



BIOPHOTONICS & BIOIMAGING LABORATORY

Qt Lesson 1

Lisa Tsai @ 2017 Summer

NTUBIME Lab405

上課之前

1

安裝Visual Studio 2015

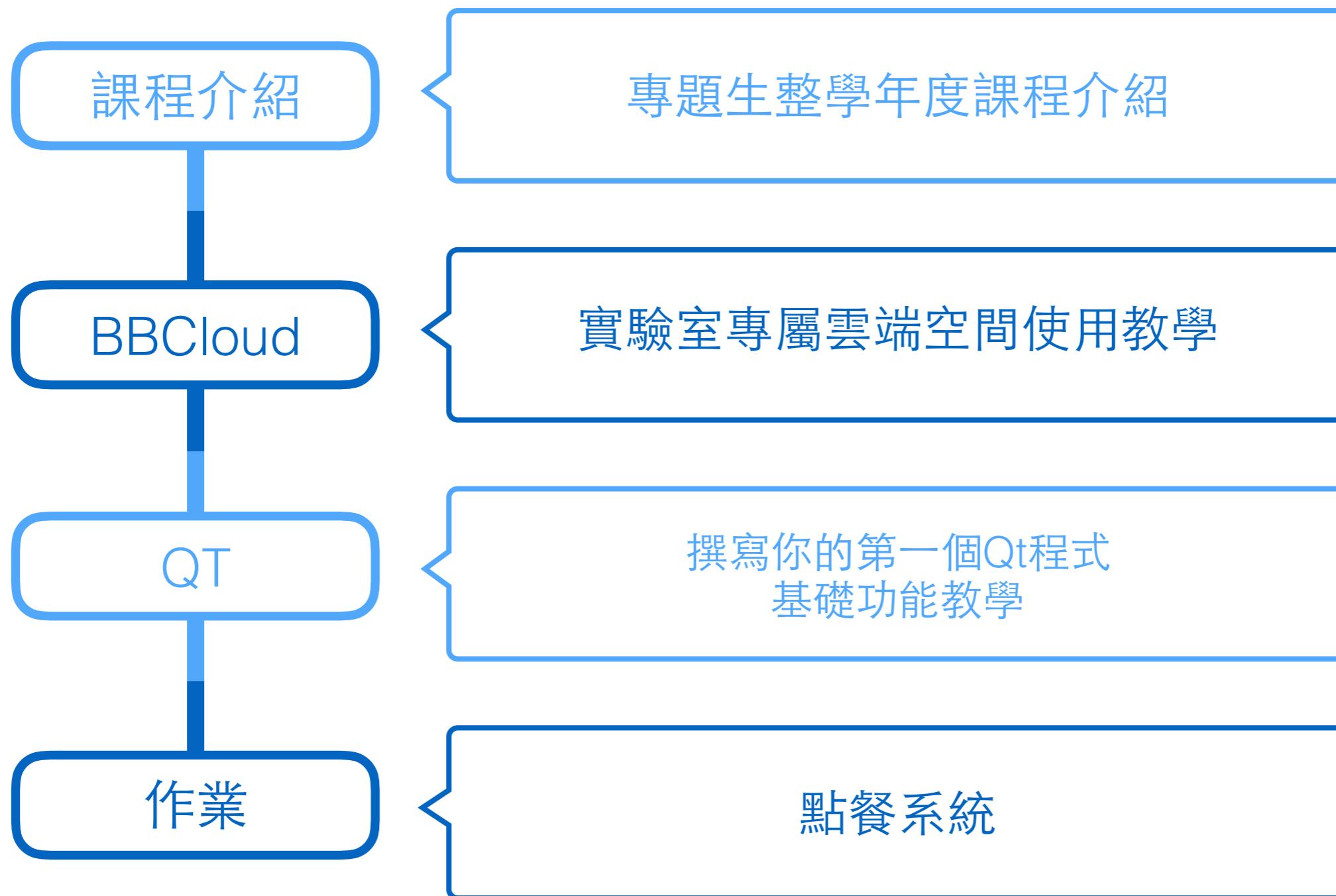
2

安裝Qt 5.9

3

下載這份投影片

Schedule



課程介紹

專題生整學年度課程介紹



BIOPHOTONICS & BIOIMAGING LABORATORY

生物光電暨生物影像實驗室

研究領域

機器視覺

機器人

生物觀測

非破壞性檢測

核心能力

影像處理

程式設計

CAD機構設計

機電整合

機器視覺

訓練與生活

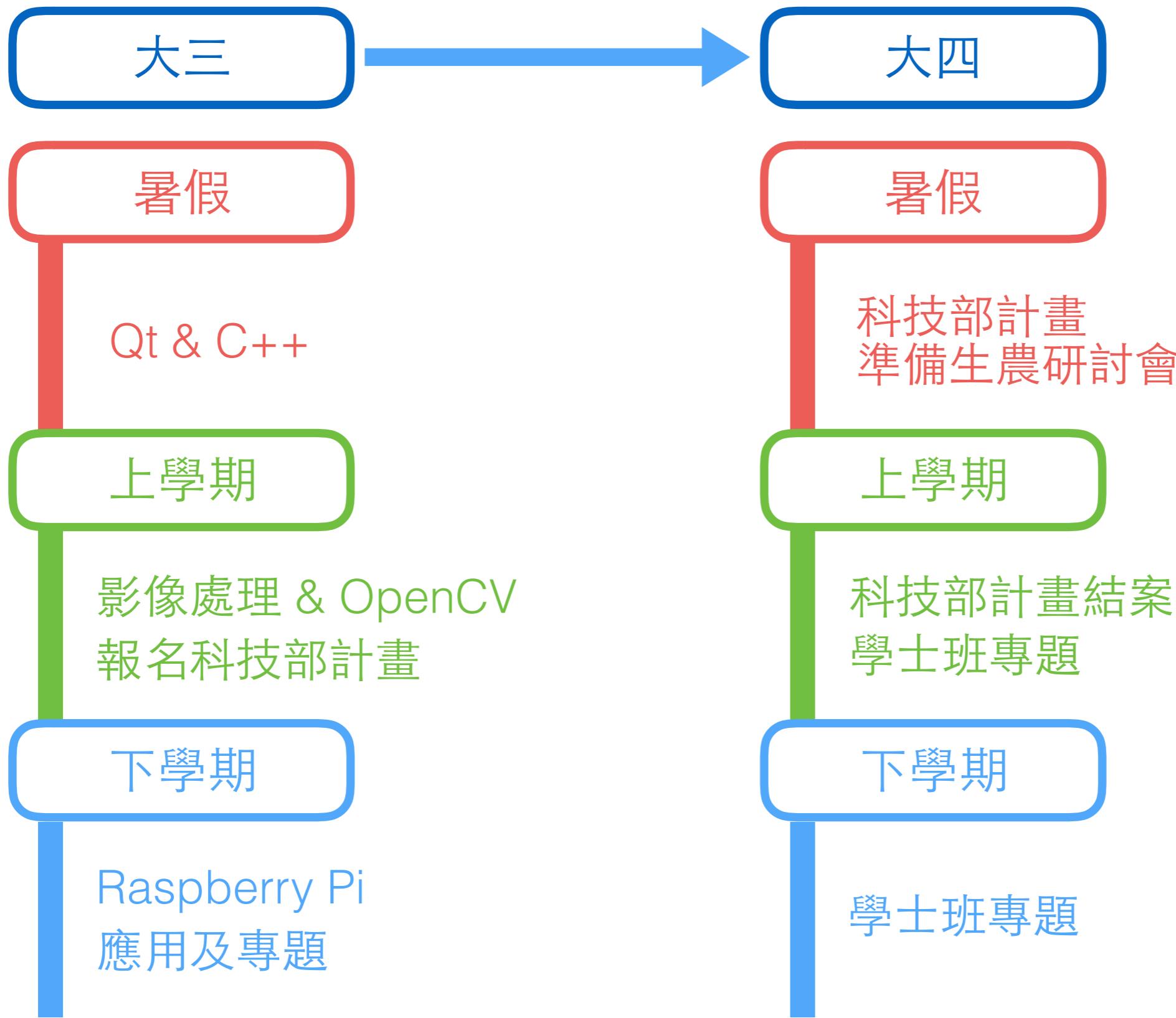
進階程式語言

影像處理

嵌入式系統

聚餐 & 競賽

訓練課程



Qt 課程

	日期	課程	作業
week 1	7/4	Qt 環境架設 & GUI 簡單介紹	點餐系統
week 2	7/25	Qt 基礎練習 / widget 介紹	會員集點
week 3	8/1	Github / SourceTree	上傳前兩次作業
week 4	8/8	Gitbook 專案管理 / 共同編輯 / 同步 / 版本控制	fork 及修改別人的專題
week 5	8/15	指標、初階物件導向應用	
week 6	8/22	進階物件導向程式設計	打磚塊
week 7	8/29	Qt IO system 功能介紹	CSV資料處理
week 8	9/5	Qt QImage & QTimer 介紹	計時器或小畫家
week 9	9/12	Qt 多執行緒程式撰寫	滑鼠控制事件
week 10	9/19	使用常見函式庫 qcustomplot / OpenCV 基礎介紹	資料處理及統計
week 11	9/26	專題輔導	
week 12	10/3	專題輔導	
week 13	10/11	專題輔導	
week 14	10/17	專題報告	專題

BBLabCloud

實驗室專屬雲端空間使用教學



BIPHOTONICS & BIOIMAGING LABORATORY

BBLab Quick Guide

Context

- * BBLab
- * After Entering
- * Change your Profile
- * Sharing and Comments
- * Resources
- * Search
- * More about Files

BBLab

- * BBLab :
<https://bblabcloud.bime.ntu.edu.tw/index.php/login>
- * Account / Password : 兩個都是學號
- * 請到學校信箱改密碼

After Entering

The screenshot shows a file management interface with a red header bar. The header includes a logo, a 'Files' dropdown, a search icon, and a user name '蔡雨錡'. On the left, there's a sidebar with links for 'All files', 'Recent', 'Favorites', 'Shared with you', 'Shared with others', 'Shared by link', and 'Tags'. Below the sidebar, a 'Deleted files' section is visible. The main area displays a list of files and folders:

	Name	Size	Modified
	Documents	77 KB	seconds ago
	lab resources	512.4 GB	5 days ago
	Photos	2.3 MB	seconds ago
	share resources	149.6 GB	5 days ago
	Nextcloud.mp4	452 KB	seconds ago
	Nextcloud Manual.pdf	3.9 MB	seconds ago

At the bottom of the main list, it says '4 folders and 2 files' and '662 GB'.

Change your Profile



Personal ▾

蔡雨錡 ▾

Personal info

Sessions

App passwords

Sync clients

Activity

Federated Cloud

Second-factor backup codes

Profile picture



png or jpg, max. 20 MB

Full name

蔡雨錡

Phone number

Your phone number

Website

Your website

Email

r05631012@ntu.edu.tw

For password recovery and notifications

Address

Your postal address

Twitter

Your Twitter handle

Groups

You are member of the following groups:

Current Lab Member

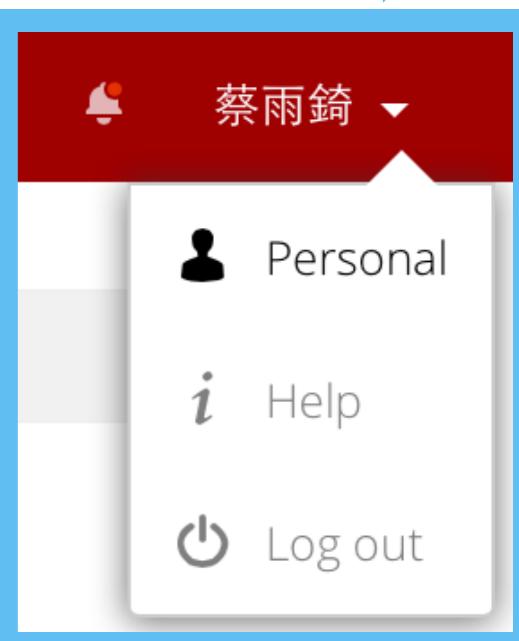
Password

.....

