



Symbian

the new open-source mobile OS

Overview of topics - theory

- History of OS
- The Symbian Foundation
- Future outlook

Overview of topics - practical

- Development options
- Native applications in C++
- Qt

- Selling an application

- Where to go for help

About /me



- Tam HANNA
 - CEO, Tamoggemon Ltd.
 - Runs web sites about mobile computing

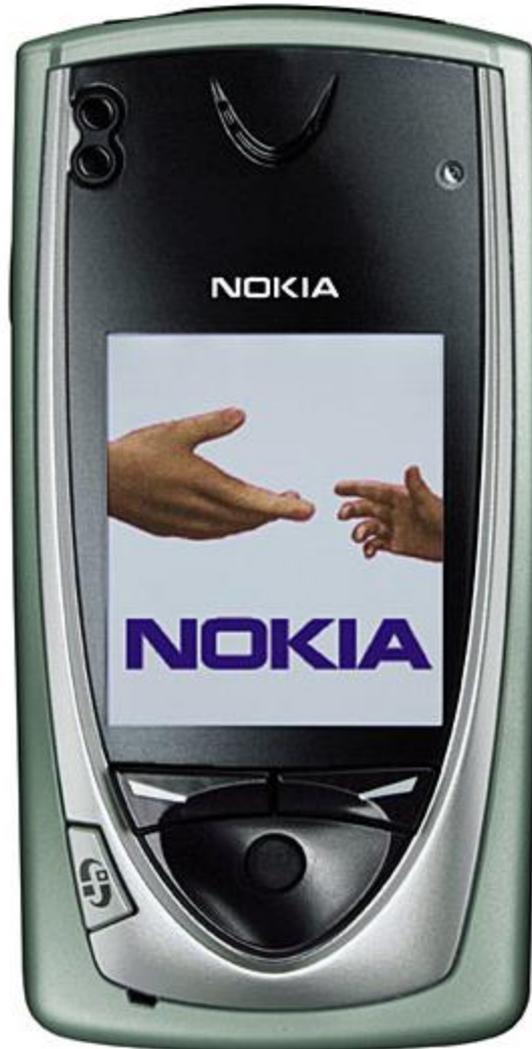
EPOC

- Developed by Psion
 - Series5
 - Revo

- “Thrown out” to Symbian



Series60



- First versions
 - Introduced on 7650
- S60v2 still common
 - Nokia N70

S60v3

- Renamed due to virus problems
- Introduces mandatory signing
 - Binary break
- Three feature packs
 - Downward compatible



S60v5



- S60v3 + touch
 - Lives along v3
- Very basic GUI
- Partially downward compatible
 - Apps run, but cant be controlled due to lack of buttons

Symbian^3

- Roll-out now
- Better GUI for S60v5
 - Mostly downward compatible
- Ask me for a demo
 - Hands-on!



The Symbian foundation

Symbian Ltd

- Commercial enterprise
- Belonged to phone manufacturers
- Developed, sold Symbian

Going open

- Nokia bought shares from others
- Announced opensourcing at SEE2008
- Packet movage to EPL
 - Issue: existing packets

Who owns it

- Non-profit organization
 - Governed by boards
 - Members picked on "amount of merit"
- Founded by various cell phone companies
- Every organization can become a member
 - "Smallish" software houses can also join

