specify basic information about the classes for which you want to generate skeleton source code files.

Class name: ByterConverter

Base class: QDialog

Header file: byterconverter.h

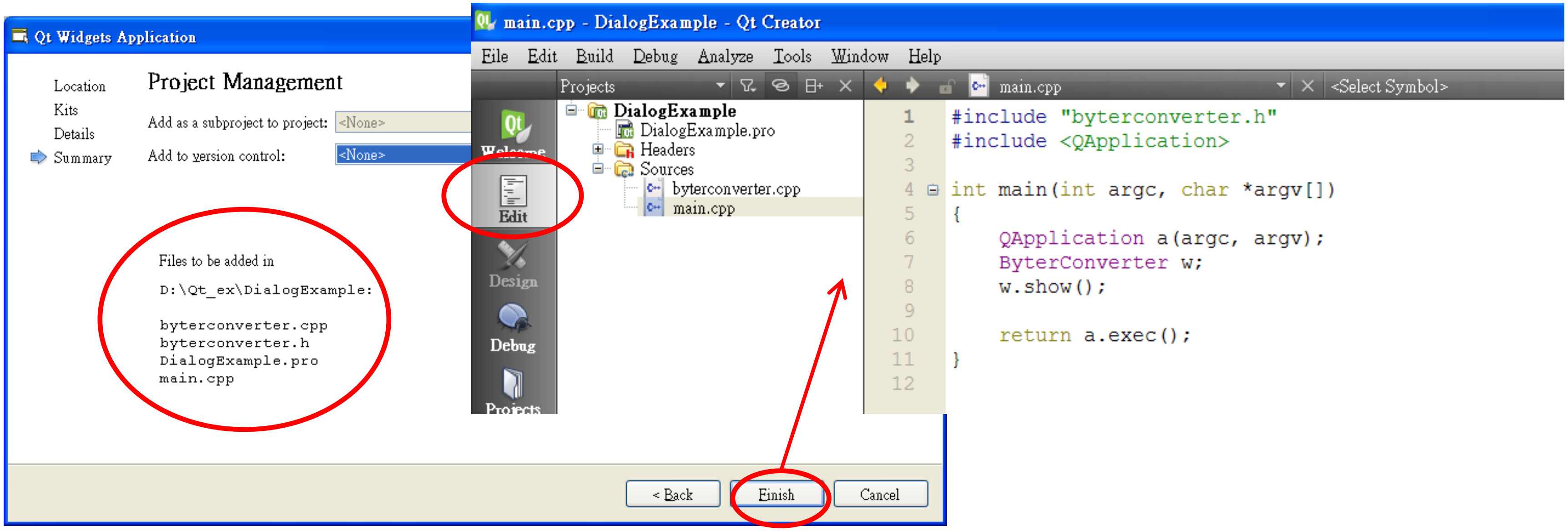
Source file: byterconverter.cpp

Generate form: □

Form file: byterconverter.ui

Qt- Dialog Class

- **Create a number converter dialog-based application:**



Project Management

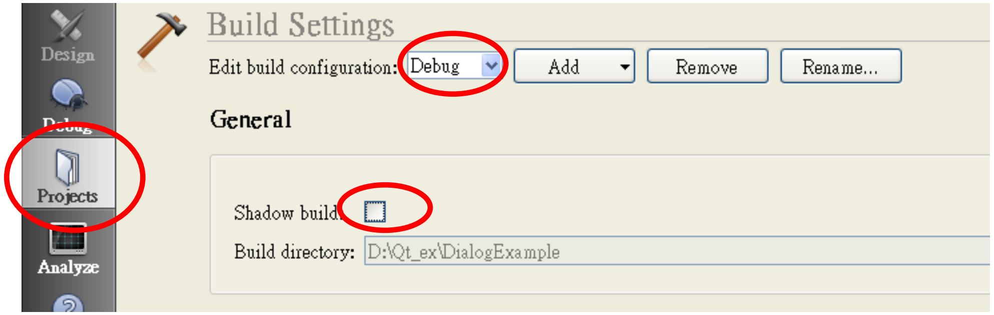
Add as a subproject to project: <None>

Add to version control: <None>

Files to be added in

```
D:\Qt_ex\DialogExample:

byterconverter.cpp
byterconverter.h
DialogExample.pro
main.cpp
```

```
#include "byterconverter.h"
#include <QApplication>

int main(int argc, char *argv[])
{
    QApplication a(argc, argv);
    ByterConverter w;
    w.show();

    return a.exec();
}
```



Build Settings

Edit build configuration: Debug

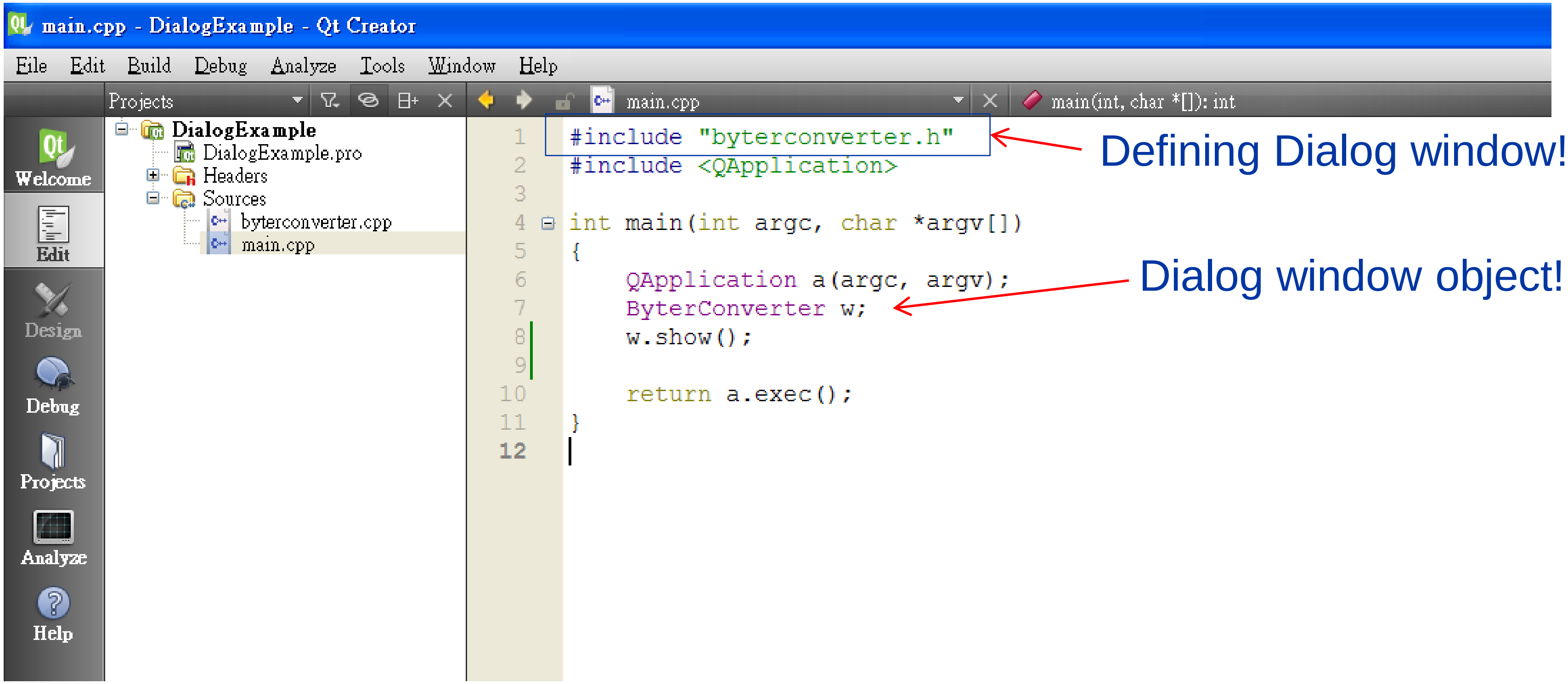
General

Shadow build: □

Build directory: D:\Qt_ex\DialogExample

Qt- Dialog Class

- **Check out the main function:**



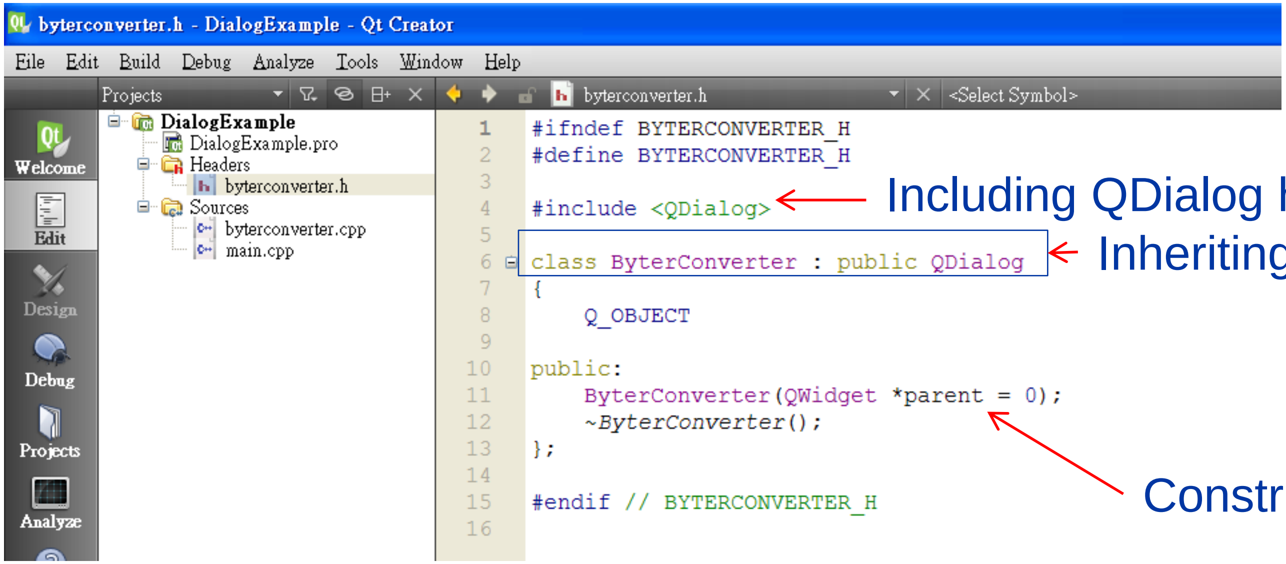
```
#include "byterconverter.h"
#include <QApplication>

int main(int argc, char *argv[])
{
    QApplication a(argc, argv);
    ByterConverter w;
    w.show();

    return a.exec();
}
```

Defining Dialog window!