New password



Change password



Create your Files

The screenshot illustrates the Nextcloud interface for managing files and media.

Top Bar: Shows the "Files" tab selected (highlighted by a blue arrow), a search icon, a notifications icon, and a user profile for "蔡雨錡".

Left Sidebar: Includes links for "All files", "Recent", "Favorites", "Shared with you", "Shared with others", "Shared by link", "Tags", and "Deleted files".

File Creation Modal: A modal window is open, showing options to "Upload", "Folder", "Text file", "Document", "Spreadsheet", and "Presentation".

File List: Displays a list of files and folders. The first item is "Nextcloud.mp4" (video). The second item is "Nextcloud Manual.pdf" (PDF). The total storage usage is listed as 662 GB.

Bottom Navigation: Shows a "Personal" section with "Files", "Activity", and "Gallery" (highlighted by a green arrow). It also includes an "Announce..." button and a megaphone icon.

Gallery View: A preview window shows a grid of photos from the "lab photos" folder, with the caption "4 folders and 2 files".

Sharing and Comments

File list:

Name	Size	Modified
Documents	77 KB	15 minutes ago
lab resources	512.4 GB	5 days ago
Photos	2.3 MB	15 minutes ago
Research	0 KB	seconds ago
share resources	149.6 GB	5 days ago
Nextcloud.mp4	452 KB	15 minutes ago
Nextcloud Manual.pdf	3.9 MB	15 minutes ago

Total: 5 folders and 2 files | Total Size: 662 GB

Sharing details for Research folder:

User	Role	Last Activity
r0	i	
R r01454014		
R r01631024		
R r01631026		
R r01631031		
R r02631002		

Resources (1)

The screenshot shows a file sharing interface with a sidebar on the left and a main content area on the right.

Sidebar:

- share resources (selected, highlighted in blue)
- applications (highlighted with a red arrow)
- document
- e-books (highlighted with a blue arrow)
- embedded system
- photo
- programming
- reference
- video

Main Content Area:

Applications View (share resources > applications > scientific (科學軟體) > Matlab):

Name	Size	Modified
Mathworks.Matlab.R2009b	4.7 GB	7 months ago
Matlab 2011a	3.4 GB	7 months ago
Matlab 2013a	5.8 GB	7 months ago
Matlab 2015a	7.1 GB	7 months ago

e-books View (share resources > e-books):

Name	Size	Modified
Computer Vision Algorithms and Applications	143.6 MB	7 months ago
Machine_Learning	1.4 GB	5 days ago
os	897.3 MB	7 months ago
Pattern_Recognition	2.7 GB	5 days ago
Robot	311 KB	7 months ago
Signal Processing	4.6 GB	7 months ago

Total Summary:

8 folders 149.6 GB

Resources (2)

The screenshot displays a cloud storage interface with two main sections. On the left, a sidebar lists several folders: 'lab resources' (selected and highlighted in blue), 'bblab vpn', 'bblabcloud essentials', 'course', 'lab photos', 'lab works' (with a large blue arrow pointing to it), and '未整理' (Uncategorized). Below this, it says '6 folders'. On the right, there are two main lists of files. The top list, under 'lab resources > course', contains five items: '2005微處理機', 'biological systems modeling and analysis', 'c++', 'digital image processing', and 'RaspberryPi'. The bottom list, under 'lab resources > lab works', contains ten items: 'Bachelor Students', 'Group Meetings', 'Master Students', 'PhD Students', 'Post Docs', 'Research Assistants', '會議與工作坊', '杜鵑花節', '林達德', and '比賽'. Each item in the lists includes a preview icon, a name, a size, and a modified date.

Name	Size	Modified
2005微處理機	13 KB	3 months ago
biological systems modeling and analysis	259 KB	7 months ago
c++		
digital image processing		
RaspberryPi		
Bachelor Students	847.4 MB	11 days ago
Group Meetings	22.9 GB	4 months ago
Master Students	434.1 GB	5 days ago
PhD Students	54.6 GB	6 months ago
Post Docs		
Research Assistants		
會議與工作坊		
杜鵑花節		
林達德		
比賽		

Search

The screenshot shows a search interface with a red header bar. In the center is a search input field containing the word "Matlab". To the left of the search field are icons for home and add. To the right are icons for notifications and user profile, with the name "蔡雨錡" and a dropdown arrow. Below the header is a blue navigation bar with icons for file operations. The main content area displays search results for "Matlab" across various folders. Each result is shown with a small icon, the file name, and its path. There are 30 search results in total.

30 search results in other folders

- Mathworks Matlab R2015a x64.7z.005
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2015a/Mathworks Matlab R2015a x64.7z.005
- 09.23.06.Mathworks.Matlab.R2006b-ACMEiSO
share/resources/applications/programming (程式設計) /09.23.06.Mathworks.Matlab.R2006b-ACMEiSO
- Matlab_R2009b_crack.rar
share/resources/applications/scientific (科學軟體) /Matlab/Mathworks.Matlab.R2009b/Matlab_R2009b_crack.rar
- Matlab_2013a.part3.rar
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2013a/Matlab_2013a.part3.rar
- Mathworks Matlab R2015a x64.7z.001
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2015a/Mathworks Matlab R2015a x64.7z.001
- Matlab_2013a.part4.rar
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2013a/Matlab_2013a.part4.rar
- MATLAB_2011a_x64.part3.rar
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2011a/MATLAB_2011a_x64.part3.rar
- Matlab 2013a
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2013a
- Mathworks Matlab R2015a x64.7z.004
share/resources/applications/scientific (科學軟體) /Matlab/Matlab 2015a/Mathworks Matlab R2015a x64.7z.004
- Mathworks Matlab R2015a x64.7z.010

More about Files

1. Click Details

Name	Size	Modified
Kurmar-2015-Face%20Recognition%20for%20Catt...	1.2 MB	5 days ago
TrungKienDao-2015-AUTOMATIC%20... .pdf	677 KB	5 days ago

2 files

2. Click Tags

3. Type your Tag

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Department of Computer Science and Engineering, FET, SSTC, SSGI, Bhilai, India
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Abstract - Global standards for cattle recognition, registration and traceability are being developed. However missed or swapped cattle, false insurance claims and reallocation of cattle at slaughter houses are global problems throughout the world. Previous cattle recognition approaches have their own boundaries and they are not able to provide required level of security to cattle livestock. In this paper, an attempt has been made to minimize the above mentioned problems by descriptors automatic face recognition of cattle. The proposed multi-resolution algorithm extracts feature through Speeded Up Robust Feature (SURF) and Local Binary Patterns (LBP) from different Gaussian pyramid levels. The feature descriptors obtained at every Gaussian level area unit combined using weighted sum rule fusion techniques. The proposed algorithm yields rank-1 identification accuracy of 92.5 % on a cattle face database of 1200 cattle face image (120 subjects × 10 face image of each subject). Thus, in this paper, we have tried to demonstrate that identification of cattle based on their cattle face can be used to recognize the cattle and negate the notion that all cattle look alike.

Keywords: Cattle, face recognition, animal identification, RFID, RANSAC.

According to available literature survey of cattle today online (www.cattletodayonline.com), 1.3 billion cattle population of the world is distributed as - 30% of total in Asia, 20% in South America, 15% in Africa, 14% in North Central America and 10% in Europe [4]. Also, a survey of cattle population states that every year around 14,121 million cattle are slaughtered for feeding in USA (January 1, 2012) [5]. All these facts emphasize the requirement of an automatic and robust identification scheme.

Animal biometrics system utilizes both the variability and uniqueness of vocalizations, coat patterns, body dynamics and their morphologies as biometrics traits [6]. Coat pattern of zebra, tiger, penguin and muzzle point of cattle are the equivalent to the fingerprints of humans.

The motivation of this work is to embark on a

1.2 MB 5 days ago Tags

Face Recognition

Face Recognition

Activities Comments Sharing Versions

You commented Cool

Added system tag Lisa

Added system tag Face Recognition

You created Kurmar-2015-Face%20Recognition%20for%20Catt...

蔡 蔡雨鈞

New comment ...

蔡 蔡雨鈞 Cool

a n

QT

撰寫你的第一個Qt程式
基礎功能教學



BIPHOTONICS & BIOIMAGING LABORATORY

Qt Creator 開新專案 (1/7)

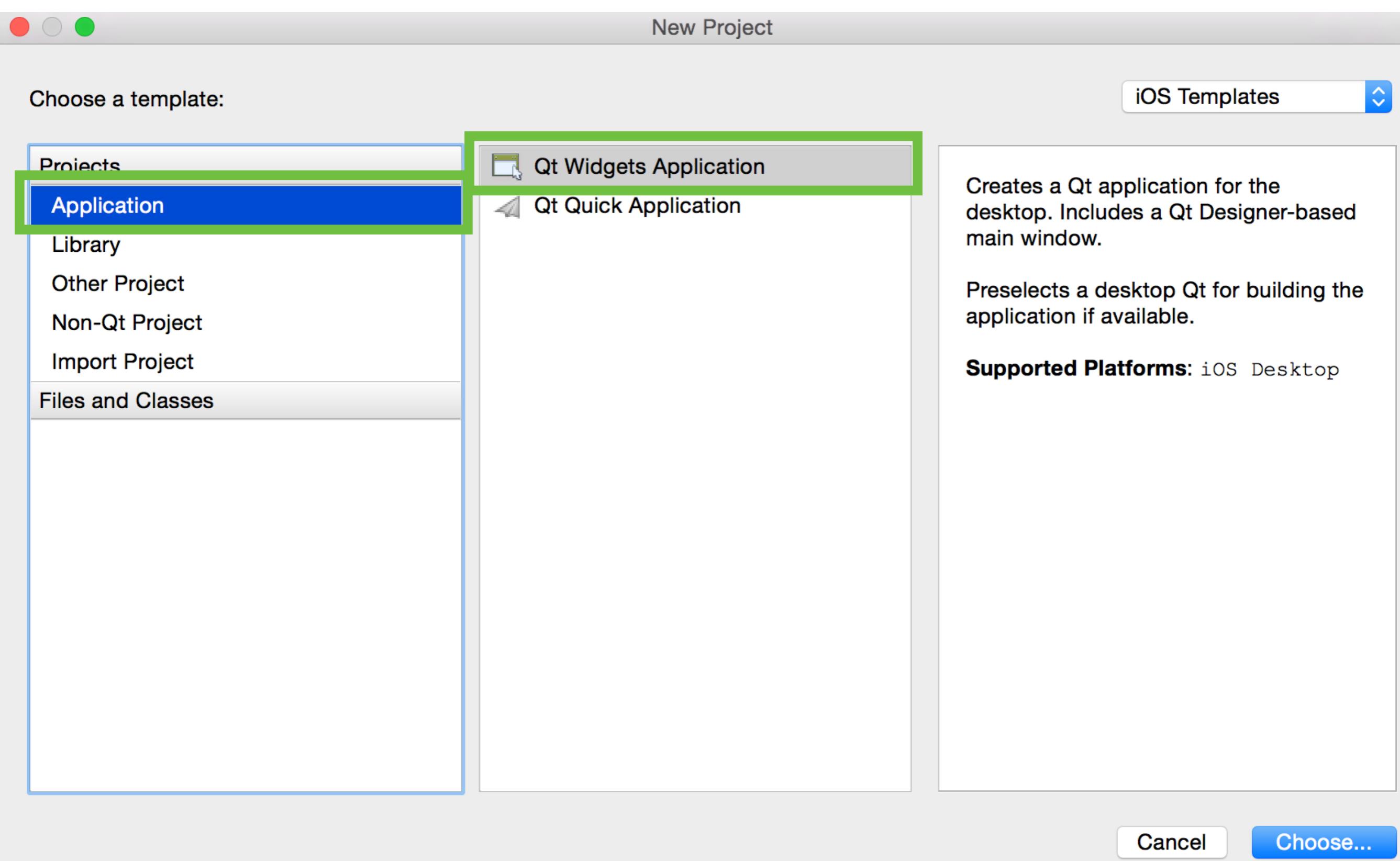
Qt Creator

The screenshot shows the Qt Creator welcome screen. On the left, there's a sidebar with icons for Welcome, Edit, Design, Debug, Projects, Analyze, and Help. The main area has tabs for Projects, Examples, and Tutorials, with 'Projects' being the active tab. A large green button labeled 'New Project' is highlighted. Below it is a 'Sessions' section with 'default (last session)'. To the right is a 'Recent Projects' list containing 14 entries, each with a small Qt icon, the project name, and its path:

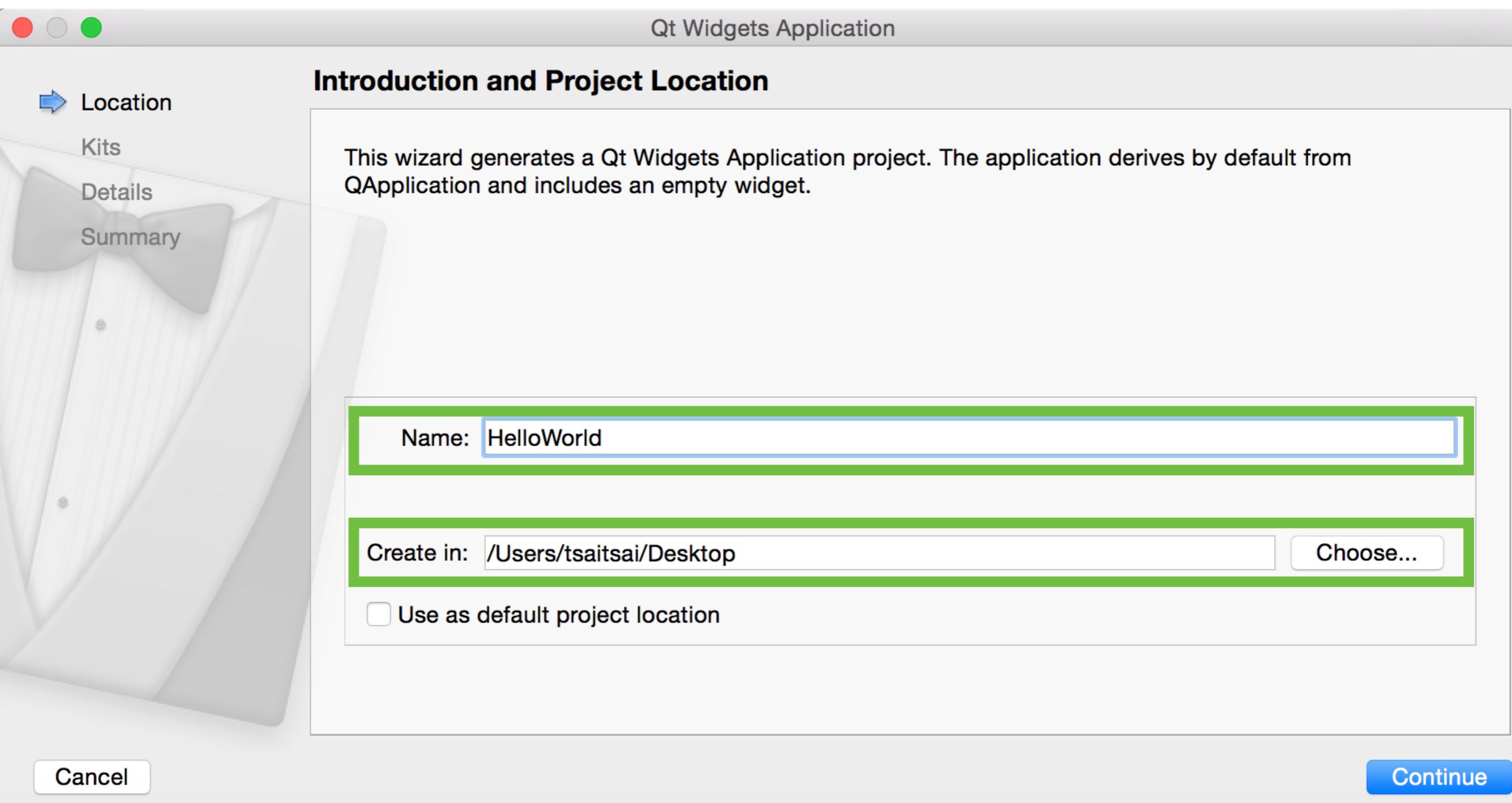
- NVwork2
~/NVwork2/NVwork2.pro
- NVwork2f
~/NVwork2f/NVwork2f.pro
- photosurface
~/Qt/Examples/Qt-5.5/quick/demos/photosurface/photosurface.pro
- templPhw4
~/templPhw4/templPhw4.pro
- painter
~/painter/painter.pro
- FuzzyTest
~/FuzzyTest/FuzzyTest.pro
- QTimer_QThread
~/QTimer_QThread/QTimer_QThread.pro
- Thread
~/Thread/Thread.pro
- QPainter_MouseEvent
~/QPainter_MouseEvent/QPainter_MouseEvent.pro
- icontest
~/icontest/icontest.pro
- StatusBar
~/StatusBar/StatusBar.pro
- calendar
~/Qt/Examples/Qt-5.5/quick/controls/calendar/calendar.pro
- appchooser

At the bottom, there's a search bar 'Type to locate (⌘K)' and a navigation bar with tabs 1 through 6: Issues, Search Results, Application Output, Compile Output, QML/JS Console, and General Messages.

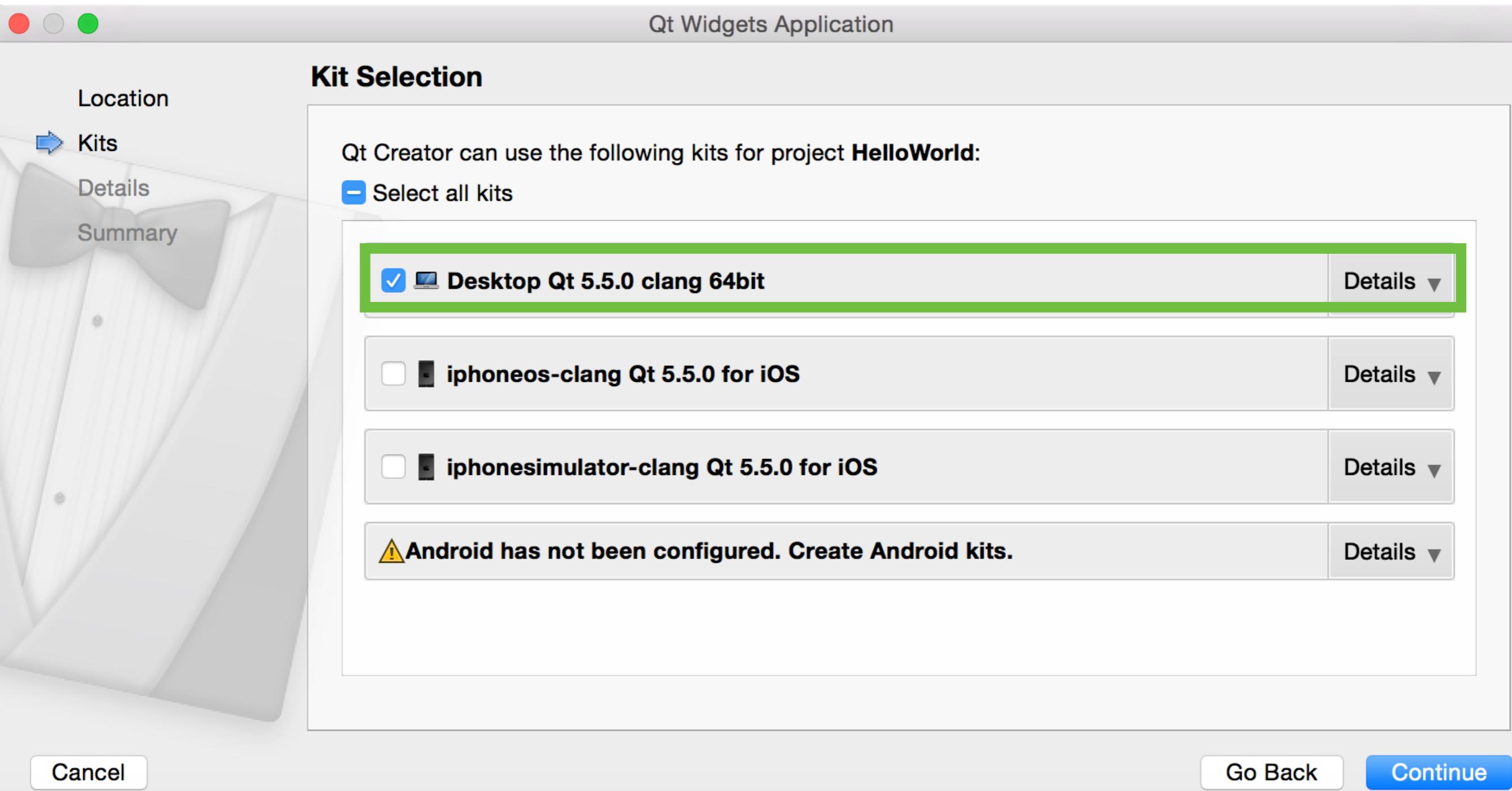
Qt Creator 開新專案 (2/7)