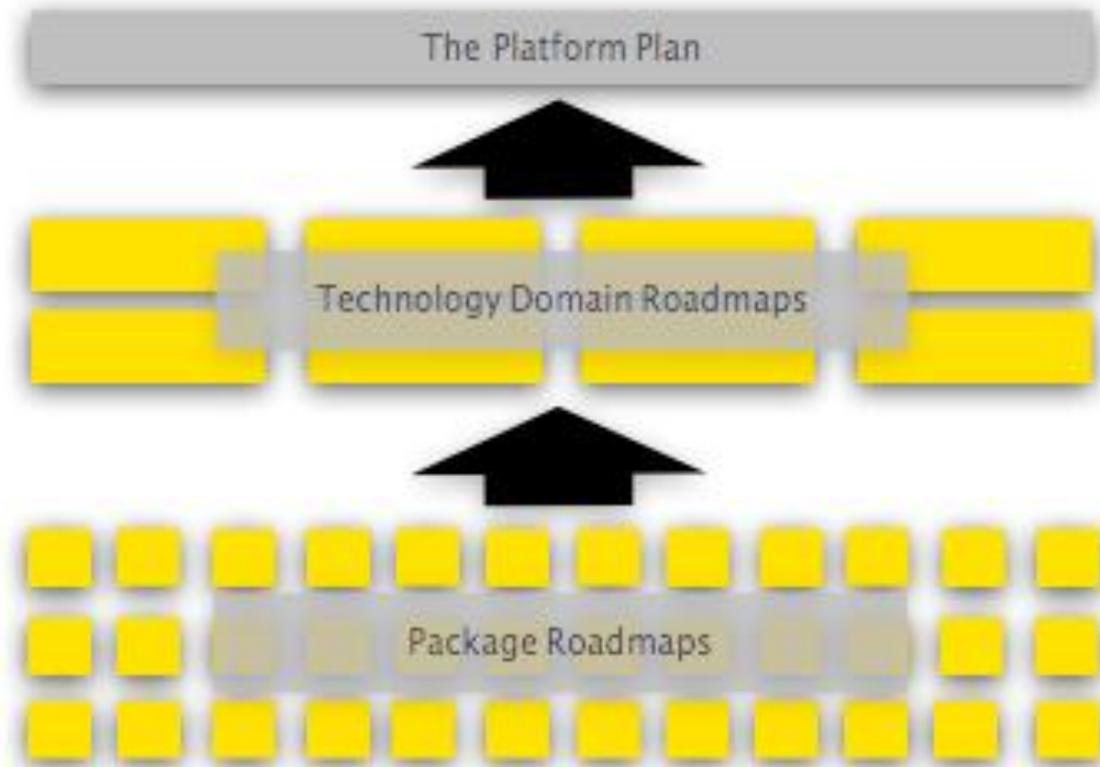
Symbian foundation - I

- Meritocracy
- Council system
 - Councils decide
 - Membership by election

Symbian foundation - II

- Income sources
 - Nokia
 - Membership
 - Signing

Symbian foundation - III



Symbian foundation - V

- Membership – 1.500,-\$ / yr
 - Election rights
 - Packet owner right
 - „Dating site“
 - Extra rights (Software-Hardware)
 - Rebates at Events
- Individuals: Symbian DevCo

FUTURE

future outlook

66

The Symbian Foundation Platform Plan

Open for contribution

2009

2010

2011

** Proposal under review*

S^2

Symbian^2

- Personal: Customisable home screen supporting embedded widgets and other personal content
- Dynamic: Ability for apps to take action in response to the user's changing location

S^4

Symbian^4

- Direct UI*: Fresh new user experience
- Qt integrated as primary runtime environment*
- Majority of SHAI in place

Symbian^2

Symbian^3

Symbian^4

Symbian^5

S^3

Symbian^3

- Looking good: Graphics support for advanced layering and effects
- Sounding clear: High performance networking architecture enabling fixed internet performance, ideal for streaming high def video and high quality VoIP calls

Also available:

- SDK based on Forum Nokia SDK 5th Edition, compatible with Symbian OS v9.x and S60 5th Edition