Dialog window object!

Qt- Dialog Class

- **Check out the definition of ByteConverter class:**



```
#ifndef BYTERCONVERTER_H
#define BYTERCONVERTER_H

#include <QDialog>

class ByterConverter : public QDialog
{
    Q_OBJECT

public:
    ByterConverter(QWidget *parent = 0);
    ~ByterConverter();
};

#endif // BYTERCONVERTER_H
```

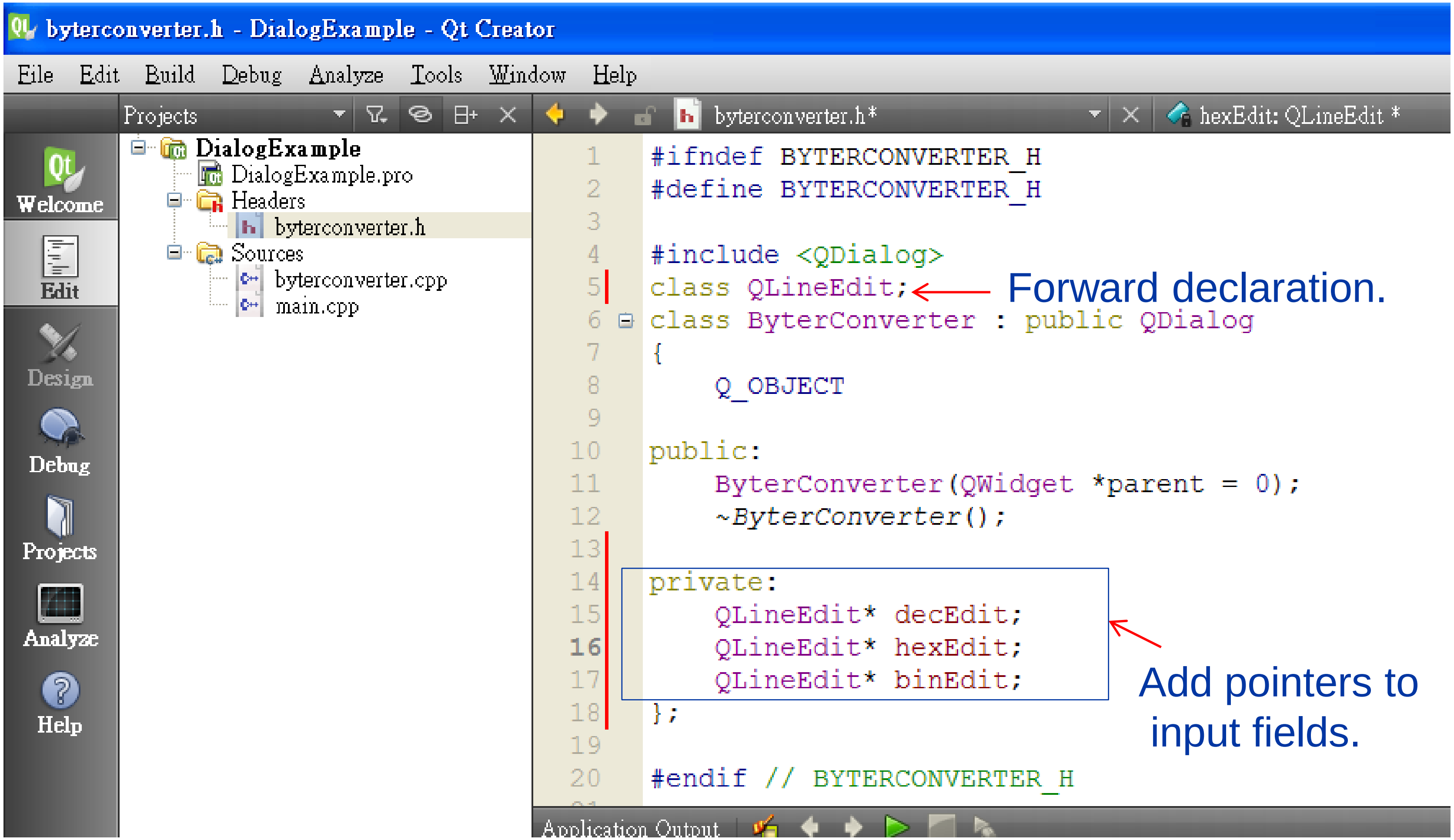
Including QDialog header file!

Inheriting from QDialog Class!

Constructor!

Qt- Dialog Class

- **Modify the definition of ByteConverter class:**



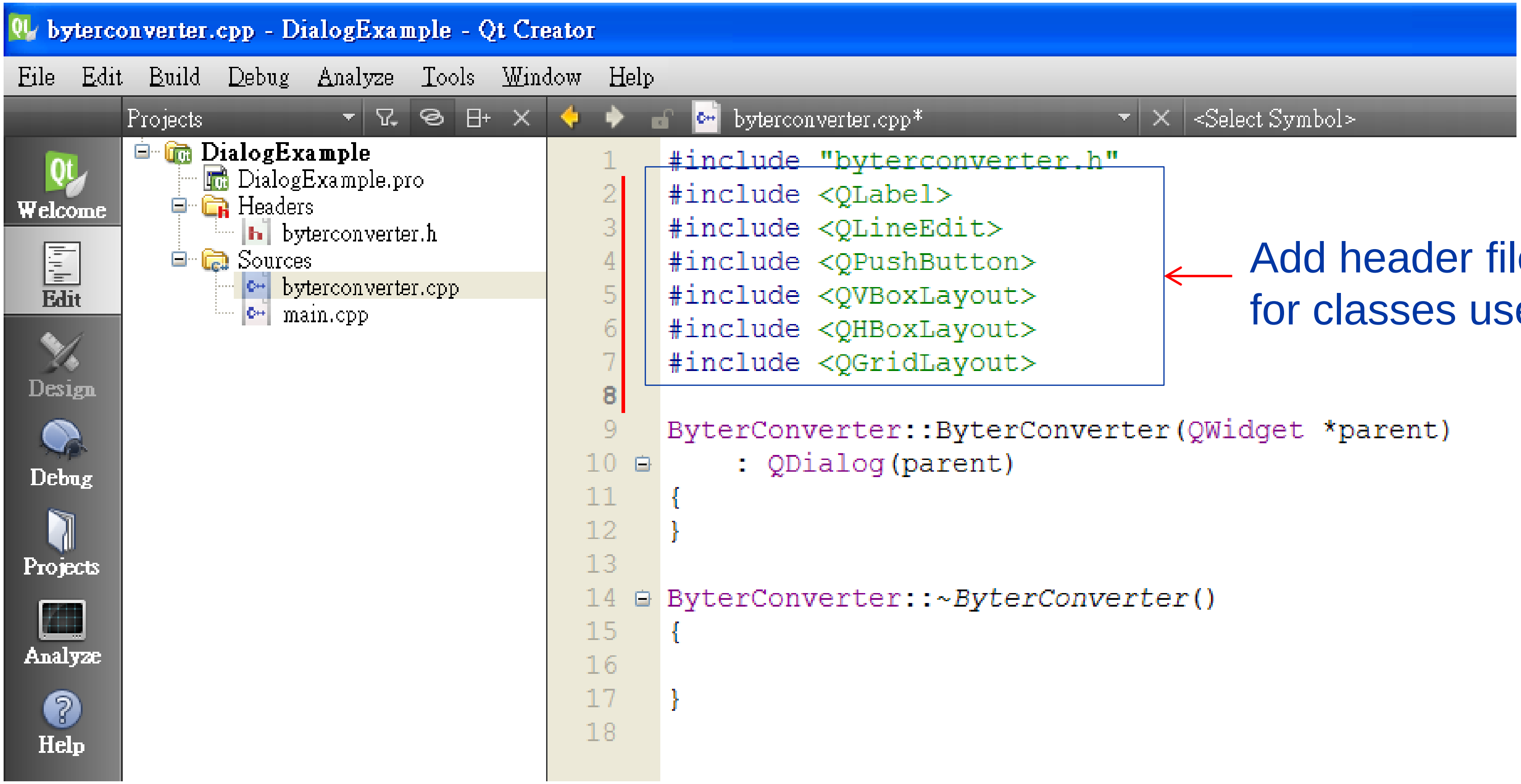
```
#ifndef BYTERCONVERTER_H
#define BYTERCONVERTER_H

#include <QDialog>
class QLineEdit;
class ByterConverter : public QDialog
{
    Q_OBJECT

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

private:
    QLineEdit* decEdit;
    QLineEdit* hexEdit;
    QLineEdit* binEdit;
};

#endif // BYTERCONVERTER_H
```

Forward declaration.

Add pointers to input fields.