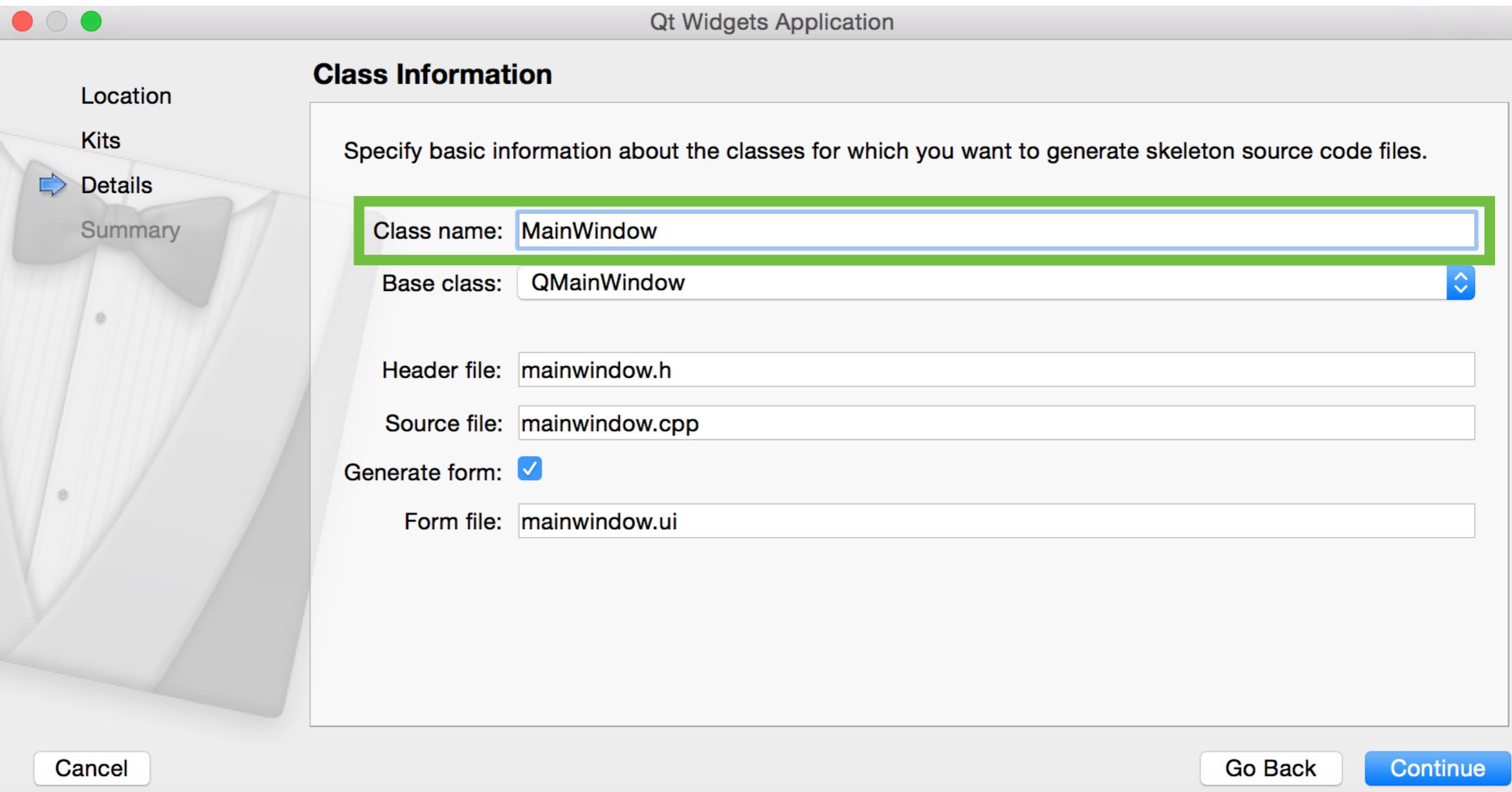
Qt Creator 開新專案 (3/7) - 檔案名稱及位置



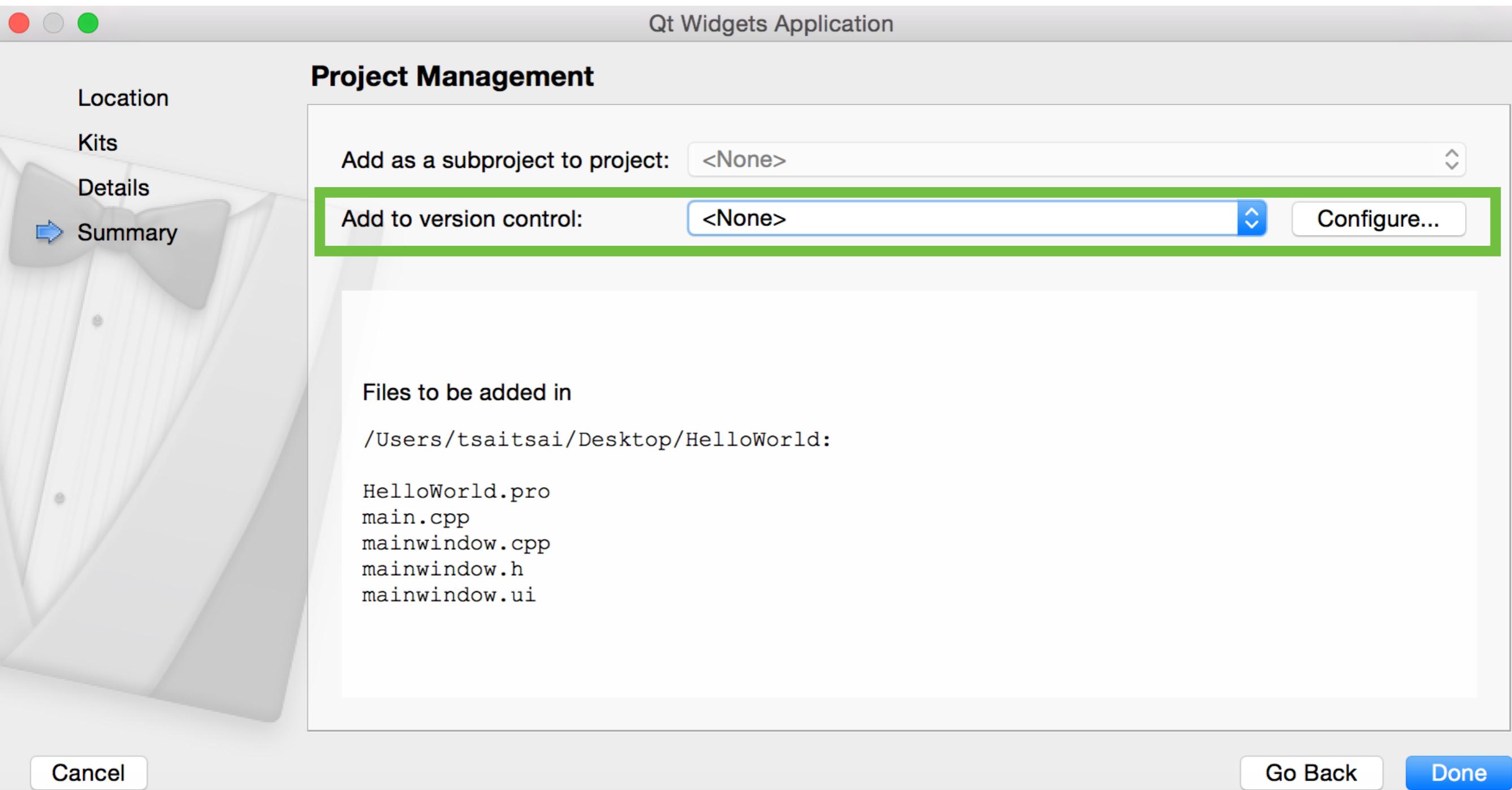
Qt Creator 開新專案 (4/7) - 選擇 Kit 版本



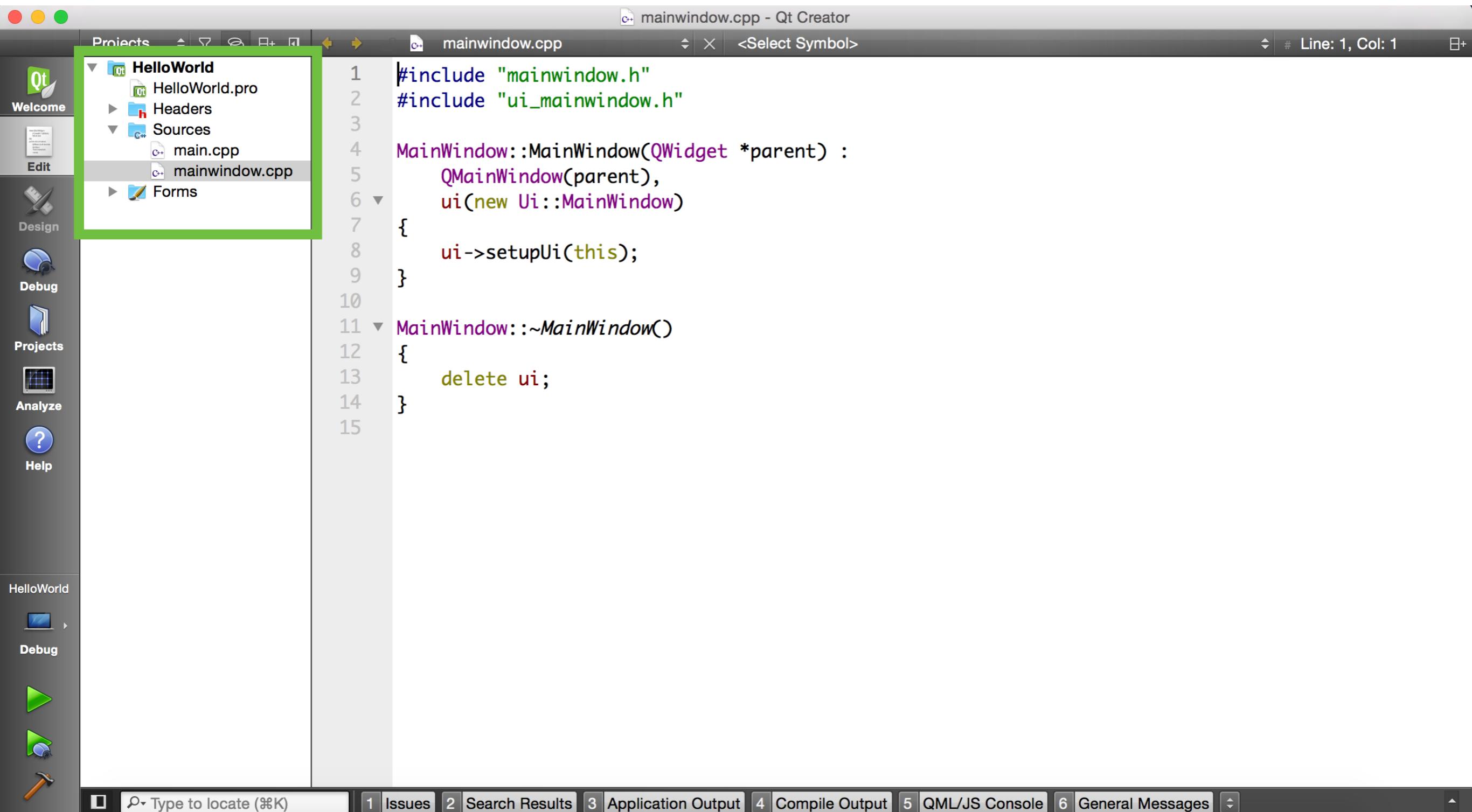
Qt Creator 開新專案 (5/7) - Class 命名



Qt Creator 開新專案 (6/7) - 版本控制



Qt Creator 開新專案 (7/7) - Get Started !



main.cpp

```
#include "mainwindow.h"
#include <QApplication>      //每個Qt GUI 應用程式必要的東西

int main(int argc, char *argv[])
{
    QApplication a(argc, argv);    //管理gui 物件控制流程和主要設定選項
    MainWindow w;                //視窗宣告
    w.show();                     //顯示視窗
    return a.exec();              //跳回主事件迴圈，直到程式呼叫exit()、quit() 或關閉視窗
}
```

mainwindow.h

```
#ifndef MAINWINDOW_H
#define MAINWINDOW_H

#include <QMainWindow>

namespace Ui {
class MainWindow;
}

class MainWindow : public QMainWindow //公開繼承QMainWindow 類別
{
    Q_OBJECT

public:
    explicit MainWindow(QWidget *parent = 0); //explicit :: 為了避免QWidget 被系統轉換成 MainWindow Object, default = 0
    ~MainWindow();

private:
    Ui::MainWindow *ui;
};

#endif // MAINWINDOW_H
```