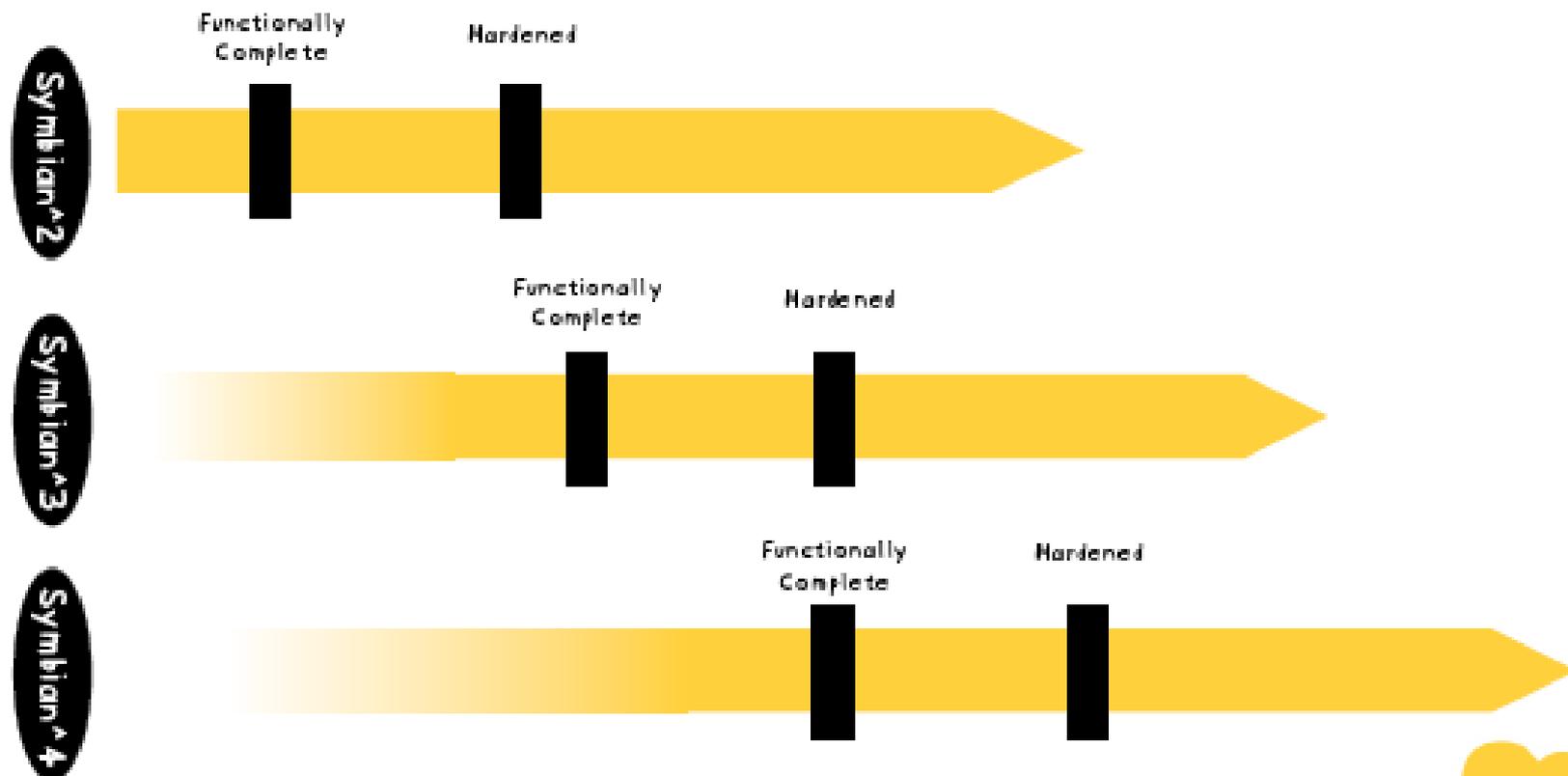


Symbian Foundation Platform Plan

Open for contribution



Miss some dates to be confirmed by Release Council



What to expect

- Will switch to QT
 - Known to open-source heads
 - Native development will remain possible
- Symbian^4 – new UI stack
 - LARGE binary break

NICKOLSKI & WILSON

A Theory of Mobile Processes

CAMBRIDGE

Guzdial
Rose



Squeak

Open Personal Computing
and Multimedia

DYBVIK | THE SCHEME PROGRAMMING LANGUAGE ANSI SCHEME

SECOND EDITION



Nelson

Systems Programming with

Modula-3

Learning Python

Lutz & Ascher

THIRD EDITION

Programming Perl

Wall,
Christiansen
& O'Reart

Miranda

The Craft of
Functional
Programming

Thompson

ULLMAN

ELEMENTS OF FUNCTIONAL PROGRAMMING

MIL97 EDITION



The Little MLer

Felleisen and Friedman

The Java™ Programming Language
Second Edition

Arnold
Gosling



JAVA

The Dylan
Reference Manual

Shalit

Addison
Wesley

Apple
PRESS

STROUSTRUP



THE C++ PROGRAMMING LANGUAGE

THIRD EDITION

THE C PROGRAMMING LANGUAGE

SECOND EDITION



KERNIGHAN • RITCHIE

Development options

C++

- Symbian “fucked” C++
 - “C with objects”
- Somewhat difficult to learn and understand
- But:
 - Apps somewhat easy to sell
 - Full device access

.NET CF

- Net60
 - from third party
- Must be purchased
- Great communality with PPC et al

J2ME

- Oldest run time environment
- Developing for it is somewhat easy
- But:
 - Bad user experience (prompts)
 - Might be dropped from future boxen

WRT / flash / etc

- Various Web 2.0-Technologies available
- Easy to develop for
- But:
 - Selling results is difficult at times
 - Extremely limited functionality

Native applications in C++



Carbide.c++

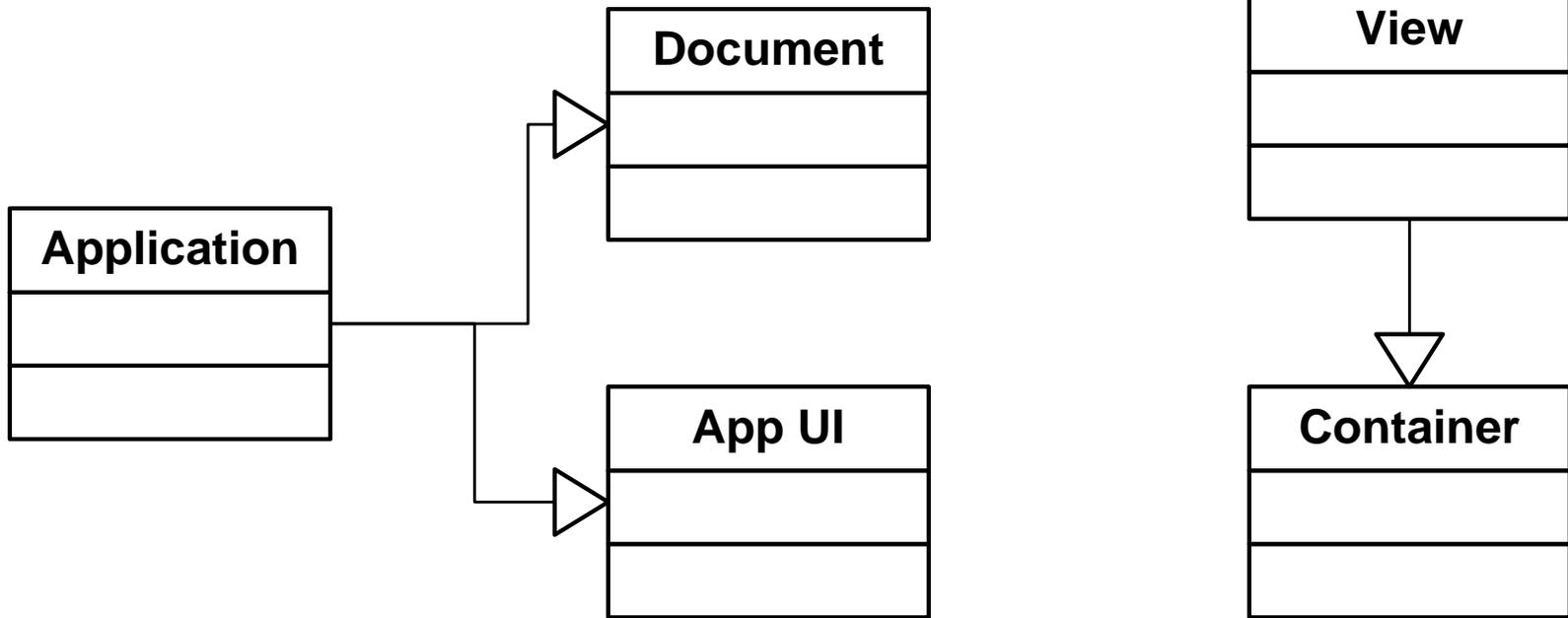
- Free, Eclipse-based IDE



- Contains dangerously buggy UI editor
 - COMMIT CODE TO CVS FREQUENTLY!!!