Qt- Dialog Class

- **Modify the constructor of ByteConverter class:**

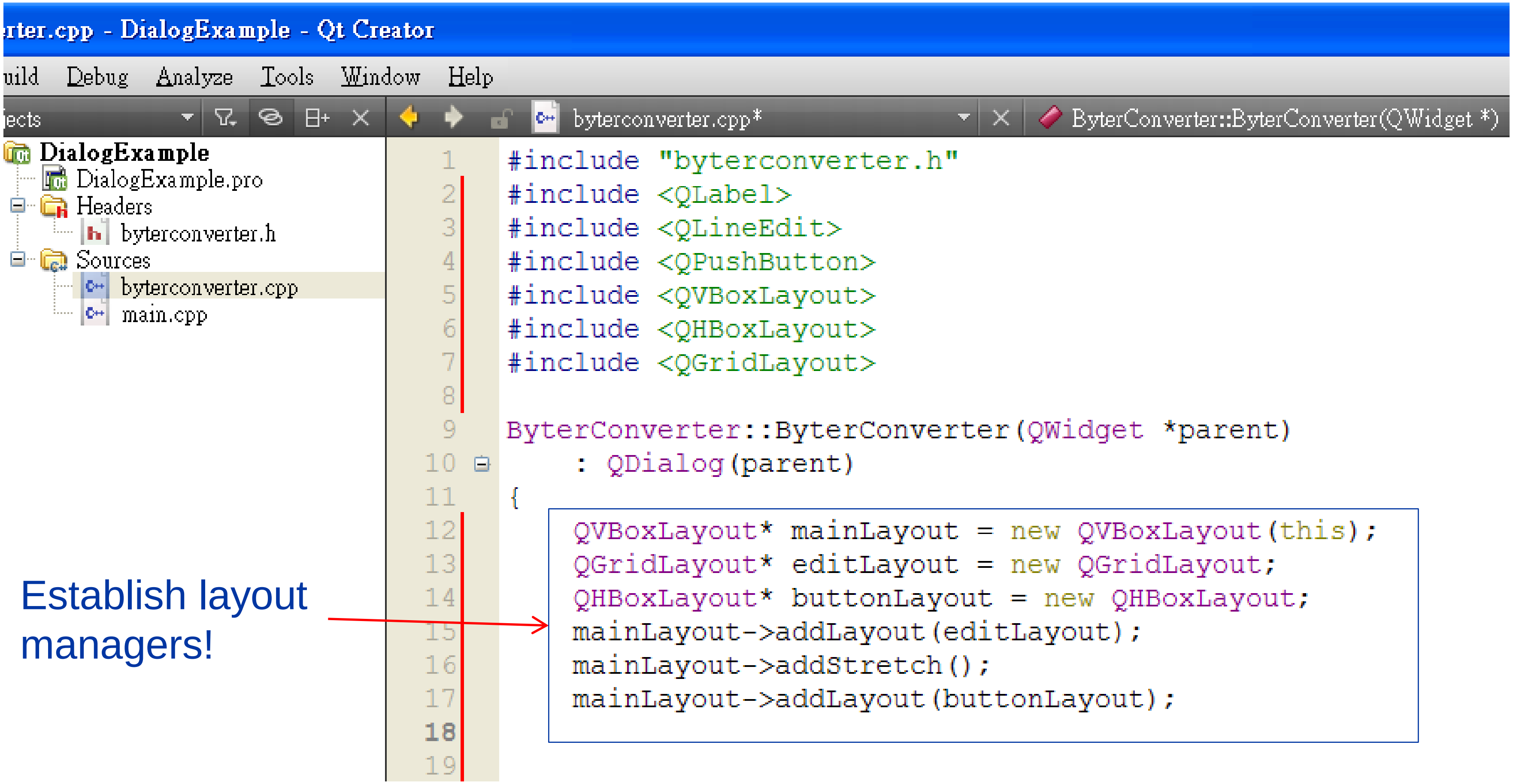


```
#include "byterconverter.h"
#include <QLabel>
#include <QLineEdit>
#include <QPushButton>
#include <QVBoxLayout>
#include <QHBoxLayout>
#include <QGridLayout>

ByterConverter::ByterConverter(QWidget *parent)
     : QDialog(parent)
{
}

ByterConverter::~ByterConverter()
{

}

```

Add header files for classes used.

Qt- Dialog Class

- **Modify the constructor of ByteConverter class:**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jects
byterconverter.cpp*
ByterConverter::ByterConverter(QWidget *)
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byterconverter.h
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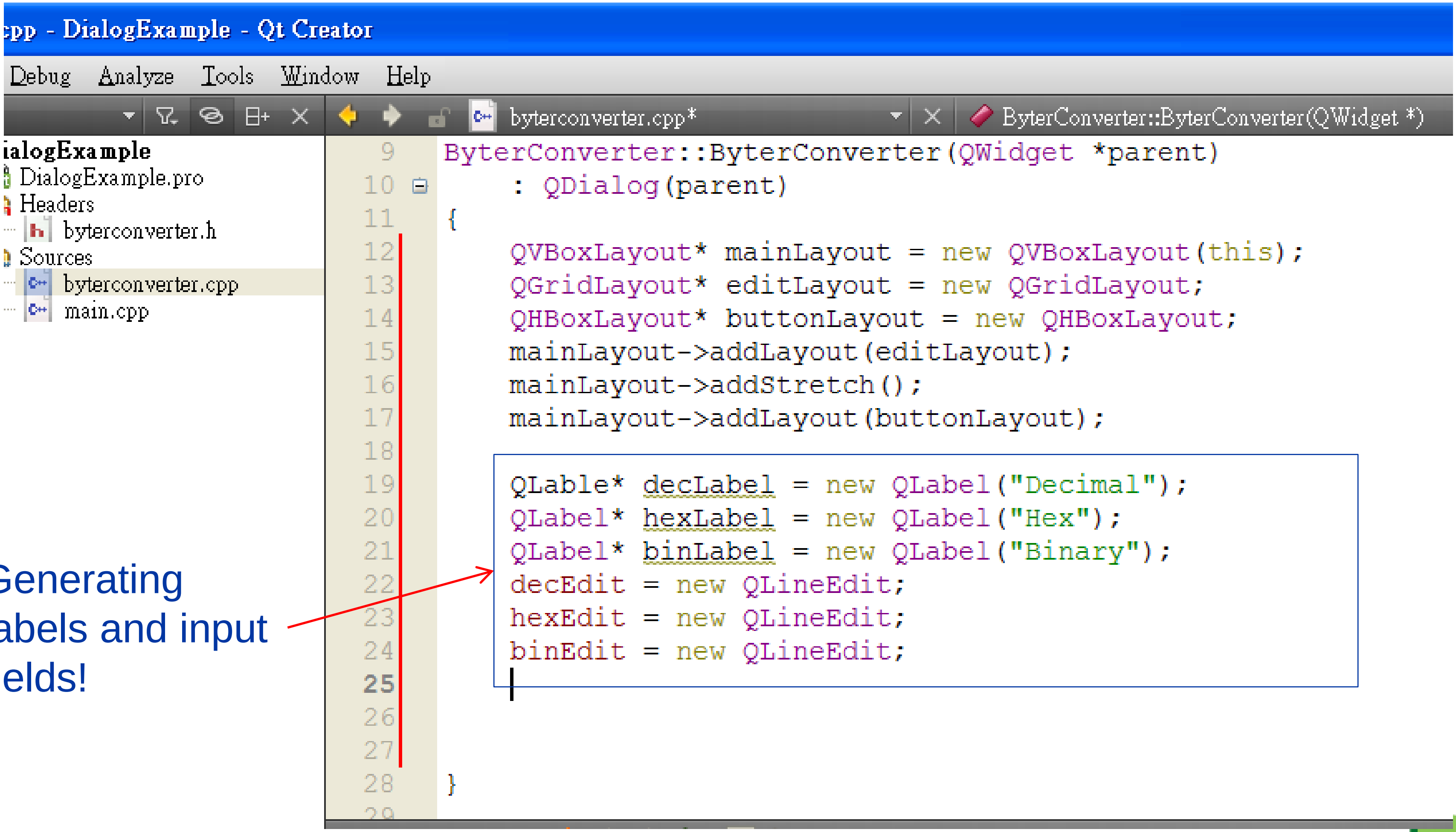
byterconverter.cpp
main.cpp

```cpp
#include "byterconverter.h"
#include <QLabel>
#include <QLineEdit>
#include <QPushButton>
#include <QVBoxLayout>
#include <QHBoxLayout>
#include <QGridLayout>

ByterConverter::ByterConverter(QWidget *parent)
    : QDialog(parent)
{
    QVBoxLayout* mainLayout = new QVBoxLayout(this);
    QGridLayout* editLayout = new QGridLayout;
    QHBoxLayout* buttonLayout = new QHBoxLayout;
    mainLayout->addLayout(editLayout);
    mainLayout->addStretch();
    mainLayout->addLayout(buttonLayout);
```

Establish layout managers!

Qt- Dialog Class

- **Modify the constructor of ByteConverter class:**

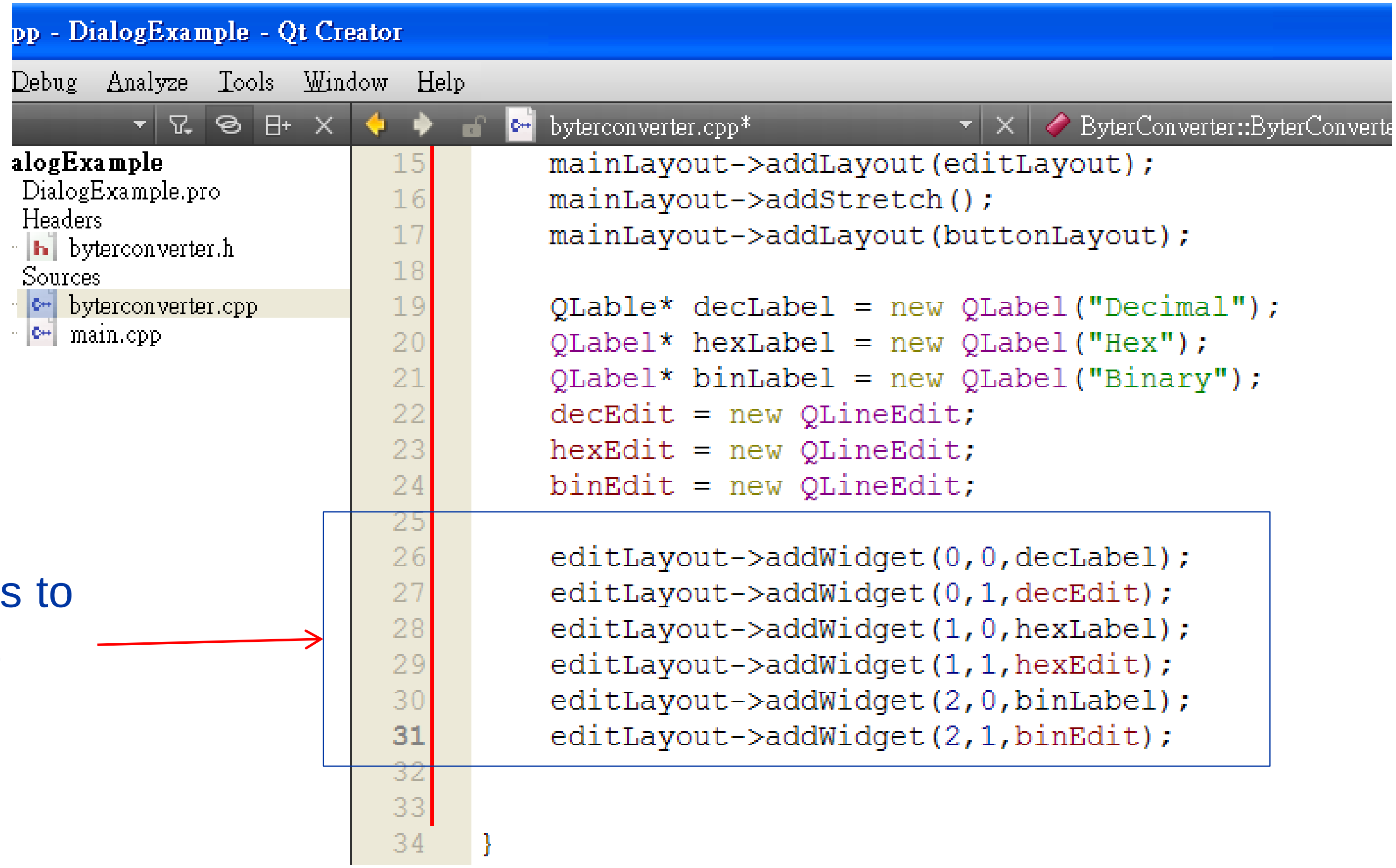


```
ByterConverter::ByterConverter(QWidget *parent)
    : QDialog(parent)
{
    QVBoxLayout* mainLayout = new QVBoxLayout(this);
    QGridLayout* editLayout = new QGridLayout;
    QHBoxLayout* buttonLayout = new QHBoxLayout;
    mainLayout->addLayout(editLayout);
    mainLayout->addStretch();
    mainLayout->addLayout(buttonLayout);

    QLable* decLabel = new QLabel("Decimal");
    QLabel* hexLabel = new QLabel("Hex");
    QLabel* binLabel = new QLabel("Binary");
    decEdit = new QLineEdit;
    hexEdit = new QLineEdit;
    binEdit = new QLineEdit;



}
```