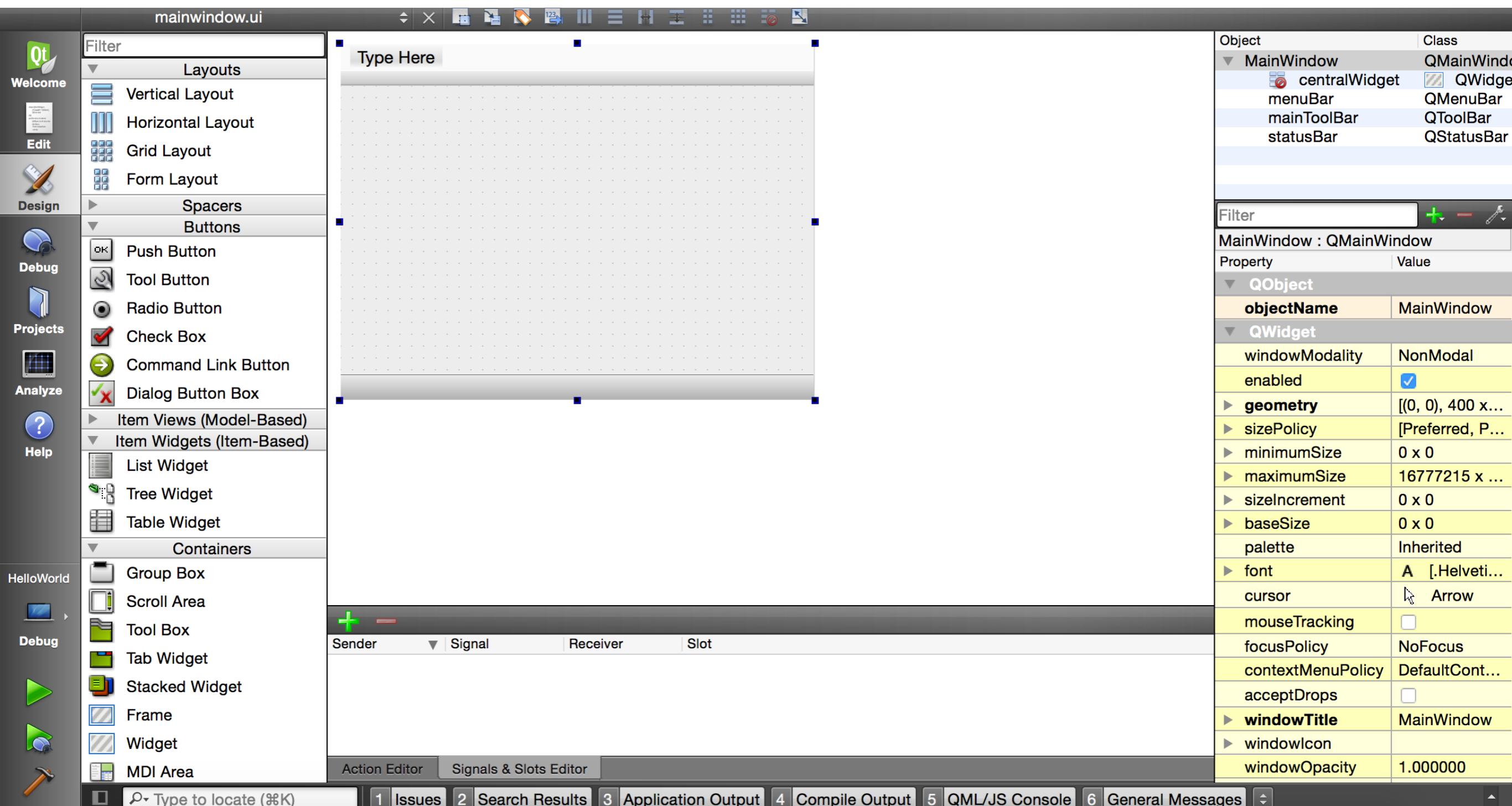
mainwindow.cpp - 主要程式撰寫區

```
#include "mainwindow.h"
#include "ui_mainwindow.h"

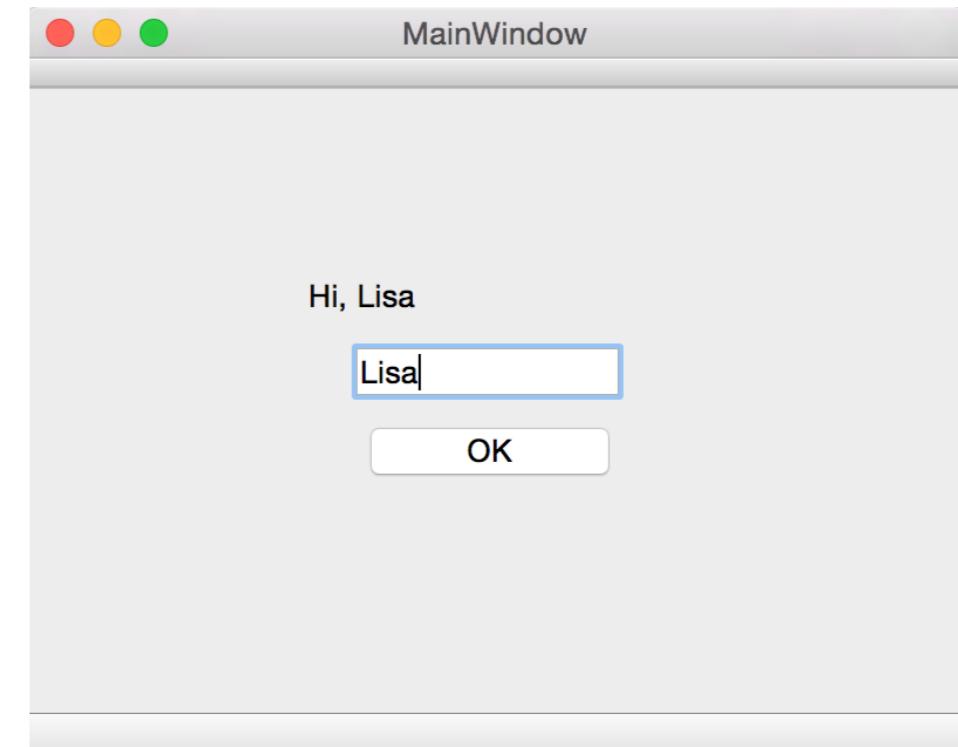
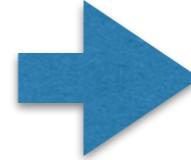
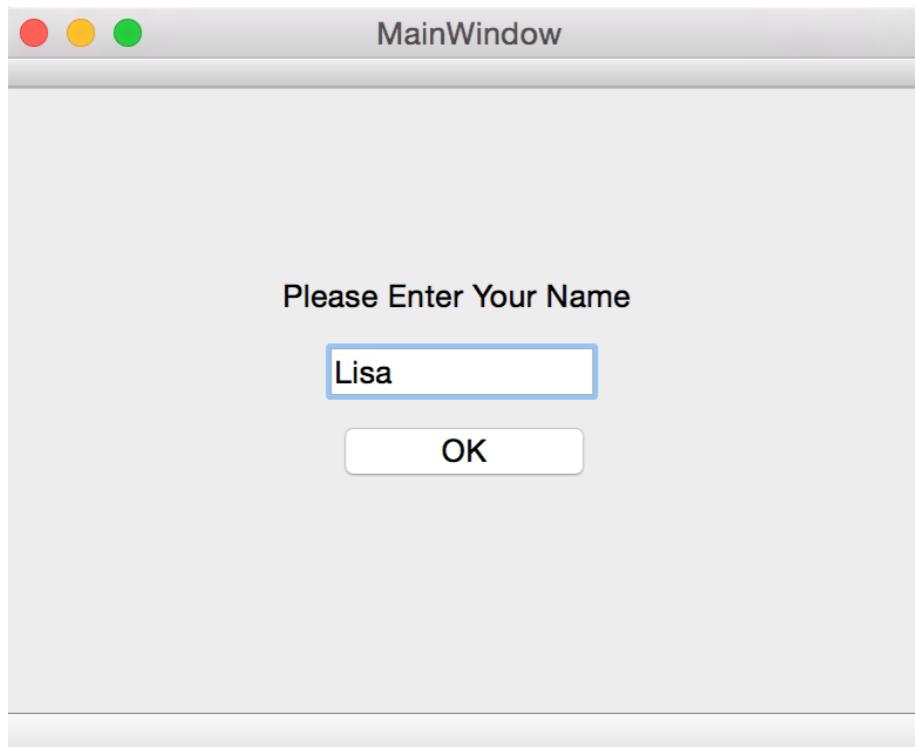
MainWindow::MainWindow(QWidget *parent) :
    QMainWindow(parent)
//    ui(new Ui::MainWindow)
{
    ui = new Ui::MainWindow();
    ui->setupUi(this);           //啟動mainwindow時會初始化的部分，程式中需要初始化的東西也可以放在這裡
}

MainWindow::~MainWindow()
{
    delete ui;                  //關閉mainwindow時，需要刪除東西或是釋放記憶體空間等等
}
```

mainwindow.ui - 設計介面

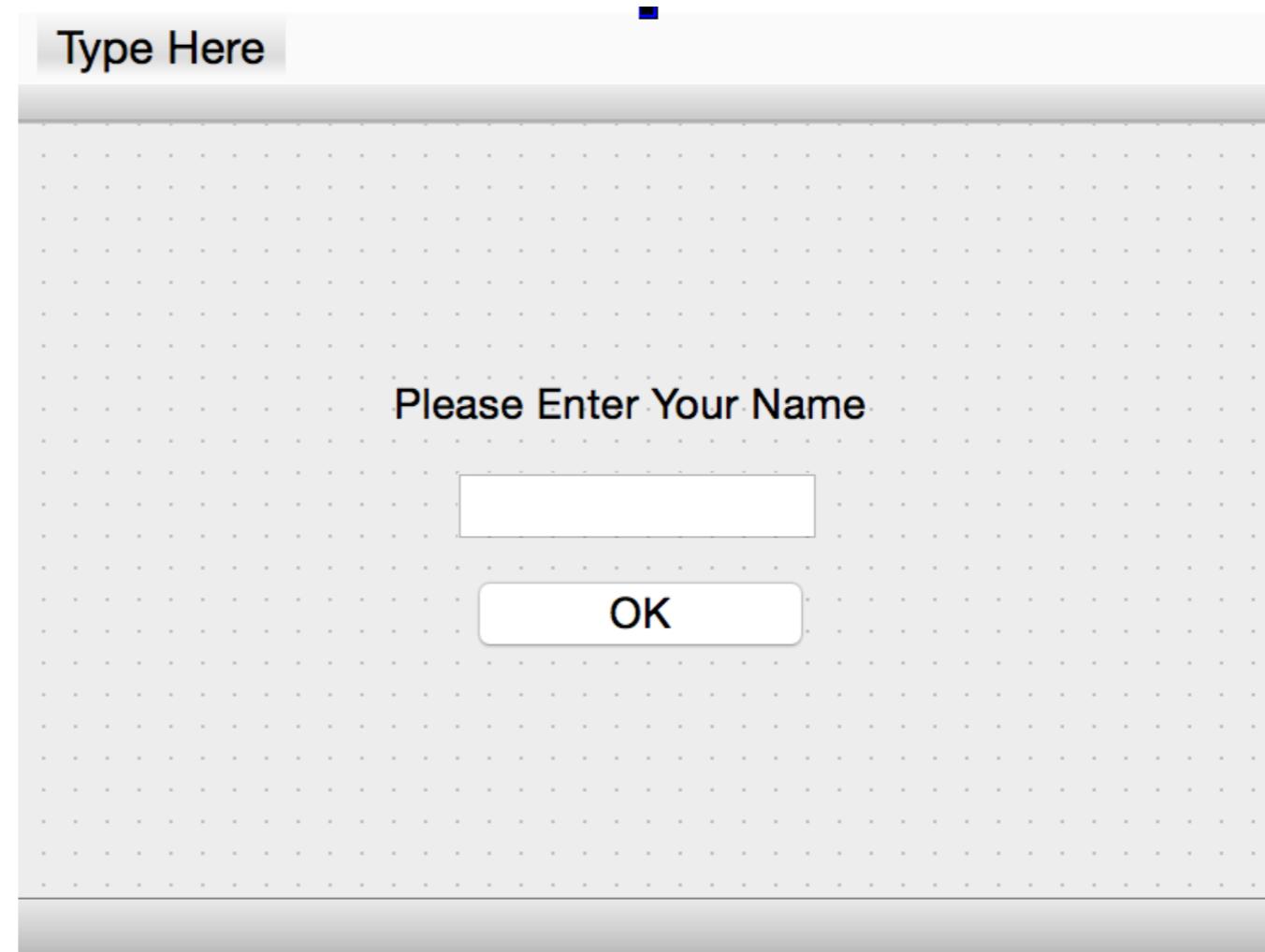


Hello World !