Basic app structure

- Five classes:



- Auto-generated

Application / Document

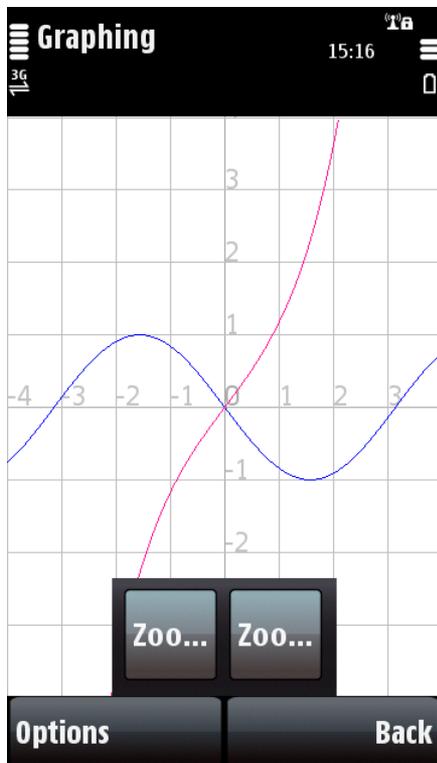
- Do not touch
- Let Carbide generate them, and ignore
- Development mantra: if it works, its ok
 - F00K the rules

AppUi

- Use as "static repository"
 - Stores global data
- Can be accessed easily from forms
- `CLocaNoteAppUi* temp =
(static_cast<CLocaNoteAppUi*>((CCoeEnv::Static()
->AppUi()))`

View / Container

- Contain logic for "forms"
- One view, one container per form



Two-phase initialization

- Handsets always low on memory
- “Clean up stack” catches object references
 - Stack unwinding, clean-up
- Can generally be ignored

```
/**  
 * First phase of Symbian two-phase construction. Should not contain any  
 * code that could leave.  
 */
```

```
CTouchCalcContainerView::CTouchCalcContainerView()
```

```
{  
 // [[[ begin generated region: do not modify [Generated Contents]  
 iTouchCalcContainer = NULL;  
 // ]]] end generated region [Generated Contents]  
  
}
```

```
/**  
 * The view's destructor removes the container from the control  
 * stack and destroys it.  
 */
```

```
CTouchCalcContainerView::~~CTouchCalcContainerView()
```

```
{  
 // [[[ begin generated region: do not modify [Generated Contents]  
 delete iTouchCalcContainer;  
 iTouchCalcContainer = NULL;  
 // ]]] end generated region [Generated Contents]
```

```
▪ }
```

```
/**
 * Symbian two-phase constructor.
 * This creates an instance then calls the second-phase constructor
 * without leaving the instance on the cleanup stack.
 * @return new instance of CTouchCalcContainerView
 */
```

```
CTouchCalcContainerView* CTouchCalcContainerView::NewL()
{
    CTouchCalcContainerView* self = CTouchCalcContainerView::NewLC();
    CleanupStack::Pop( self );
    return self;
}
```

```
/**
 * Symbian two-phase constructor.
 * This creates an instance, pushes it on the cleanup stack,
 * then calls the second-phase constructor.
 * @return new instance of CTouchCalcContainerView
 */
```

```
CTouchCalcContainerView* CTouchCalcContainerView::NewLC()
{
    CTouchCalcContainerView* self = new ( ELeave ) CTouchCalcContainerView();
    CleanupStack::PushL( self );
    self->ConstructL();
    return self;
}
```

```
/**
 * Second-phase constructor for view.
 * Initialize contents from resource.
 */
void CTouchCalcContainerView::ConstructL()
{
// [[[ begin generated region: do not modify [Generated Code]
BaseConstructL( R_TOUCH_CALC_CONTAINER_TOUCH_CALC_CONTAINER_VIEW );

// ]]] end generated region [Generated Code]

// add your own initialization code here

}
```

Active objects

- Primitive form of multi-tasking
- An AO runs “in the background”
- Needed for some API calls

```

void CSaveImageAO::SaveAsL(CFbsBitmap* aBitmap, TFileName& aFileName, TUid almageType,
    TUid almageSubType)
{
    ilmageEncoder->Convert( &iStatus, *aBitmap);
    SetActive();
}
}
void CSaveImageAO::DoCancel()
{
    ilmageEncoder->Cancel();
}
void CSaveImageAO::RunL()
{
    iObserver->ImageSaved(iStatus.Int());

}
TInt CSaveImageAO::RunError(TInt aError)
{
    iObserver->ImageSaved(aError);
    return KErrNone;
}