Generating labels and input fields!

Qt- Dialog Class

- **Modify the constructor of ByteConverter class:**

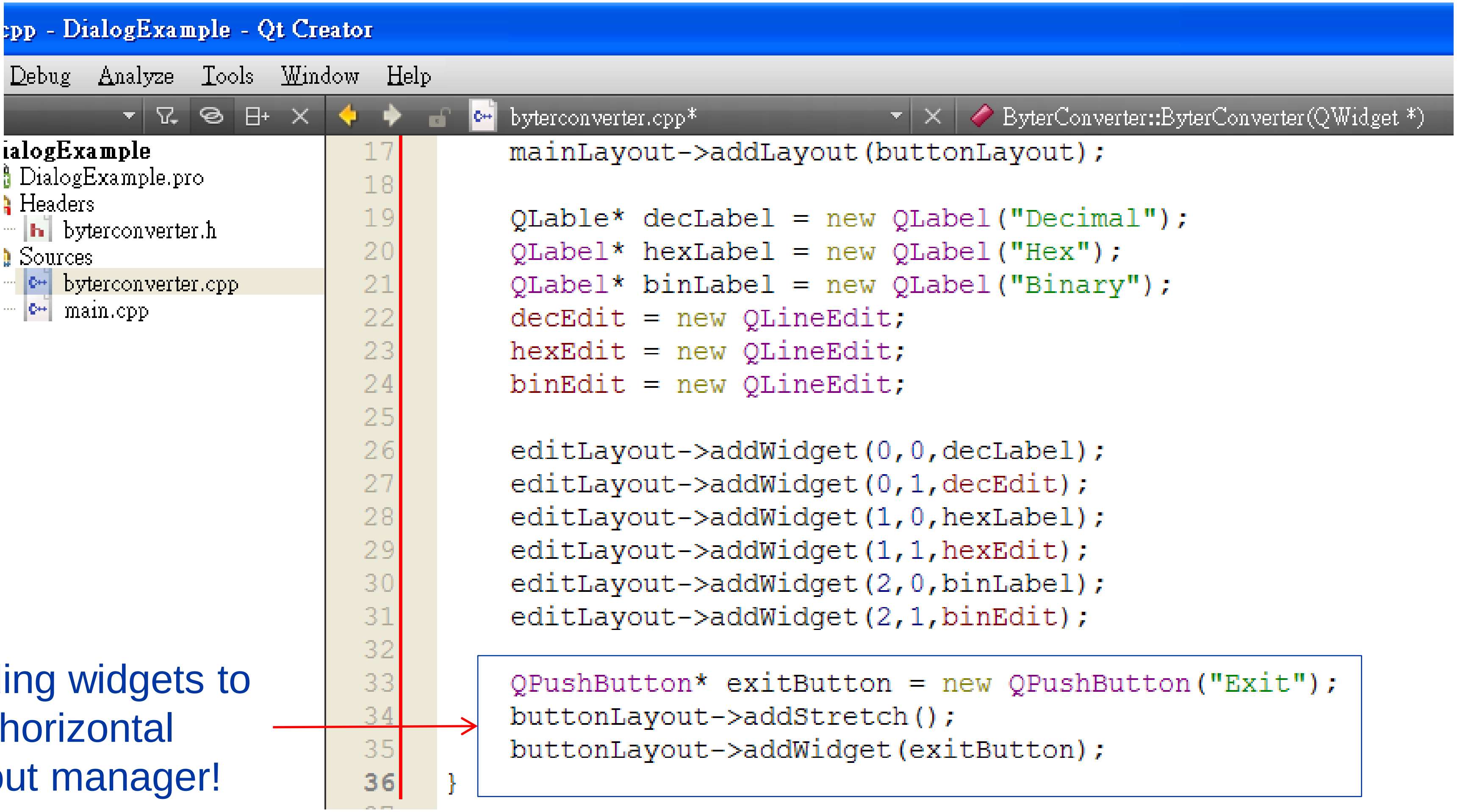


```
    mainLayout->addLayout(editLayout);
    mainLayout->addStretch();
    mainLayout->addLayout(buttonLayout);

    QLable* decLabel = new QLabel("Decimal");
    QLabel* hexLabel = new QLabel("Hex");
    QLabel* binLabel = new QLabel("Binary");
    decEdit = new QLineEdit;
    hexEdit = new QLineEdit;
    binEdit = new QLineEdit;

    editLayout->addWidget(0,0,decLabel);
    editLayout->addWidget(0,1,decEdit);
    editLayout->addWidget(1,0,hexLabel);
    editLayout->addWidget(1,1,hexEdit);
    editLayout->addWidget(2,0,binLabel);
    editLayout->addWidget(2,1,binEdit);


}
```

Adding widgets to the grid layout manager!

Qt- Dialog Class

- **Modify the constructor of ByteConverter class:**



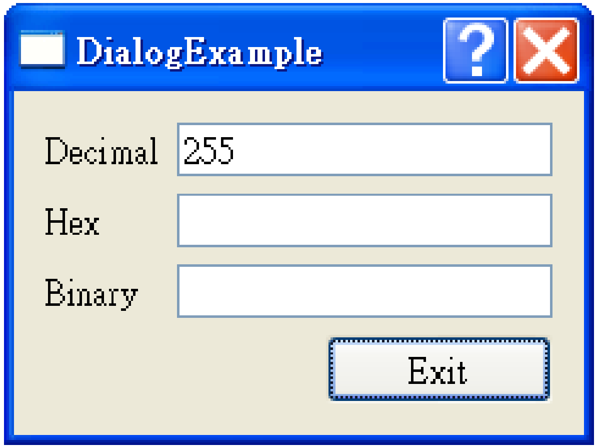
cpp - DialogExample - Qt Creator
Debug Analyze Tools Window Help
byterconverter.cpp*
ByterConverter::ByterConverter(QWidget *)
ialogExample
DialogExample.pro
Headers
byterconverter.h
Sources
byterconverter.cpp
main.cpp

```
    mainLayout->addLayout(buttonLayout);

    QLable* decLabel = new QLabel("Decimal");
    QLabel* hexLabel = new QLabel("Hex");
    QLabel* binLabel = new QLabel("Binary");
    decEdit = new QLineEdit;
    hexEdit = new QLineEdit;
    binEdit = new QLineEdit;

    editLayout->addWidget(0,0,decLabel);
    editLayout->addWidget(0,1,decEdit);
    editLayout->addWidget(1,0,hexLabel);
    editLayout->addWidget(1,1,hexEdit);
    editLayout->addWidget(2,0,binLabel);
    editLayout->addWidget(2,1,binEdit);

    QPushButton* exitButton = new QPushButton("Exit");
    buttonLayout->addStretch();
    buttonLayout->addWidget(exitButton);
}
```

Adding widgets to the horizontal layout manager!