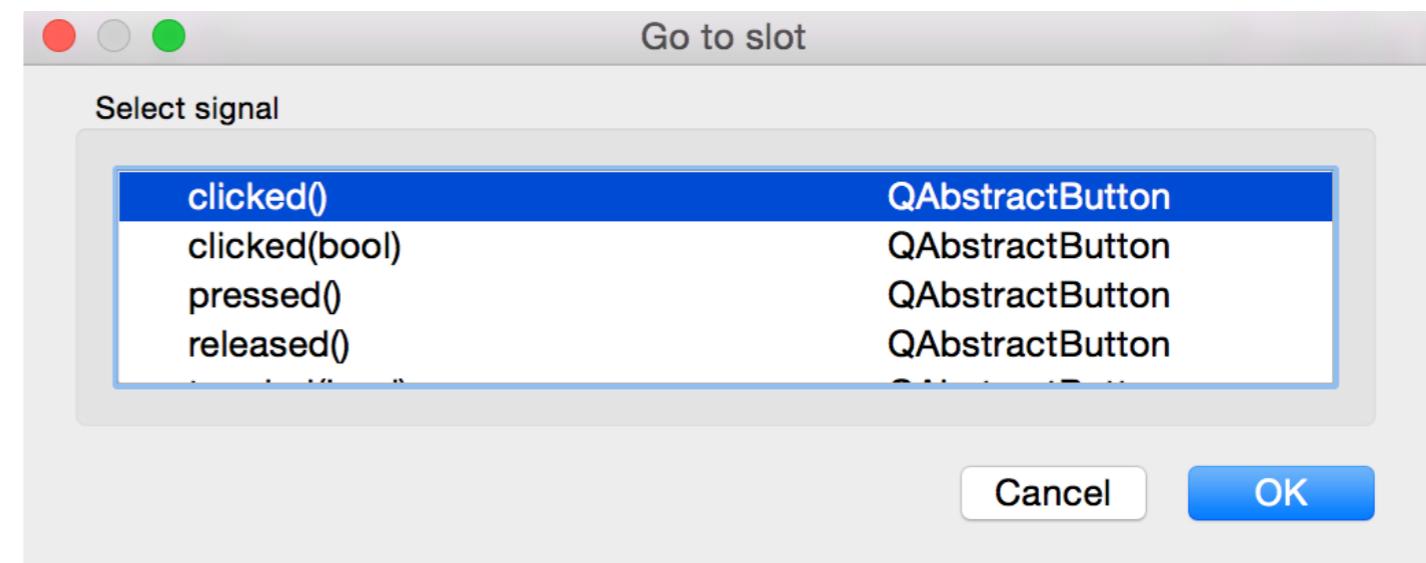
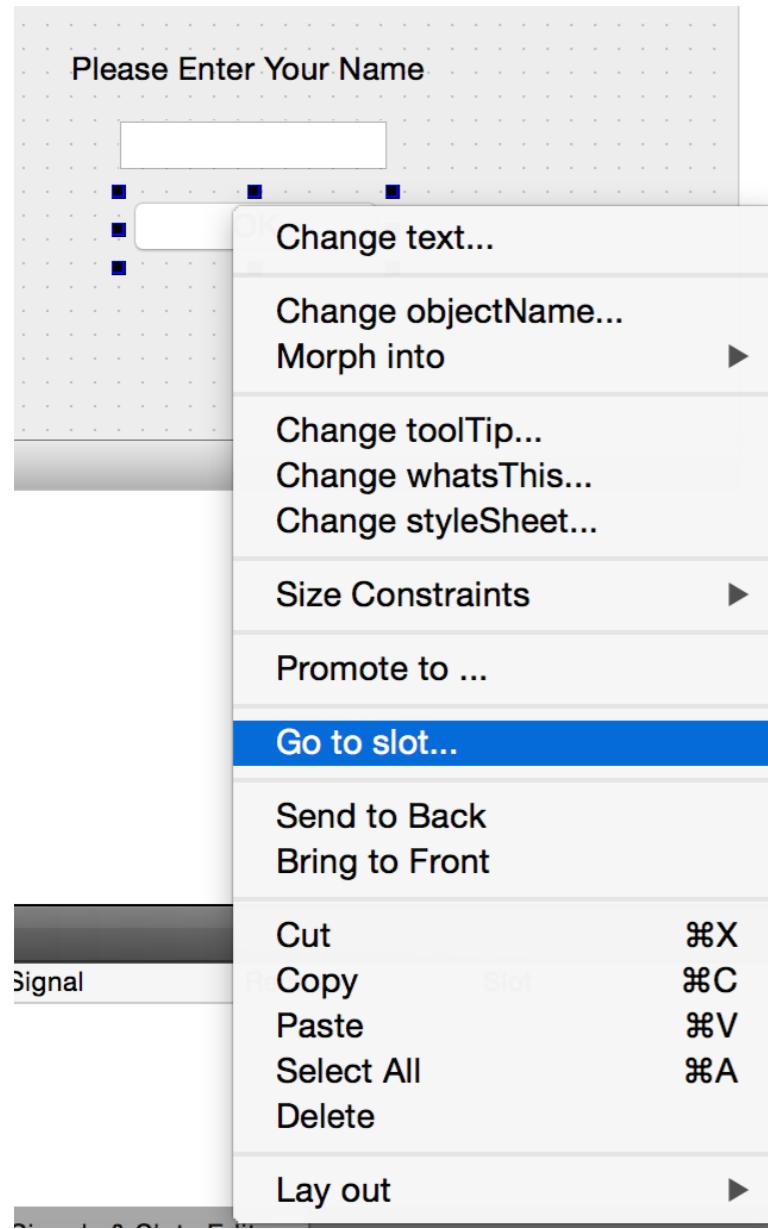


Hello World - .ui 設計介面

Label x 1
Line Edit x 1
Push Button x 1



Hello World - go to slot

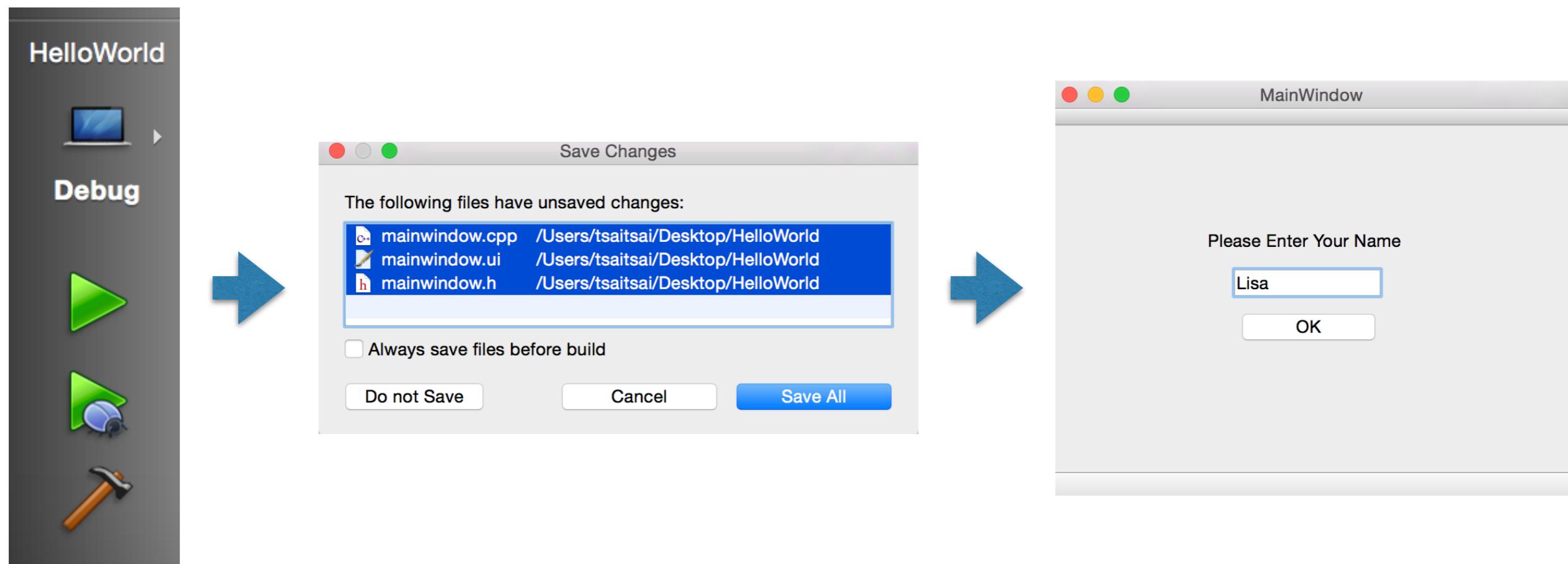


Hello World - 跳回 mainwindow.cpp

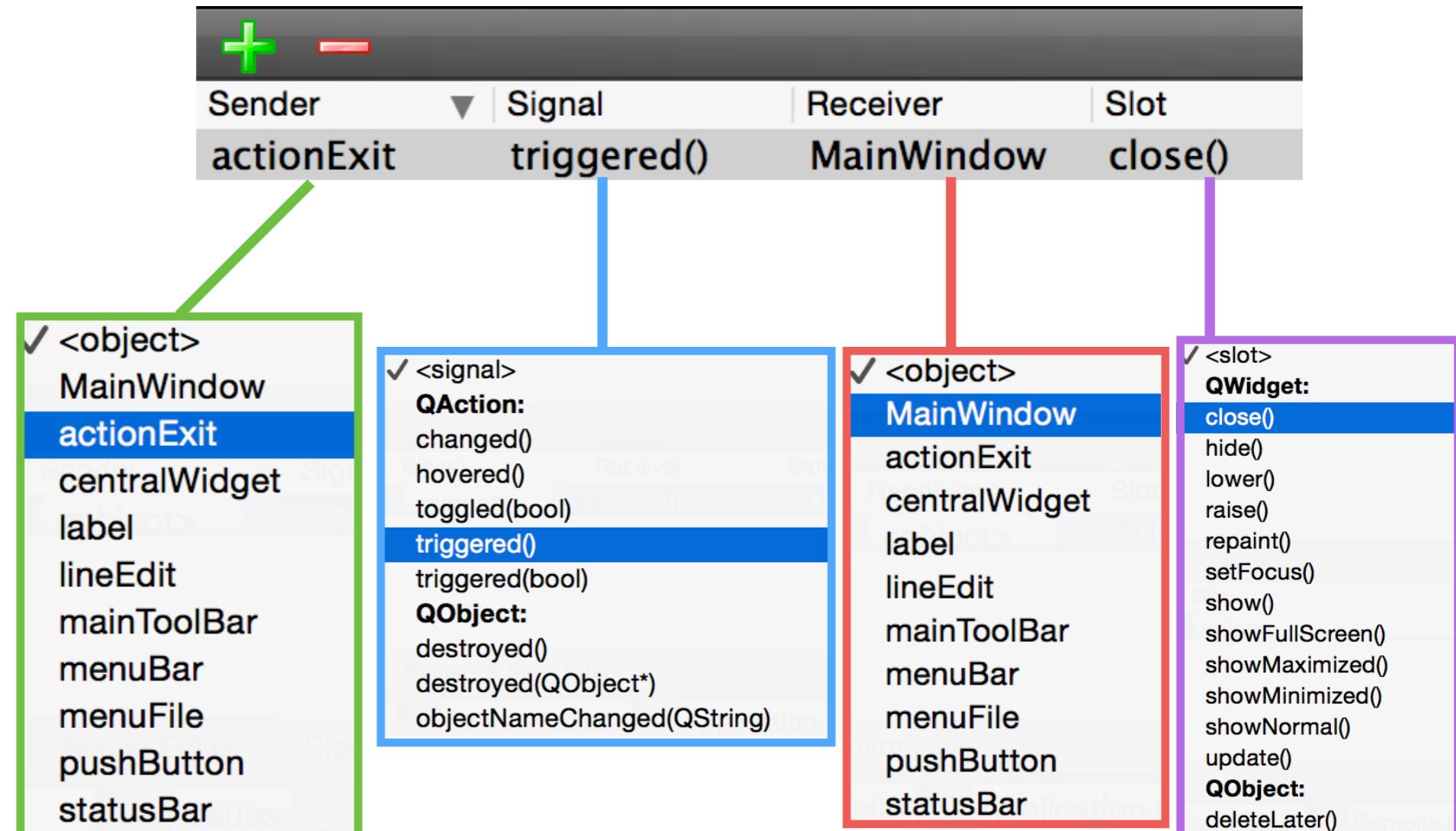
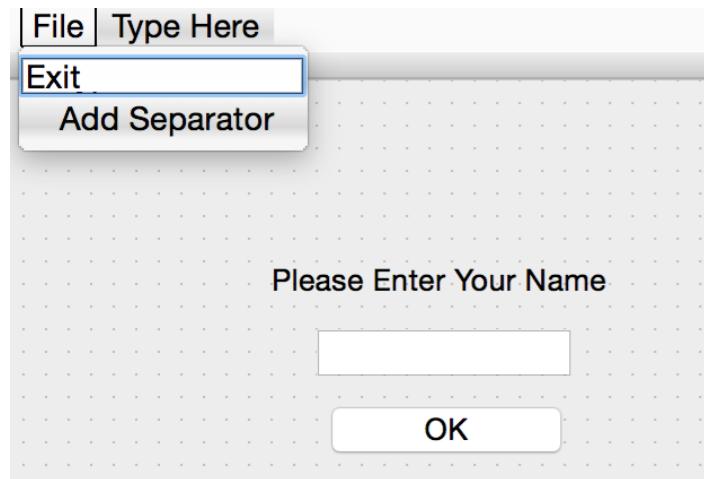
```
1 #include "mainwindow.h"
2 #include "ui_mainwindow.h"
3
4 MainWindow::MainWindow(QWidget *parent) :
5     QMainWindow(parent),
6     ui(new Ui::MainWindow)
7 {
8     ui->setupUi(this);
9 }
10
11 MainWindow::~MainWindow()
12 {
13     delete ui;
14 }
15
16 void MainWindow::on_pushButton_clicked()
17 {
18     |
19 }
20
```

```
void MainWindow::on_pushButton_clicked()
{
    ui->label->setText("Hi, "+ui->lineEdit->text());
}
```