```

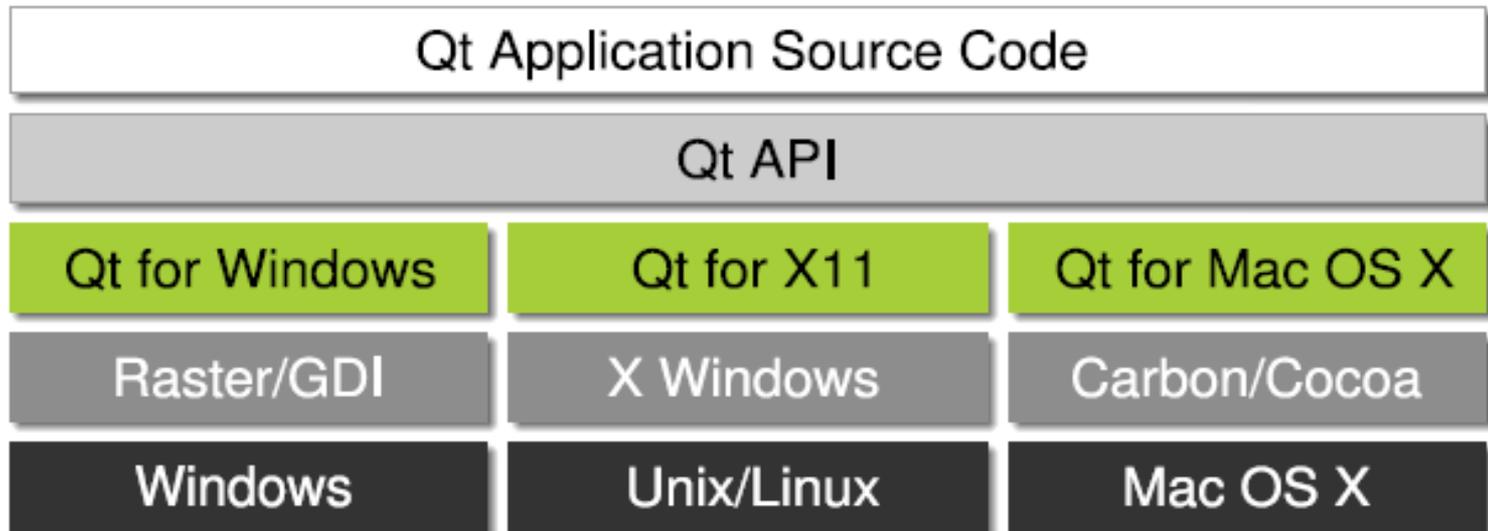
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Testing

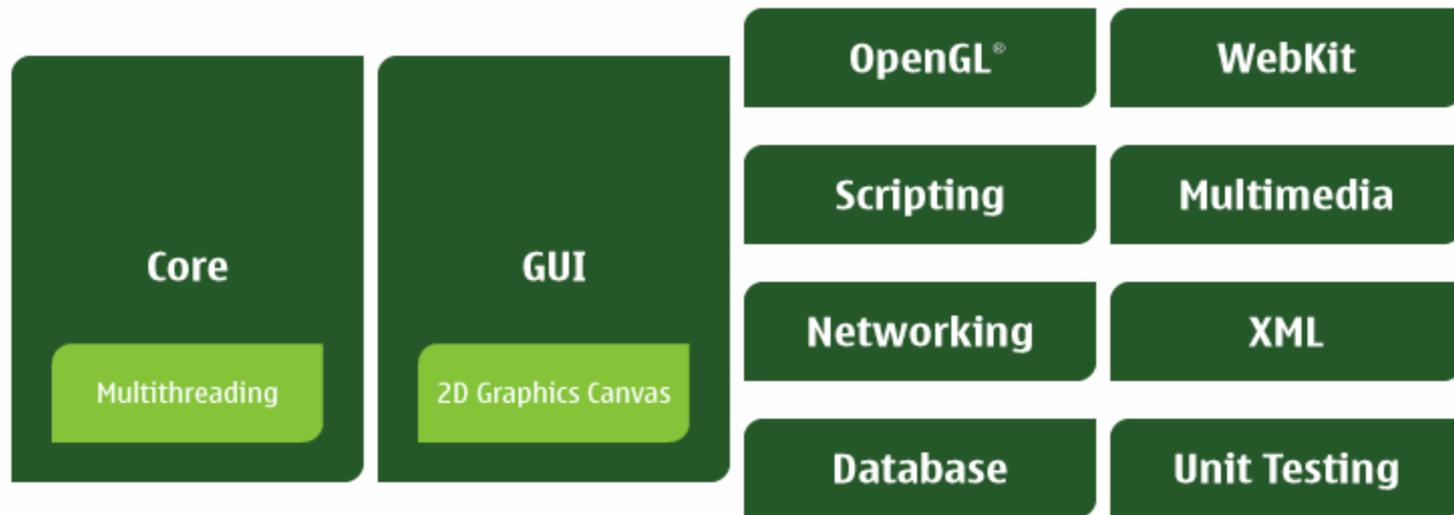
- Simulator
 - Very slow
 - With HookLogger => mem leak buster
- Real device (might need DevCert)
 - Faster
 - Works via USB
 - Install Nokia PC Suite, TRK



