PV239 – 01 Introduction

Introduction

- Roman
- Ondřej
- And what about you?

Exercises

- Introduction
- Design – XAML
- Architecture – MVVM
- Architecture – IoC/DI
- Storage
- Networking – API
- Topic of your choice

Goals

- Course organization
- Get in touch with .NET MAUI
- Go through environment setup
- Get to know available layouts and controls

Course Organization

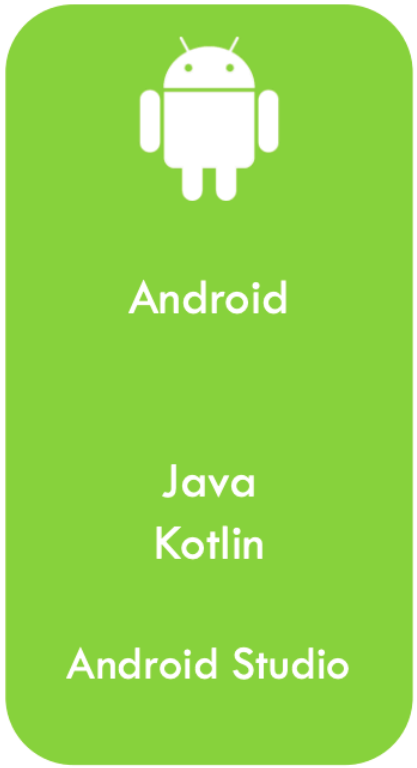
- Interactive syllabi – IS
- Materials & Resources
  - Materials repository
  - Sample app repository
- Stream/recordings – Youtube
- Optional homeworks
- Project

- Discord

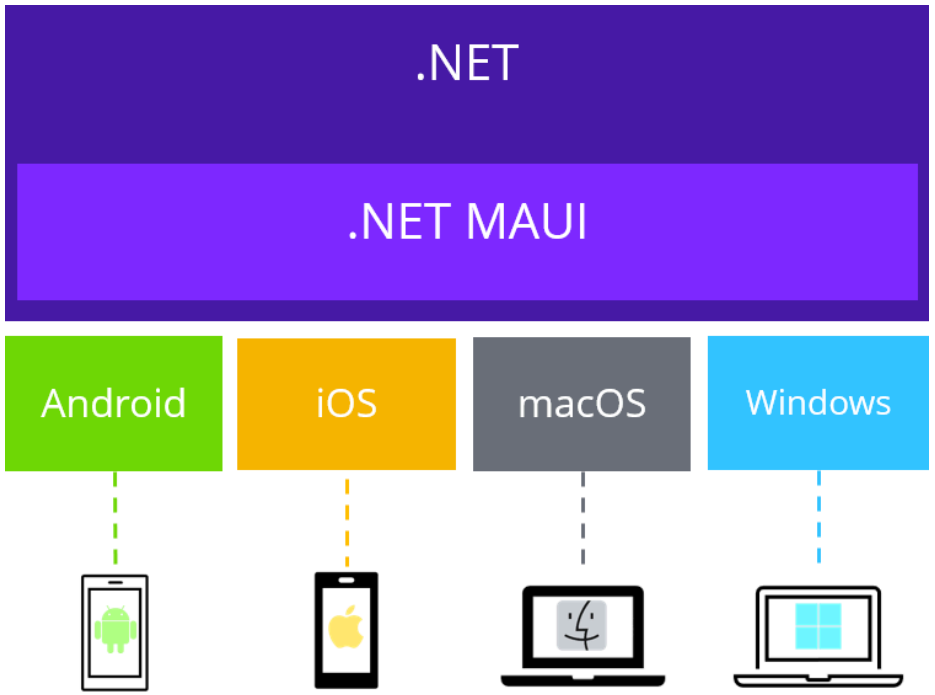
Sample Application

- CookBook
- Android, iOS, Windows
- Communication with API
- Basic CRUD operations
- Saving of settings
- MVVM architecture
- Shell navigation