Hello World - Run



Furthermore - Menu Bar & Action



Action Editor

Signals & Slots Editor

作業

點餐系統



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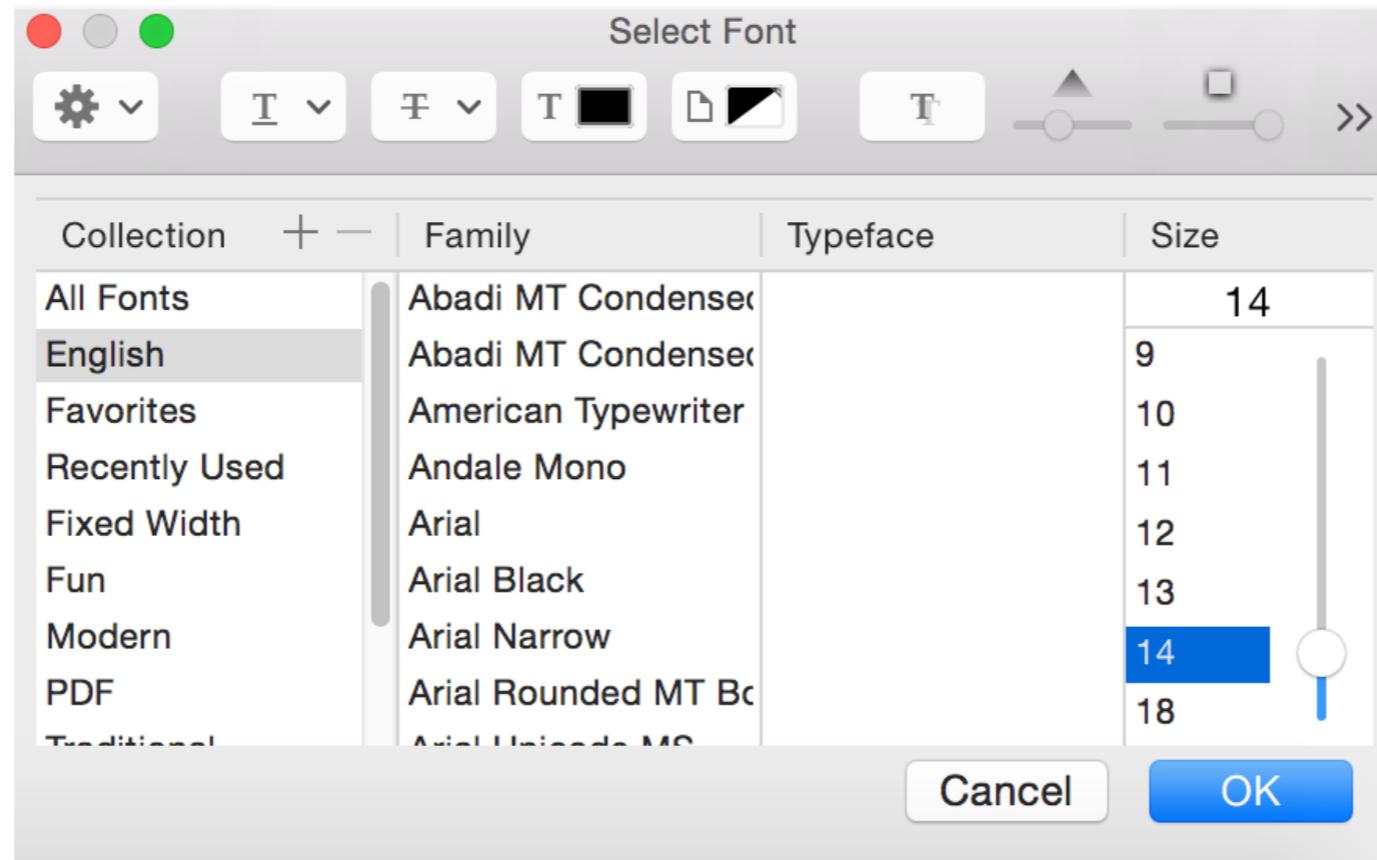
Set Title in .cpp



```
ui->setupUi(this);
this->setWindowTitle("Ordering System");
```

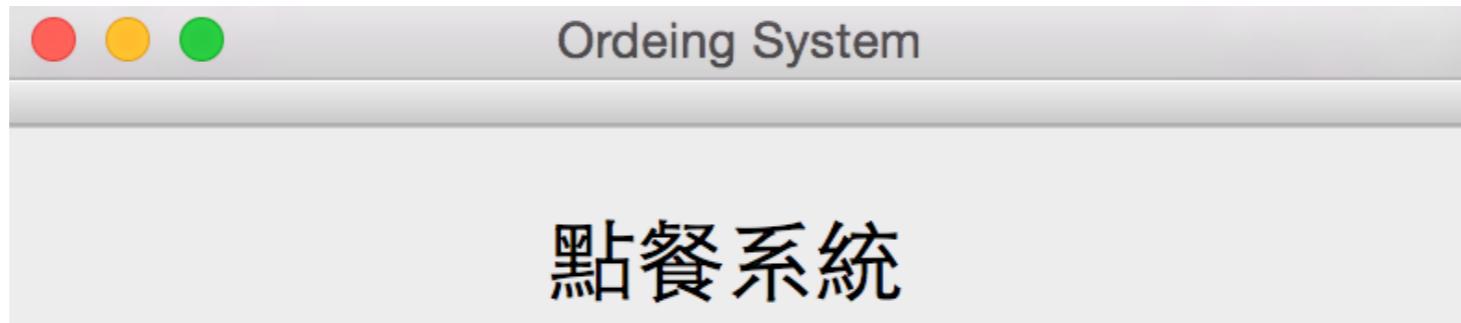
Change Label Font

label : QLabel	
Property	Value
► sizeIncrement	0 x 0
► baseSize	0 x 0
palette	Inherited
► font	A [.Helvetica Neue DesklInterface, 24]
cursor	Arrow
mouseTracking	<input type="checkbox"/>
focusPolicy	NoFocus