The framework

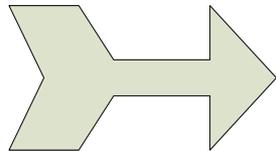


The framework - II

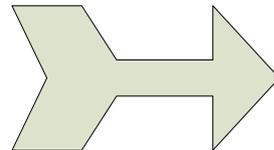


Compiling

qmake -
project



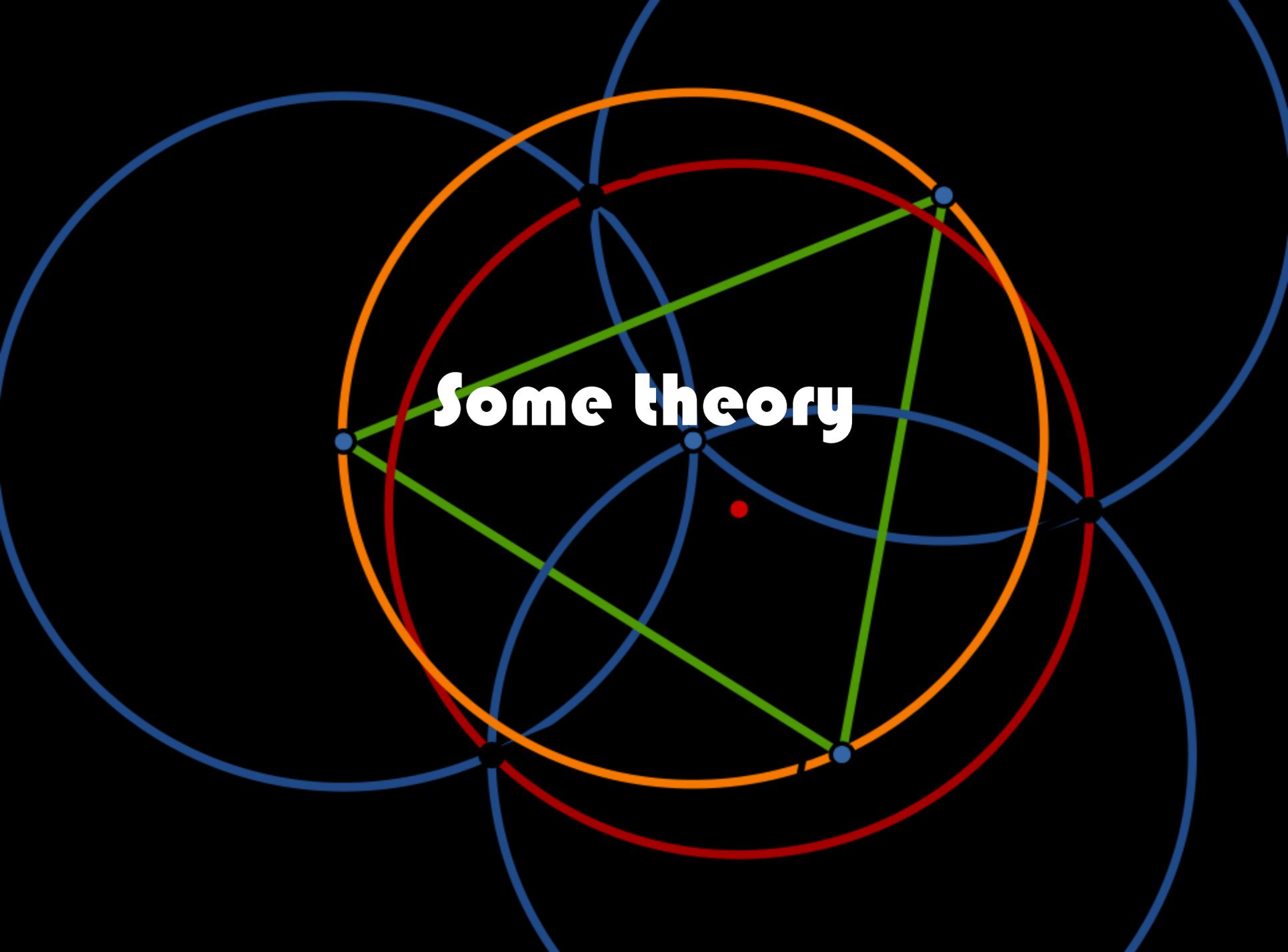
qmake



make

licensing

- LGPL
 - Viral against framework
 - !! Good idea !!
- Commercial
 - Keep your framework changes
 - Bad idea
- Free

The image features a dark blue background with several overlapping circles in blue, orange, and red. A green quadrilateral is inscribed within the central area, with its vertices marked by small blue dots. A single red dot is positioned near the center of the diagram. The text "Some theory" is written in a bold, white, sans-serif font across the middle of the image.