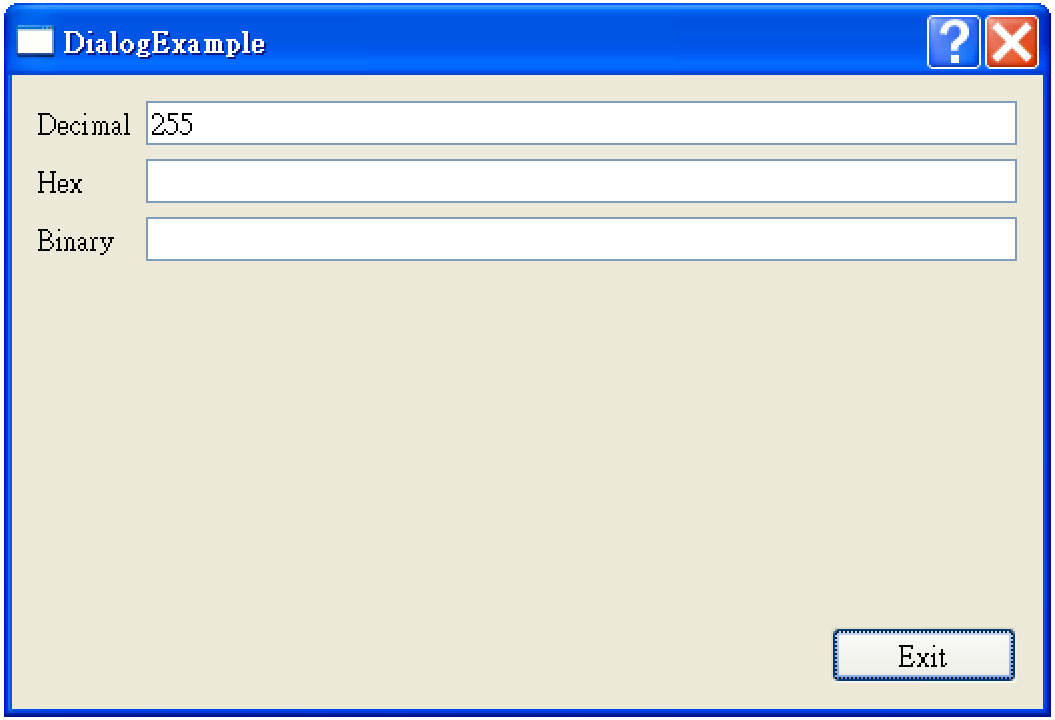
Qt- Dialog Class

- **Build and run the project:**



DialogExample

Decimal 255



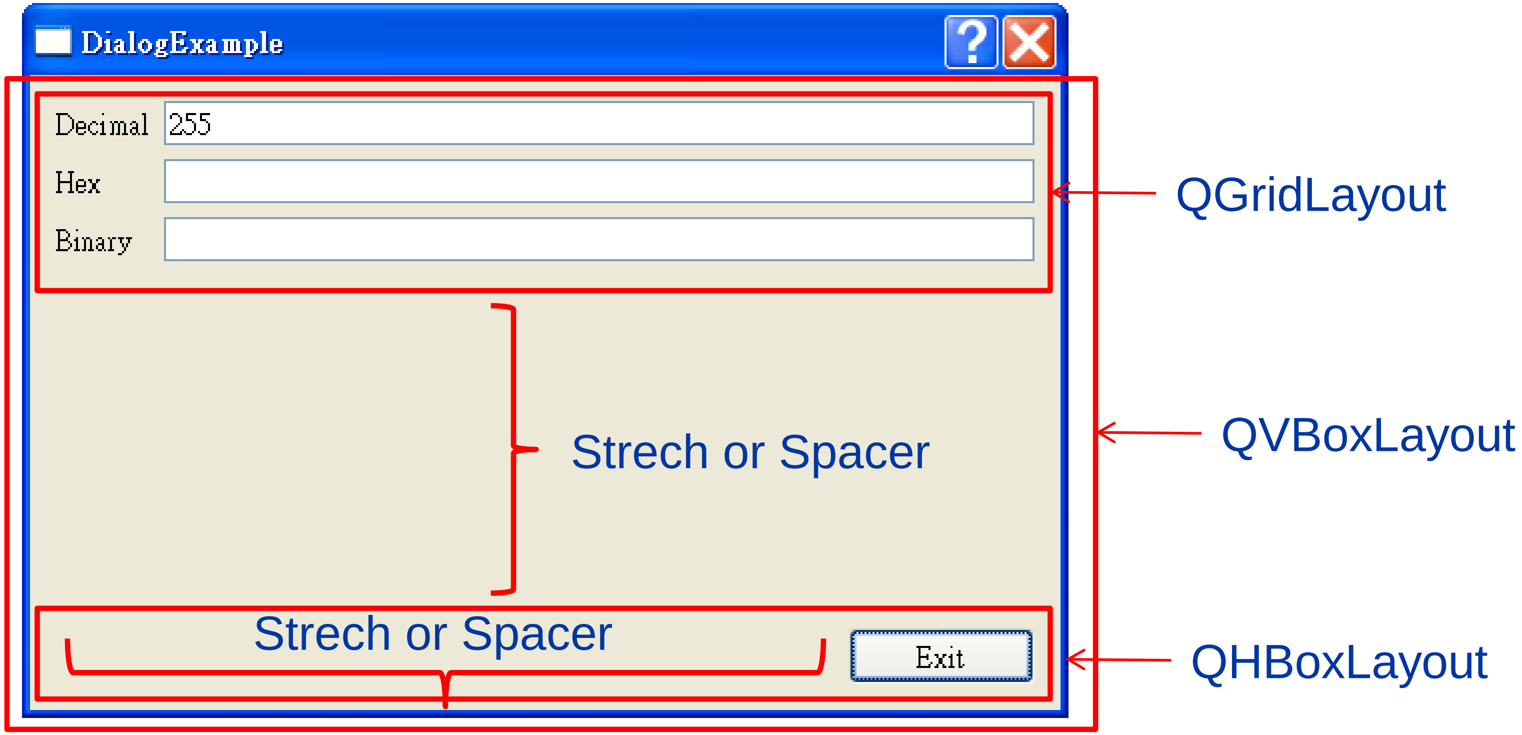
DialogExample

Decimal 255

Try to interact with the dialog window displayed!
Do you see any reaction when you key in or click on it?

Qt- Dialog Class

- **Examine the Layout Managers:**



DialogExample

Decimal 255

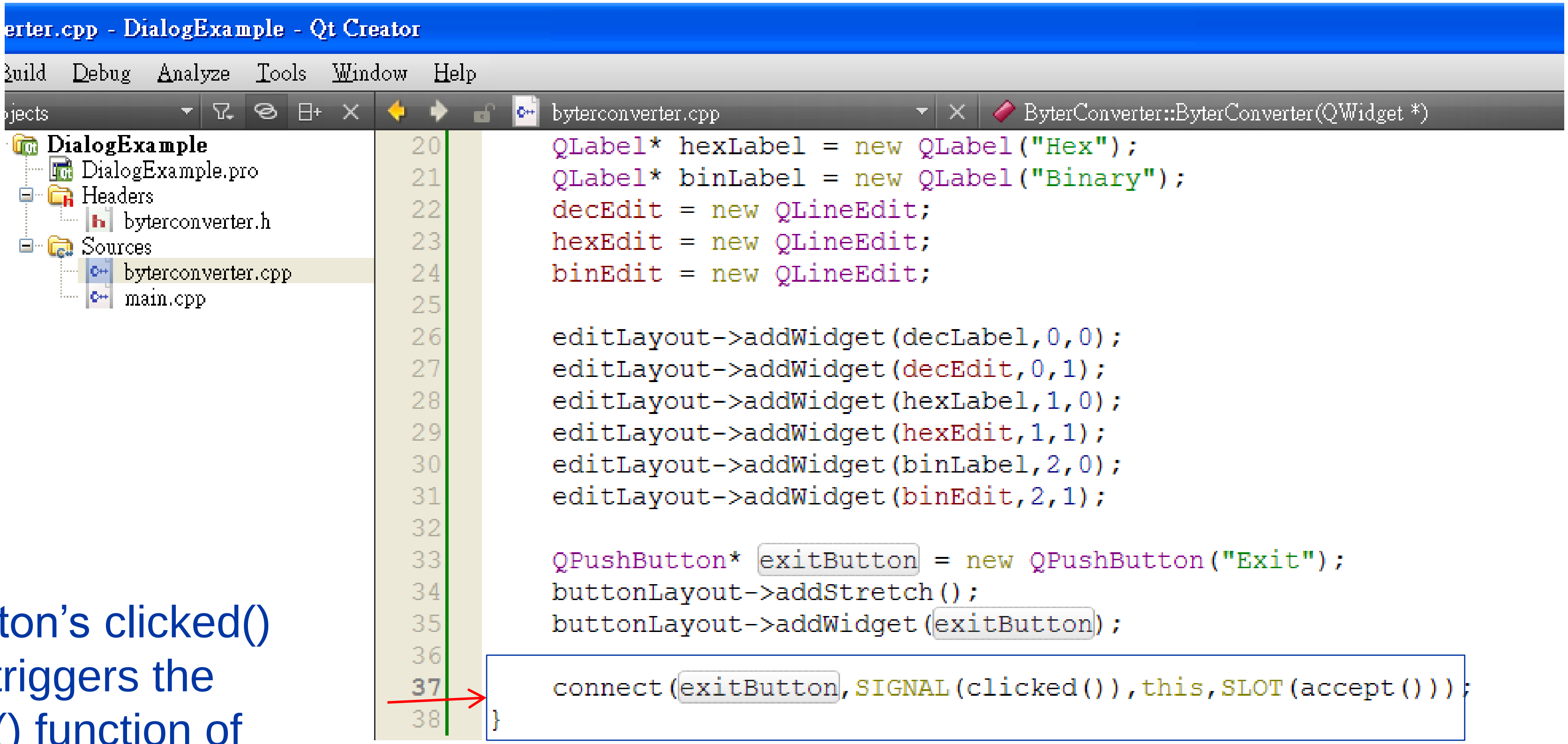
Hex

Binary

Exit

Qt- Dialog Class

- **Implement the functionality of the Exit button :**


erter.cpp - DialogExample - Qt Creator
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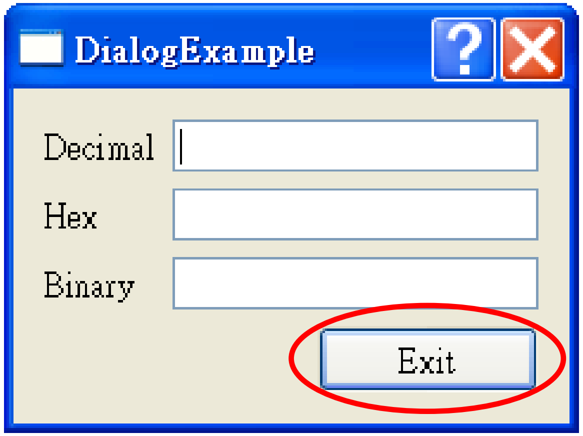
jects
byterconverter.cpp
ByterConverter::ByterConverter(QWidget *)
DialogExample
DialogExample.pro
Headers
byterconverter.h
Sources
byterconverter.cpp
main.cpp

```
    QLabel* hexLabel = new QLabel("Hex");
    QLabel* binLabel = new QLabel("Binary");
    decEdit = new QLineEdit;
    hexEdit = new QLineEdit;
    binEdit = new QLineEdit;

    editLayout->addWidget(decLabel,0,0);
    editLayout->addWidget(decEdit,0,1);
    editLayout->addWidget(hexLabel,1,0);
    editLayout->addWidget(hexEdit,1,1);
    editLayout->addWidget(binLabel,2,0);
    editLayout->addWidget(binEdit,2,1);

    QPushButton* exitButton = new QPushButton("Exit");
    buttonLayout->addStretch();
    buttonLayout->addWidget(exitButton);

    connect(exitButton,SIGNAL(clicked()),this,SLOT(accept()));
}
```

exitButton's clicked() signal triggers the accept() function of dialog window!