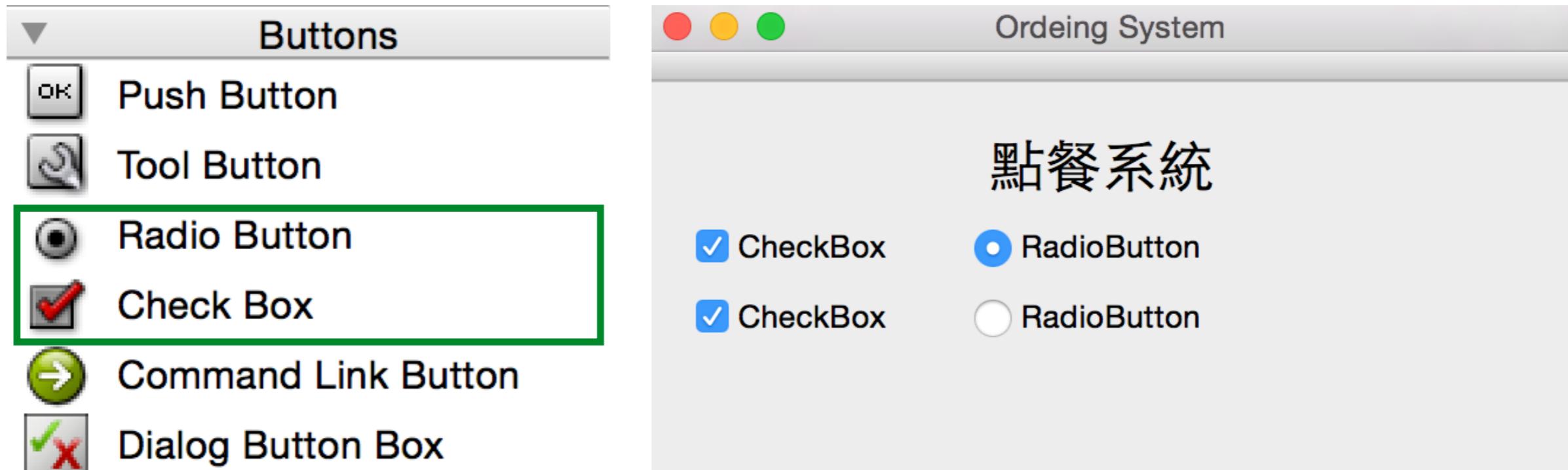
Click

Change Label Alignment



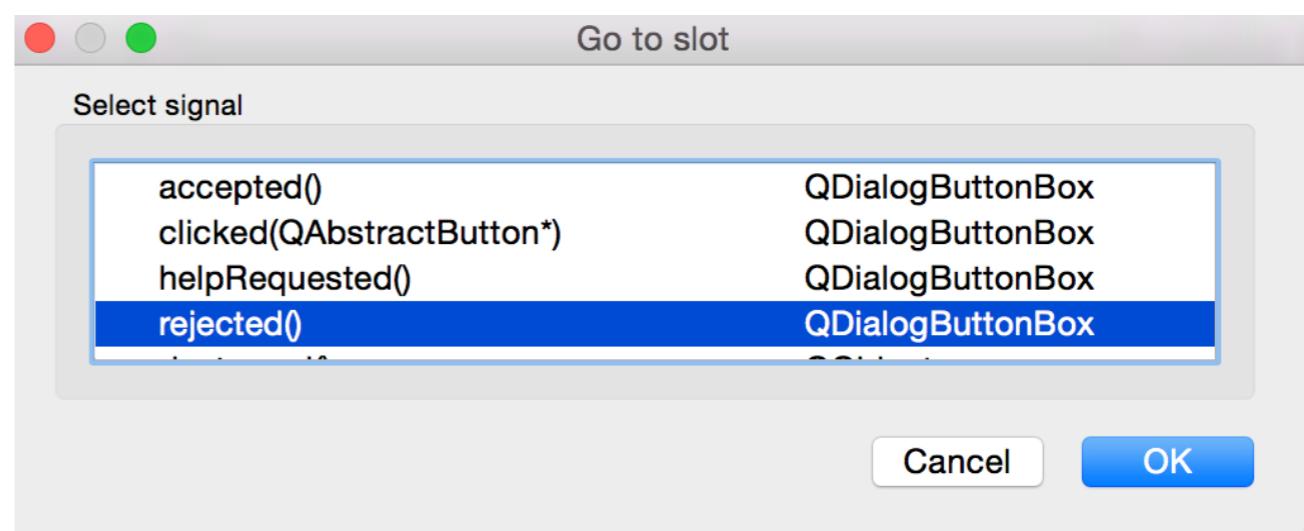
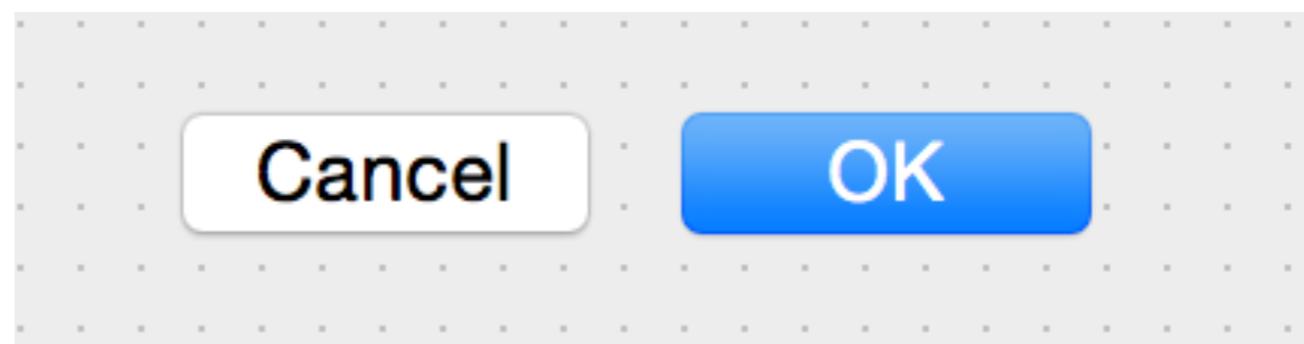
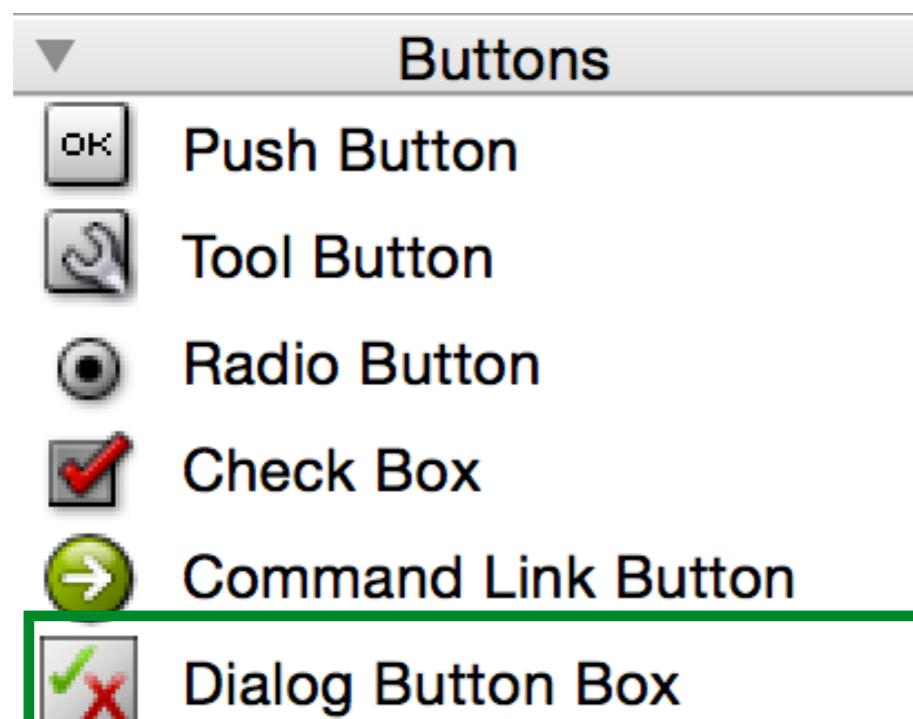
```
MainWindow::MainWindow(QWidget *parent) :  
    QMainWindow(parent),  
    ui(new Ui::MainWindow)  
{  
    ui->setupUi(this);  
    this->setWindowTitle("Ordeing System");  
    ui->label->setAlignment(Qt::AlignCenter);  
}
```

Check Box / Radio Button



CheckBox - Can check more than one
RadioButton - Only one can be chosen

Dialog Button Box



Change Object Name

Object	Class
▼ centralWidget	QWidget
checkBox	QCheckBox
checkBox_2	QCheckBox
checkBox_3	QCheckBox
label	QLabel
label_2	QLabel
radioButton_Cash	QRadioButton
radioB...Credit	QRadioButton

It is best to keep both
Class Name and Function

Layout

Layouts

 Vertical Layout

 Horizontal Layout

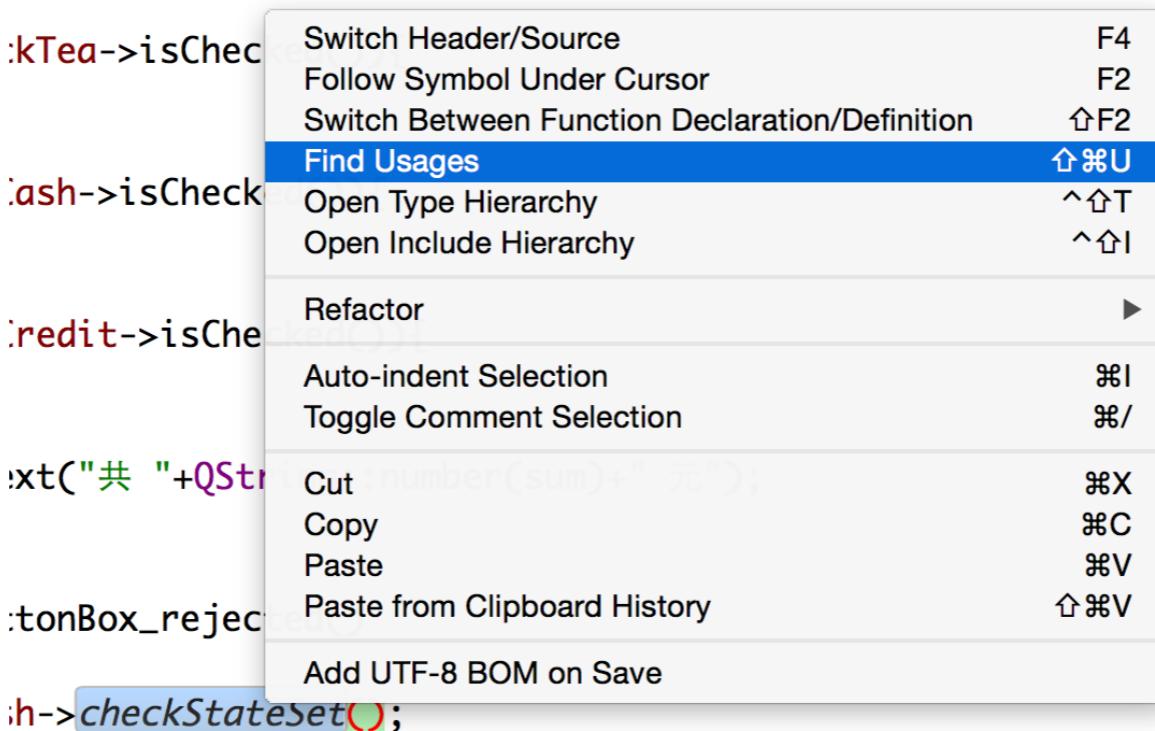
 Grid Layout

 Form Layout

<input type="checkbox"/> 青醬義大利麵 \$200	<input type="checkbox"/> 可樂 \$60	<input type="radio"/> 刷卡 10%off
<input type="checkbox"/> 鮪魚蛋堡 \$180	<input type="checkbox"/> 雪碧 \$50	<input type="radio"/> 現金 \$30off
<input type="checkbox"/> 班尼迪克蛋 \$160	<input type="checkbox"/> 紅茶 \$40	

Object size will change with Layout

Find Usages



A screenshot of a code editor showing a context menu. The menu is open over a line of code containing `:h->checkStateSet();`. The 'Find Usages' option is highlighted with a blue selection bar. Other options in the menu include 'Switch Header/Source' (F4), 'Follow Symbol Under Cursor' (F2), 'Switch Between Function Declaration/Definition' (⇧F2), 'Refactor' (▶), 'Auto-indent Selection' (⌘I), 'Toggle Comment Selection' (⌘/), 'Cut' (⌘X), 'Copy' (⌘C), 'Paste' (⌘V), 'Paste from Clipboard History' (⇧⌘V), and 'Add UTF-8 BOM on Save'.

C++ Usages: QAbstractButton::checkStateSet Search again

- ▼ /Users/tsaitsai/Desktop/OrderingSystem/mainwindow.cpp (1)
 - 51 ui->radioButton_Cash->**checkStateSet()**;
- ▼ /Users/tsaitsai/Qt/5.5/clang_64/lib/QtWidgets.framework/Headers/qabstractbutton.h (1)
 - 122 virtual void **checkStateSet()**;
- ▼ /Users/tsaitsai/Qt/5.5/clang_64/lib/QtWidgets.framework/Headers/qcheckbox.h (1)
 - 71 void **checkStateSet()** Q_DECL_OVERRIDE;

你永遠的好朋友：<https://stackoverflow.com>

Read Error Message / Protected Member

The screenshot shows a code editor with a C++ file open. The code is as follows:

```
49 | void MainWindow::on_buttonBox_rejected()
50 | {
51 |     ui->radioButton_Cash->checkStateSet(false);
52 | }
53 | 
```

A red exclamation mark icon is positioned next to the line number 51, indicating an error. The word `checkStateSet` is underlined in green, suggesting it is a misspelling of `false`. Below the code editor is a toolbar labeled "Issues" with several icons: a paintbrush, a left arrow, a right arrow, a yellow triangle, and a magnifying glass.

The "Issues" panel lists the following errors:

- expanded from macro 'Q_OBJECT'
- expanded from macro 'Q_OBJECT_NO_OVERRIDE_WARNING'
- expanded from macro 'QT_WARNING_DISABLE_CLANG'
- expanded from macro 'QT_DO_PRAGMA'
- 'checkStateSet' is a protected member of 'QAbstractButton'
declared protected here
- use of undeclared identifier 'False'; did you mean 'false'?
ui->radioButton_Cash->checkStateSet(False);
^

The bottom of the screen shows the file path: /Users/tsaitsai/Desktop/OrderingSystem/mainwindow.cpp.

Some Hints

```
if(ui->checkBox_Pasta->isChecked()){
    sum += 200;
}

if(ui->radioButton_Cash->isChecked()){
    if(sum!=0)sum-=30;
}

ui->radioButton_Credit->setAutoExclusive(false);
ui->radioButton_Credit->setChecked(false);
ui->checkBox_BlackTea->setCheckState( Qt::Unchecked );
```

Some Hints - Level Up

```
sum += (ui->checkBox_Pasta->isChecked()) ? 200 : 0;  
  
ui->label_Sum->setText("共 "+QString::number(sum)+" 元");  
  
http://doc.qt.io/qt-5/qtwidgets-widgets-groupbox-example.html
```

Homework

- 餐點
- 付款方式
- 金額計算



其餘自由發揮，對自己要求越多，獲得的就越多

參考網站

Qt 官方網站

[http://doc.qt.io/qt-5/
qtexamplesandtutorials.html](http://doc.qt.io/qt-5/qtexamplesandtutorials.html)

阿洲（中文）

http://monkeycoding.com/?page_id=5

影片教學（英文）

[https://www.youtube.com/watch?
v=6KtOzh0StTc&list=PL2D1942A4688E9D
63](https://www.youtube.com/watch?v=6KtOzh0StTc&list=PL2D1942A4688E9D63)

Thank you ~



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