Some theory

Signals and Slots - I

- "Callbacks à la Qt"
- Used for Event-Processing
- Become C++ at compile time
 - moc

Signals and Slots - II

- Signals
 - Emitted by QObject
 - "Something has happened"

- Slots
 - Member functions
 - Called if something has happened

Signals and Slots - III

- Signals are connected to Slots
- Signal happens -> Slot fired
- Connections are governed by rules
- Checks happen at runtime(!!!)

files - I

- .cpp
 - Source code
- moc* - Files
 - Contain glue
 - Automatically generated -> no CVS

files - II

- `.ui`
 - WYSIWYG-GUI
 - Contain resource-HTML
 - `ui*.h`-file is created at runtime
- `.pro`
 - Control the project

files - III

- .h
 - Headers
 - Every QObject needs one
 - ui*.h auto generated - no CVS

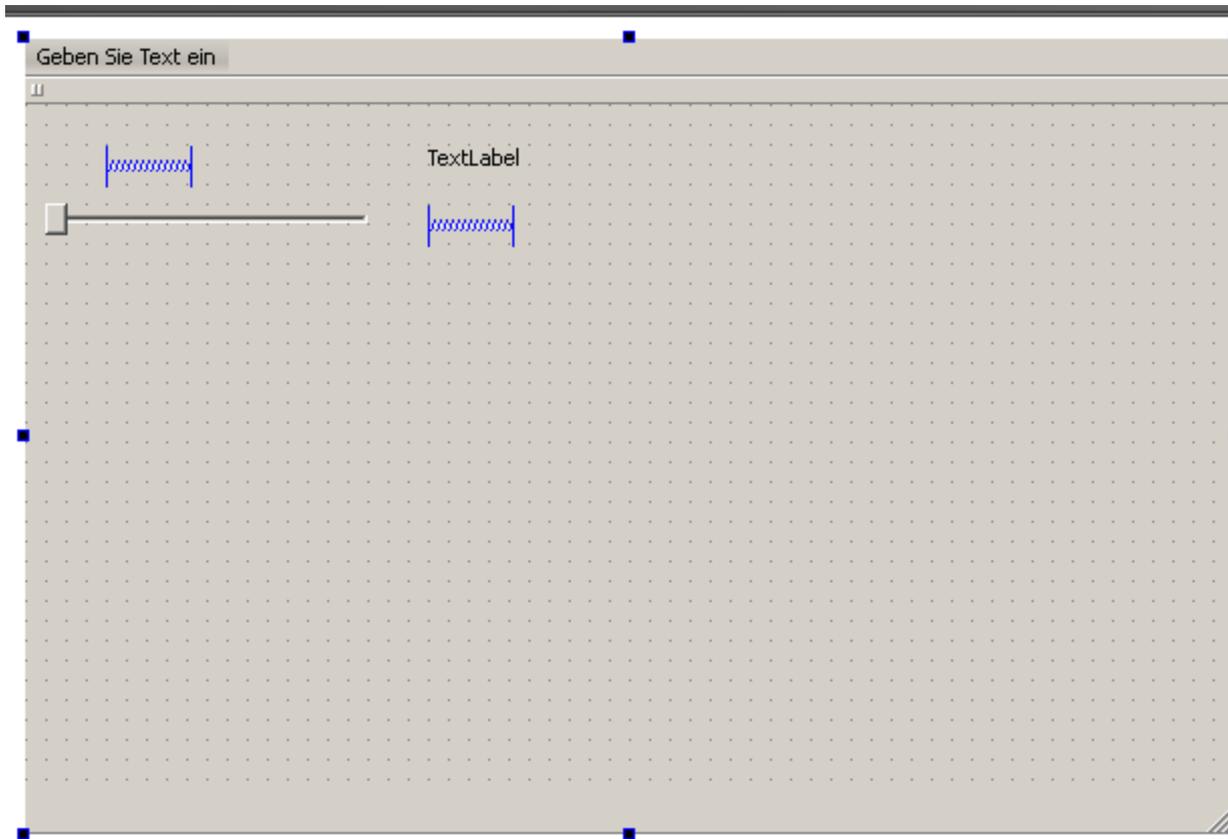
The image features several bright yellow ginkgo leaves of various sizes and orientations scattered across a solid black background. The leaves have a characteristic fan shape with fine, parallel veins radiating from the base. Some leaves are attached to thin, light-colored stems. The text 'A small example' is centered in the middle of the image in a white, bold, sans-serif font.