Qt- Dialog Class

- **Build and run the project:**



DialogExample

Decimal

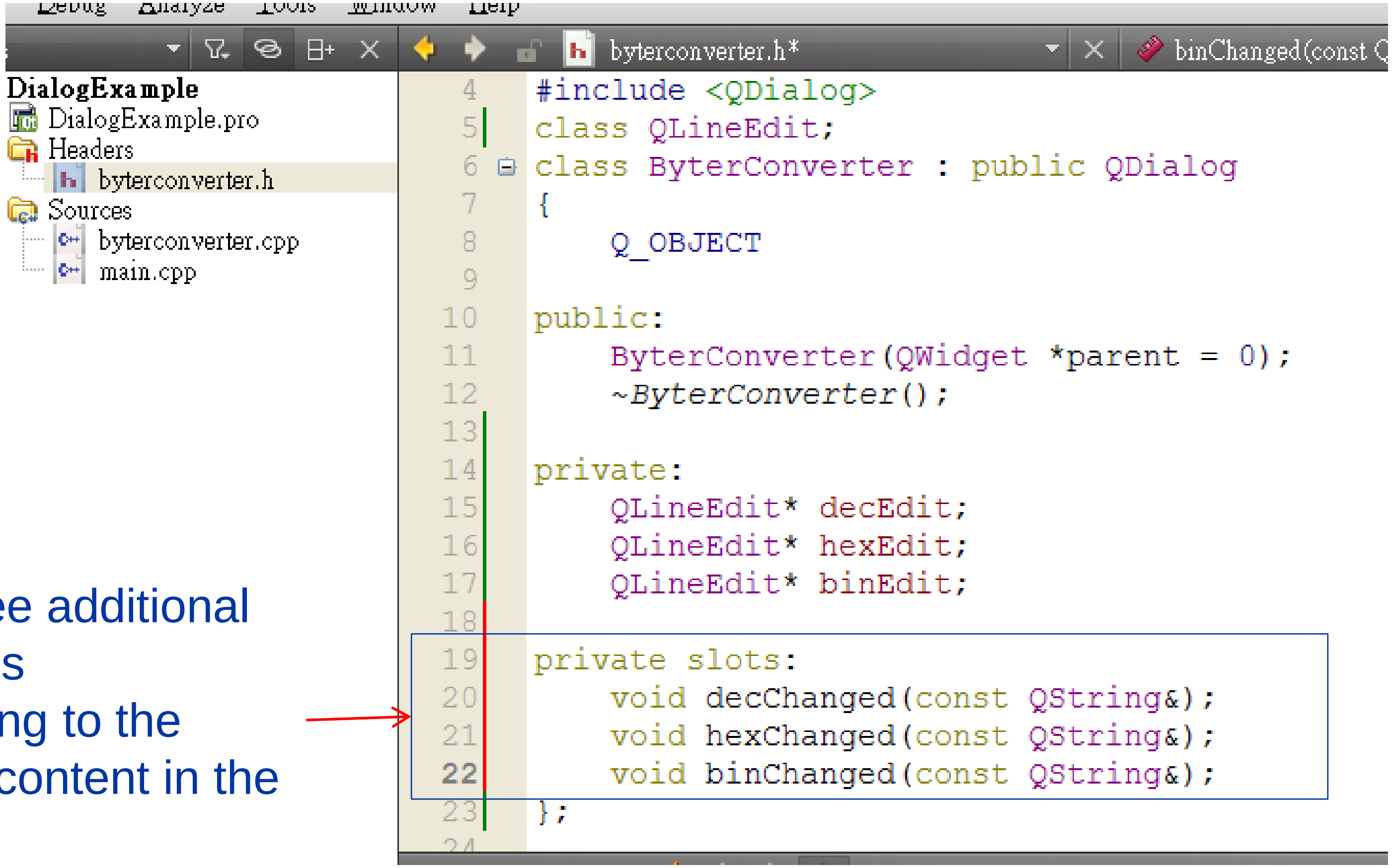
Hex

Binary

Try to click on the Exit button!
Do you see any reaction when you click on it?

Qt- Dialog Class

- **Defining customary slot functions:**

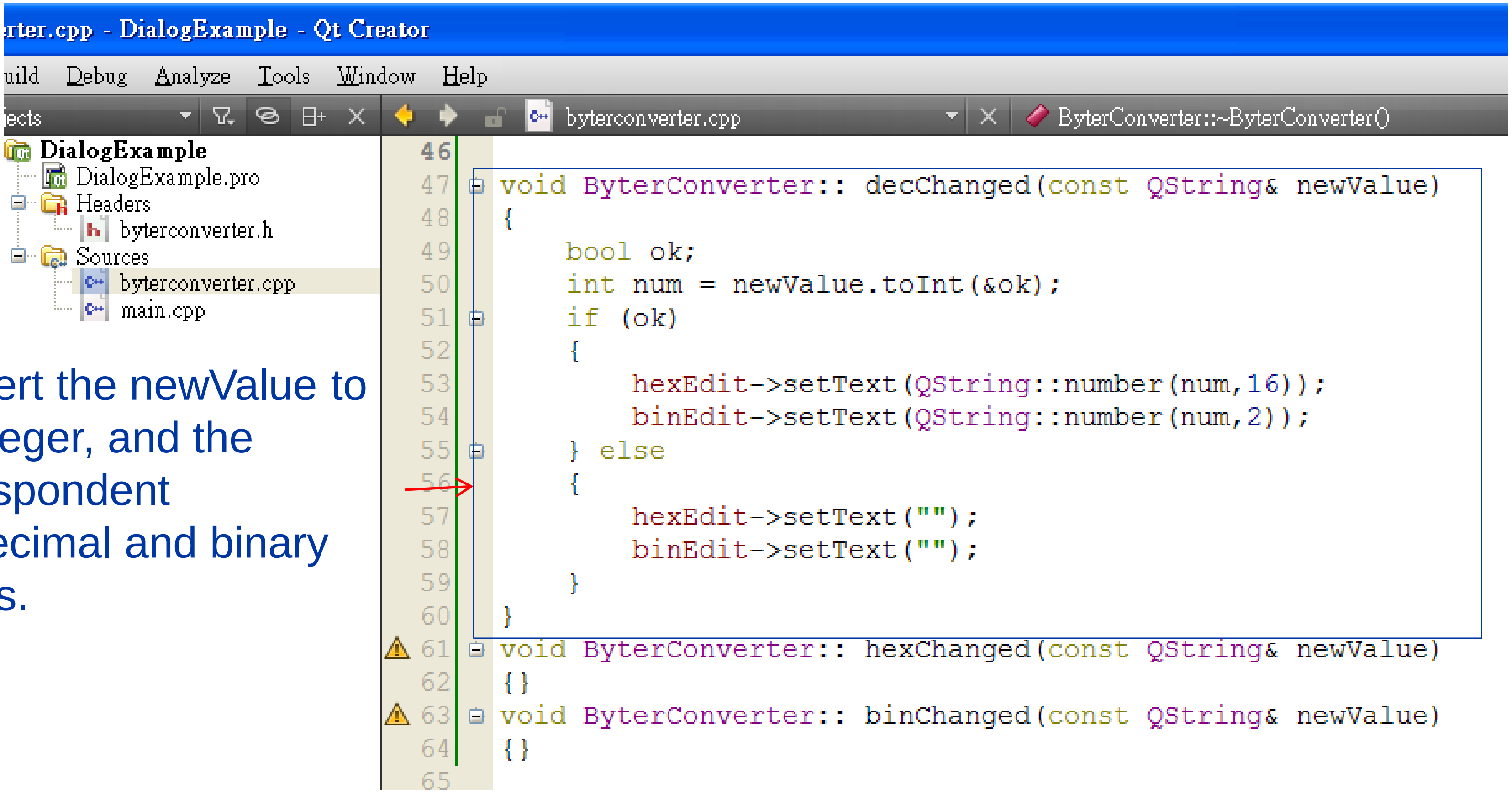


```
#include <QDialog>
class QLineEdit;
class ByterConverter : public QDialog
{
    Q_OBJECT

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

private:
    QLineEdit* decEdit;
    QLineEdit* hexEdit;
    QLineEdit* binEdit;

private slots:
    void decChanged(const QString&);
    void hexChanged(const QString&);
    void binChanged(const QString&);
};
```

Declare three additional slot functions corresponding to the changes of content in the input fields.

Qt- Dialog Class

- **Implement decChanged() slot function:**

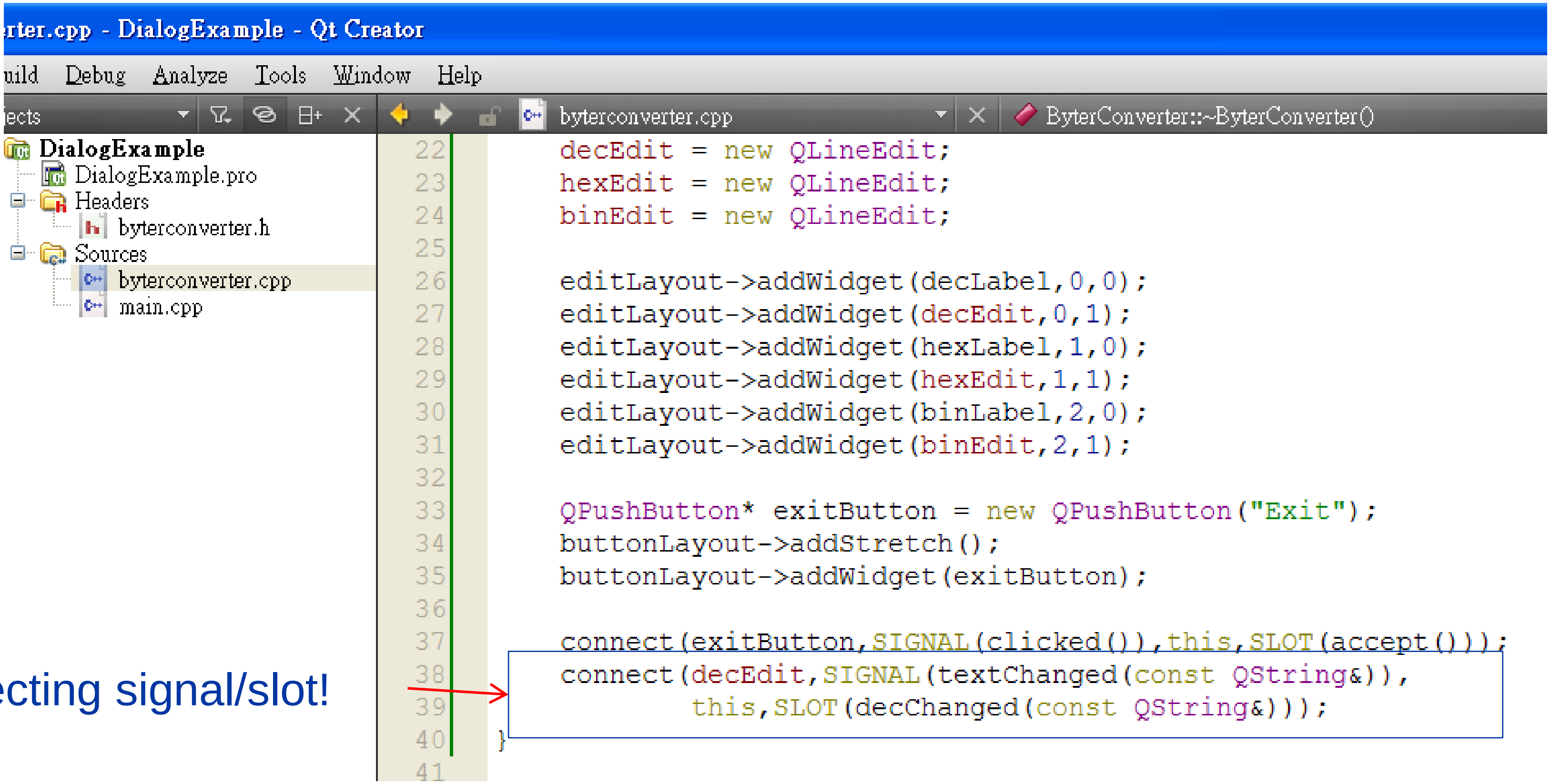


```
void ByterConverter:: decChanged(const QString& newValue)
{
    bool ok;
    int num = newValue.toInt(&ok);
    if (ok)
    {
        hexEdit->setText(QString::number(num,16));
        binEdit->setText(QString::number(num,2));
    } else
    {
        hexEdit->setText("");
        binEdit->setText("");
    }
}
void ByterConverter:: hexChanged(const QString& newValue)
{}
void ByterConverter:: binChanged(const QString& newValue)
{}
```

Convert the newValue to an integer, and the correspondent hexdecimal and binary values.

Qt- Dialog Class

- **Connect decEdit’s textChanged() signal to decChanged() slot function:**

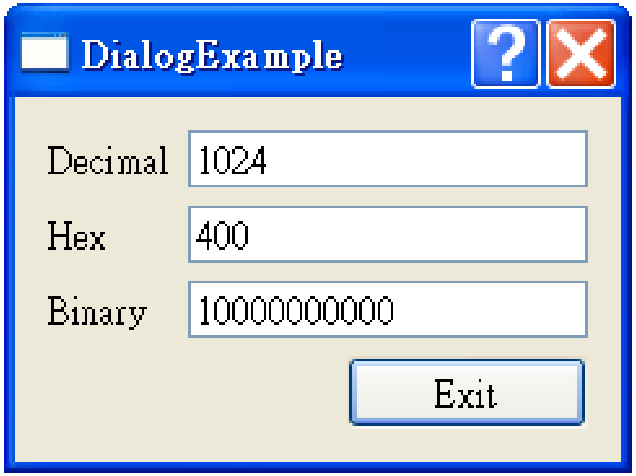


```
    decEdit = new QLineEdit;
    hexEdit = new QLineEdit;
    binEdit = new QLineEdit;

    editLayout->addWidget(decLabel,0,0);
    editLayout->addWidget(decEdit,0,1);
    editLayout->addWidget(hexLabel,1,0);
    editLayout->addWidget(hexEdit,1,1);
    editLayout->addWidget(binLabel,2,0);
    editLayout->addWidget(binEdit,2,1);

    QPushButton* exitButton = new QPushButton("Exit");
    buttonLayout->addStretch();
    buttonLayout->addWidget(exitButton);

    connect(exitButton,SIGNAL(clicked()),this,SLOT(accept()));
    connect(decEdit,SIGNAL(textChanged(const QString&)),
            this,SLOT(decChanged(const QString&)));
}
```

Connecting signal/slot!

Qt- Dialog Class

- **Build and run the project:**



Decimal 1024

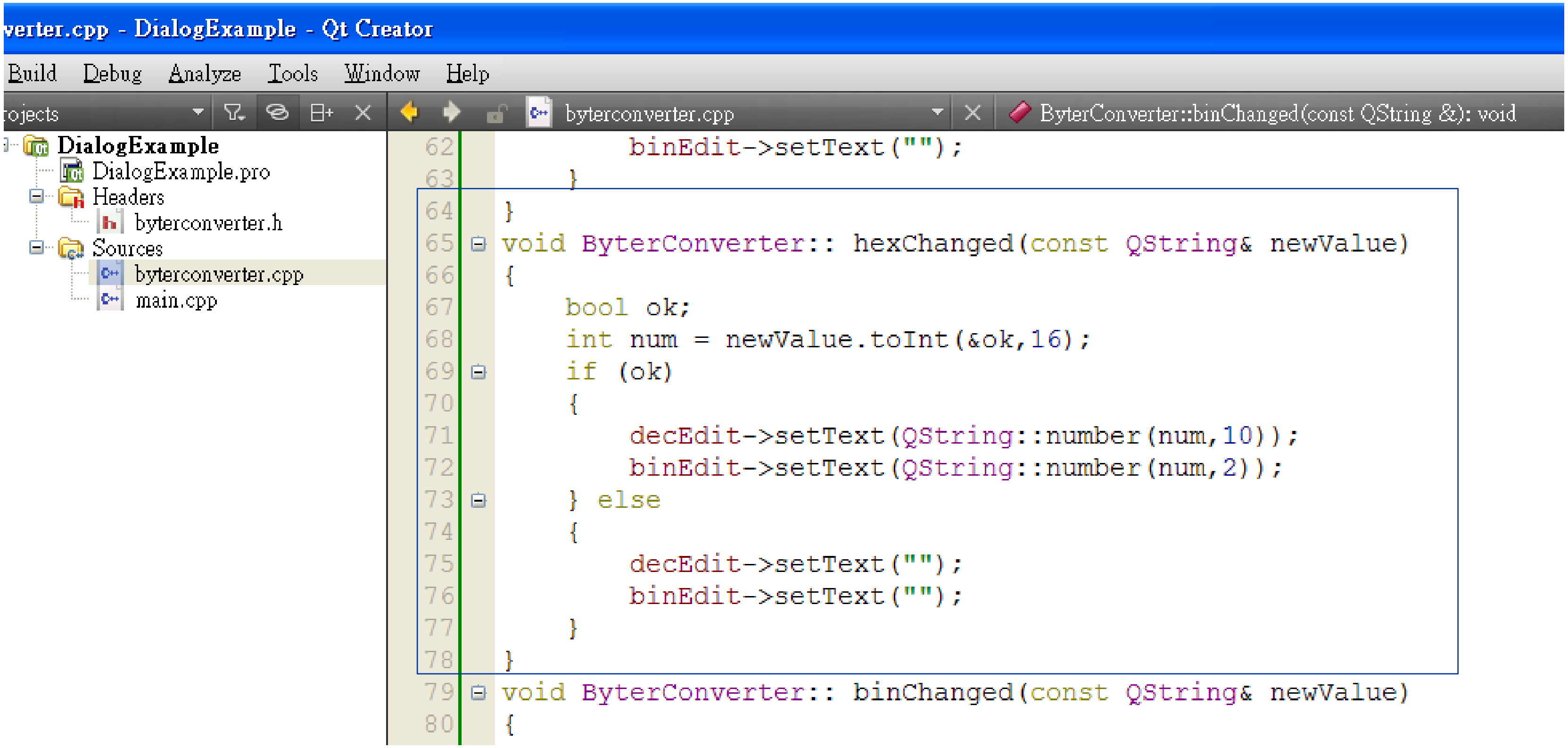
Hex 400

Binary 10000000000

Key in some decimal integer to the decEdit field and see if automatic hexdecimal and binary values apear in the other two fields.