A small example

QMainWindow

- Main Window of application

QMainWindow - II



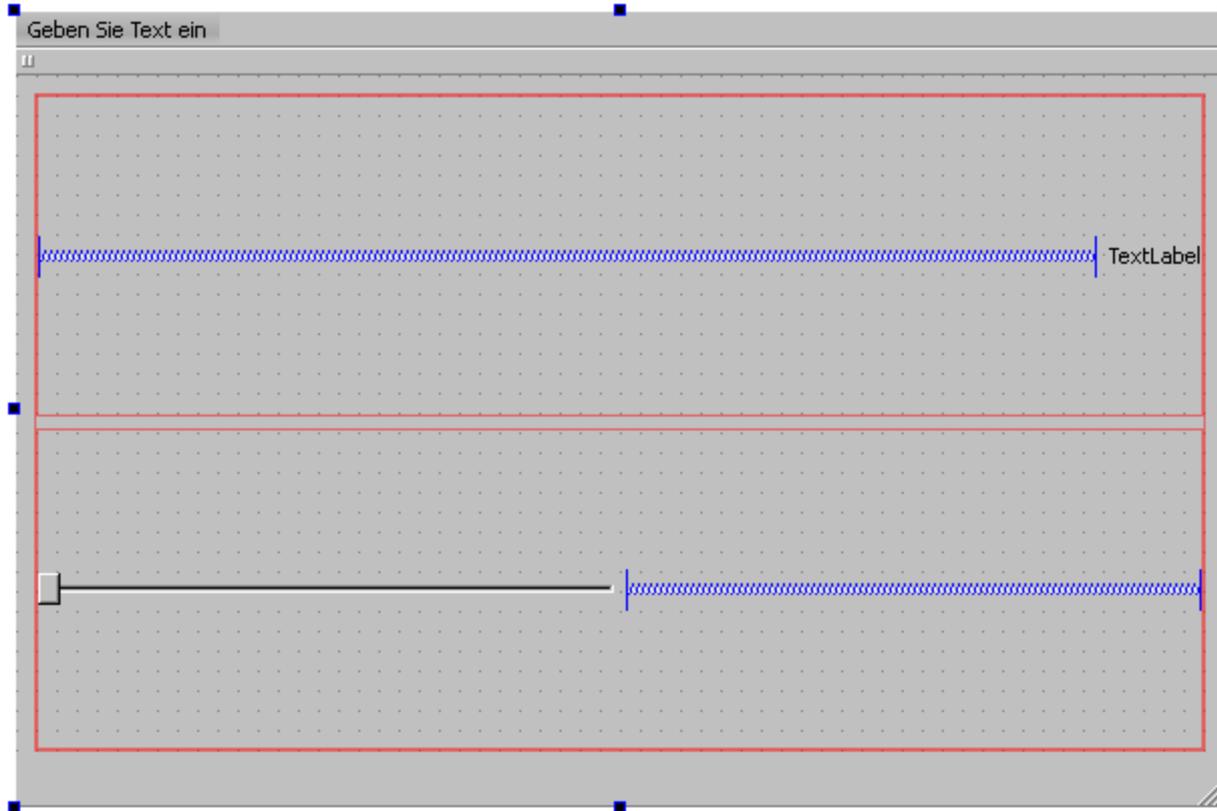
Objekt	Klasse
MainWindow	QMainWindow
centralWidget	QWidget
horizontalSlider	QSlider
horizo...Spacer	Spacer
horizo...acer_2	Spacer
label	QLabel
menuBar	QMenuBar
mainToolBar	QToolBar
statusBar	QStatusBar

QMainWindow - III

The image shows a Qt Designer window titled "Geben Sie Text ein". The central widget contains a text label and a slider. The object inspector on the right lists the following objects and their classes:

Objekt	Klasse
MainWindow	QMainWindow
centralWidget	QWidget
vert...yout	QVBoxLayout
ho...ut	QHBoxLayout
ho...er	QSlider
ho..._2	Spacer
h...2	QHBoxLayout
ho...er	Spacer
label	QLabel
menuBar	QMenuBar
mainToolBar	QToolBar
statusBar	QStatusBar

QMainWindow - IV



QMainWindow - V

```
#ifndef MAINWINDOW_H
#define MAINWINDOW_H

#include <QtGui/QMainWindow>
#include <QString>
#include <QTextStream>

namespace Ui
{
    class MainWindow;
}

class MainWindow : public QMainWindow
{
    Q_OBJECT

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

public slots:
    void sliderMoved(int val);

private:
    Ui::MainWindow *ui;
```

QMainWindow - VI

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

MainWindow::MainWindow(QWidget *parent)
    : QMainWindow(parent), ui(new Ui::MainWindow)
{
    ui->setupUi(this);
}

MainWindow::~MainWindow()
{
    delete ui;
}

void MainWindow::sliderMoved(int val)
{
    QString myStr;
    QTextStream myStream(&myStr);
    myStream<<val;
```

QMainWindow - VII



QDialog

- Popup window
- Activated via `exec()`
 - Can return value



Selling applications

Signing

- Express signed – 20\$
 - Doesn't permit all capabilities
 - Usually no checks done
- Certified signed – 200\$
 - Permits most capabilities
 - Thorough checks (!!!)

Signing - II

- Certificate needed
 - Obtained from TrustCenter Germany
- Requires registered company
 - Recommendation: UK Limited
 - www.go-ahead.de

Ovi Store

- Nokia's sale channel
- 70% of gross
- Somewhat slow ATM

Traditional channels

- Various traditional ESD's
 - Handango
 - MobiHand
- Diminishing importance

Where to go for help



forum Nokia

Forum.Nokia.com
Driving mobile innovation

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Developer Discussions

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	Forum	Last Post	Threads	Posts
	Forum Nokia Services Feedback Feedback on Forum Nokia Services; Series 40 and S60 Platforms; Tools and SDKs; Developer Resources	E55 problem by xtrcom Today 12:11 »	1,335	4,934
	Open Discussions General Discussions; News, Announcements and Job Listings	how to convert mod to... by Pearlerous Today 11:37 »	8,991	24,429

Development Platforms

Forum Nokia - II

- Free to register and use
 - But: bad search engine
- Most questions get answered quickly
 - Nokia employees around
- <http://discussion.forum.nokia.com/forum/>

Nokia Wiki

- Nokia-operated Wiki
- Contains valuable tutorials

Symbian foundation

- Has developer help services of its own
- Less developed than Nokia's
- => Stick to Nokia until told otherwise

fan pages

- www.allaboutsymbian.com
 - For users
- www.symbian-freak.com
 - Hacker forum
- tamss60.tamoggemon.com
 - My blog (for developers)

The end

Questions?

Answers at tamhan@tamoggemon.com

images by Julius Kusuma, Cimexus of Canberra, adactio,
3dh3m, JNL, Thomas Wolf, JmSchneid, InductiveLoad