Qt- Dialog Class

- **Implement hexChanged() slot function:**



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ojects
byterconverter.cpp
ByterConverter::binChanged(const QString &): void
DialogExample
DialogExample.pro
Headers
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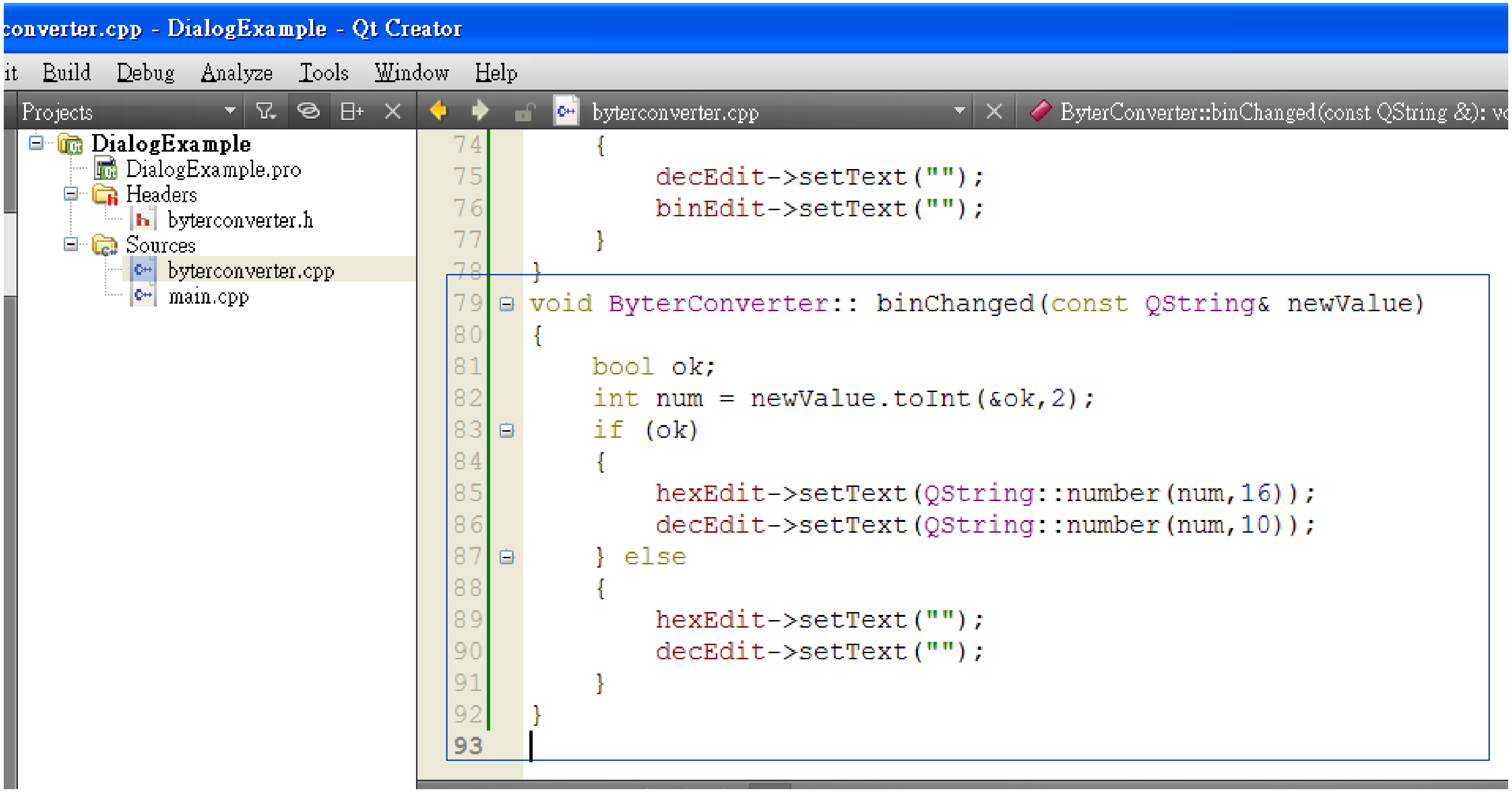
main.cpp

```
            binEdit->setText("");
        }
}
void ByterConverter:: hexChanged(const QString& newValue)
{
    bool ok;
    int num = newValue.toInt(&ok,16);
    if (ok)
    {
        decEdit->setText(QString::number(num,10));
        binEdit->setText(QString::number(num,2));
    } else
    {
        decEdit->setText("");
        binEdit->setText("");
    }
}
void ByterConverter:: binChanged(const QString& newValue)
{
```

Qt- Dialog Class

- **Implement binChanged() slot function:**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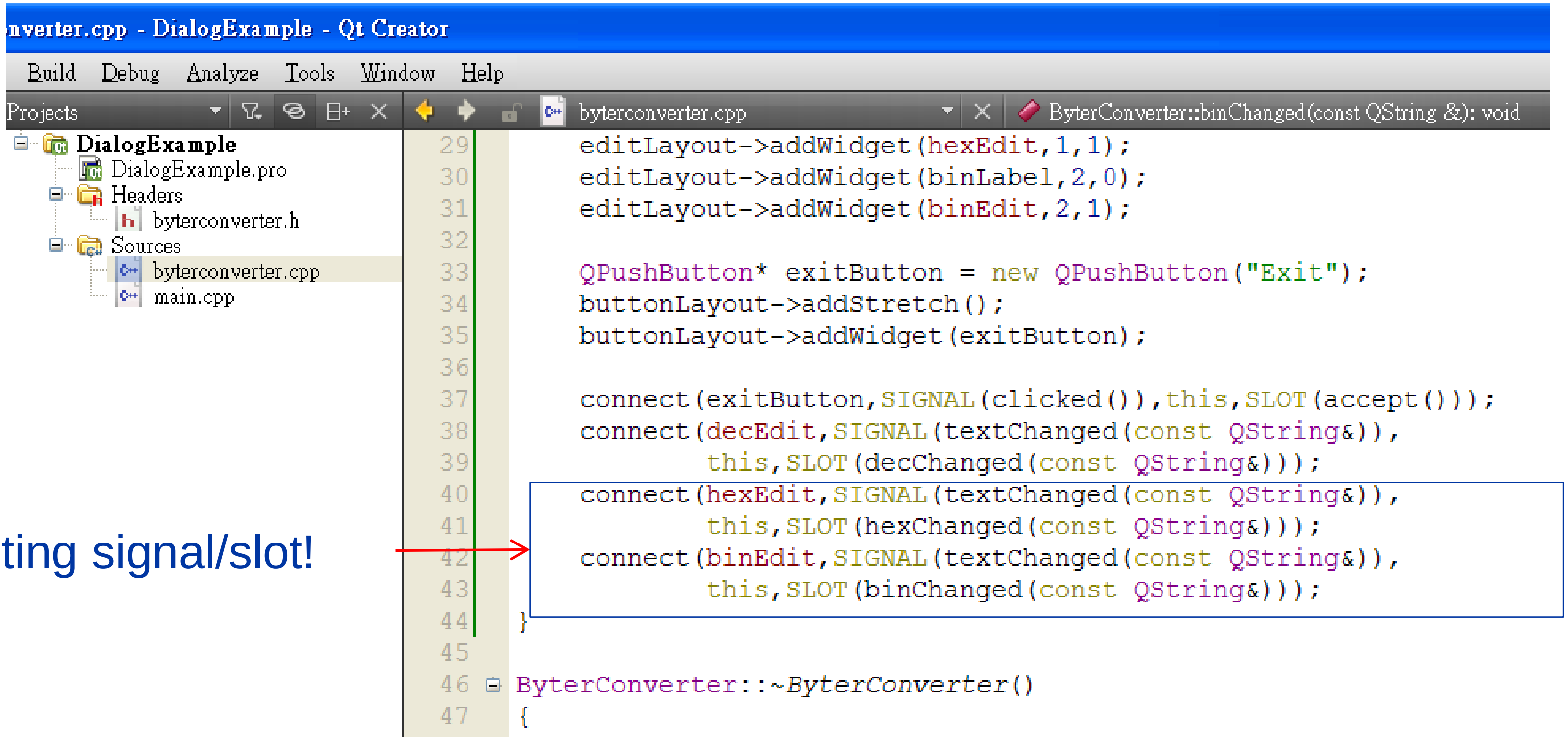
ByterConverter::binChanged(const QString &): v
DialogExample
DialogExample.pro
Headers
byterconverter.h
Sources
byterconverter.cpp
main.cpp

```
    {
        decEdit->setText("");
        binEdit->setText("");
    }
}
void ByterConverter:: binChanged(const QString& newValue)
{
    bool ok;
    int num = newValue.toInt(&ok,2);
    if (ok)
    {
        hexEdit->setText(QString::number(num,16));
        decEdit->setText(QString::number(num,10));
    } else
    {
        hexEdit->setText("");
        decEdit->setText("");
    }
}
```

Qt- Dialog Class

- **Connect the remaining signal/slot functions:**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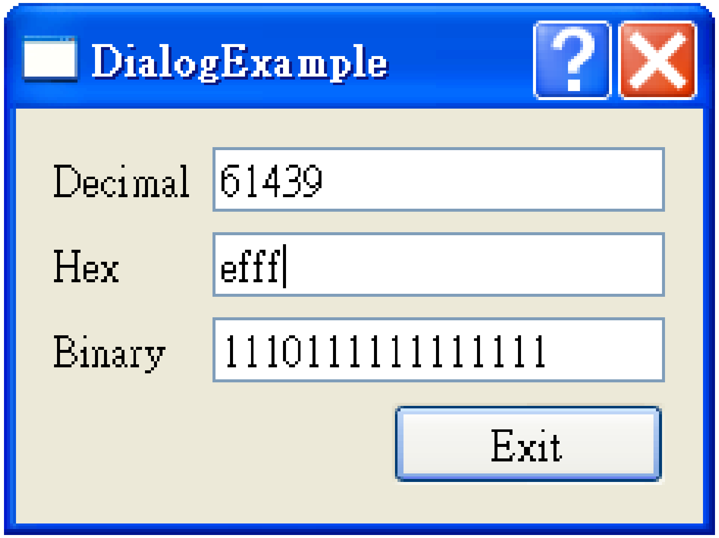
Projects
byterconverter.cpp
ByterConverter::binChanged(const QString &): void
DialogExample
DialogExample.pro
Headers
byterconverter.h
Sources
byterconverter.cpp
main.cpp

```
    editLayout->addWidget(hexEdit,1,1);
    editLayout->addWidget(binLabel,2,0);
    editLayout->addWidget(binEdit,2,1);

    QPushButton* exitButton = new QPushButton("Exit");
    buttonLayout->addStretch();
    buttonLayout->addWidget(exitButton);

    connect(exitButton,SIGNAL(clicked()),this,SLOT(accept()));
    connect(decEdit,SIGNAL(textChanged(const QString&)),
            this,SLOT(decChanged(const QString&)));
    connect(hexEdit,SIGNAL(textChanged(const QString&)),
            this,SLOT(hexChanged(const QString&)));
    connect(binEdit,SIGNAL(textChanged(const QString&)),
            this,SLOT(binChanged(const QString&)));
}

ByterConverter::~ByterConverter()
{
```

Connecting signal/slot!

Qt- Dialog Class

- **Build and run the project:**



DialogExample

Decimal 61439

Hex efff

Binary 1110111111111111

Key in some integer to the any of three input fields and see if automatic conversion of integer values occurs in the other two fields.