"Standard" Application Development



.NET Multi-platform App UI



Cross-platform, native UI

Single project system, single codebase

Deploy to multiple devices, mobile & desktop

How it Works - Structure

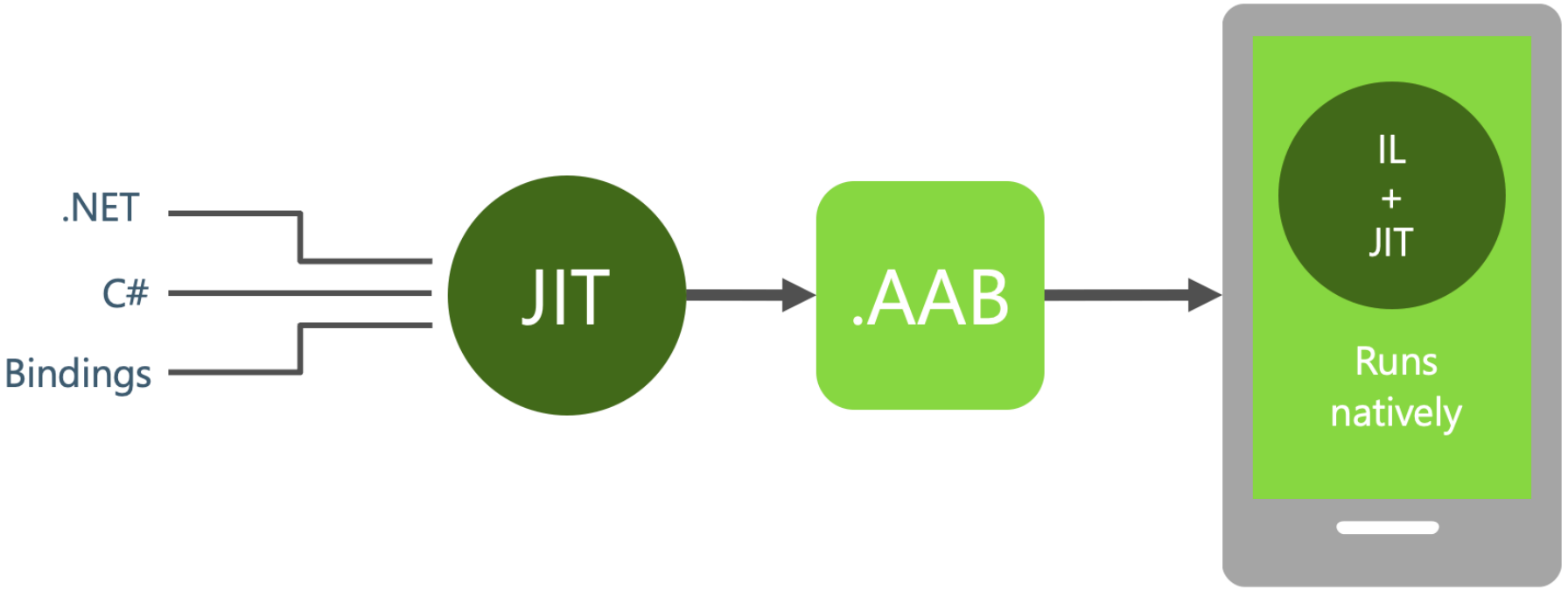
- Platform specific frameworks
  - .NET for Android
  - .NET for iOS
  - .NET for MacOS
- Windows UI (WinUI) library
- Common BCL - .NET
- .NET Runtimes
  - Mono – Android, iOS, MacOS
  - WinRT/Win32 – Windows

How it Works - UI

- Platform specific UI
  - Different platforms - different ways of defining UI
  - Can be defined separately using platform specific APIs
  - .NET for Android, .NET for iOS, .NET for MacOs, WinUI
- Common UI
  - Single framework for defining UI – mobile & desktop
  - XAML

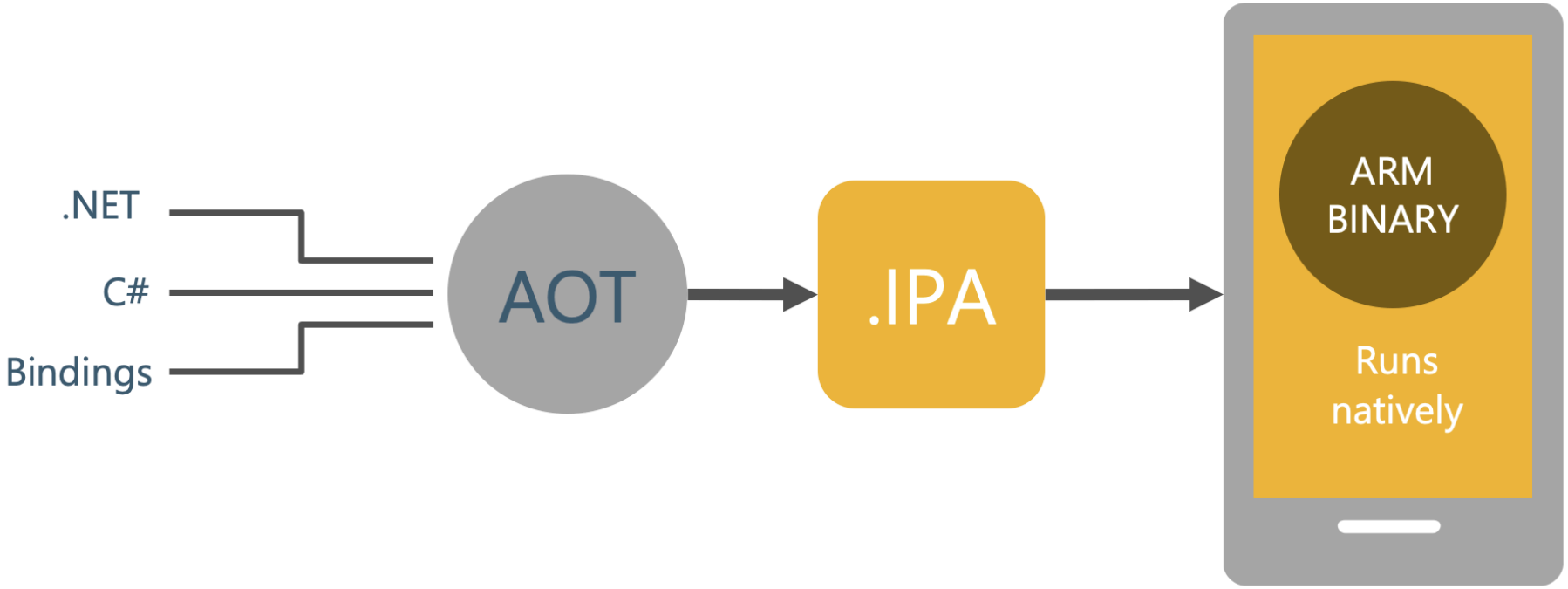
How it Works - Android

- C# compiles to intermediate language (IL)
- IL + JIT in app



How it Works - iOS

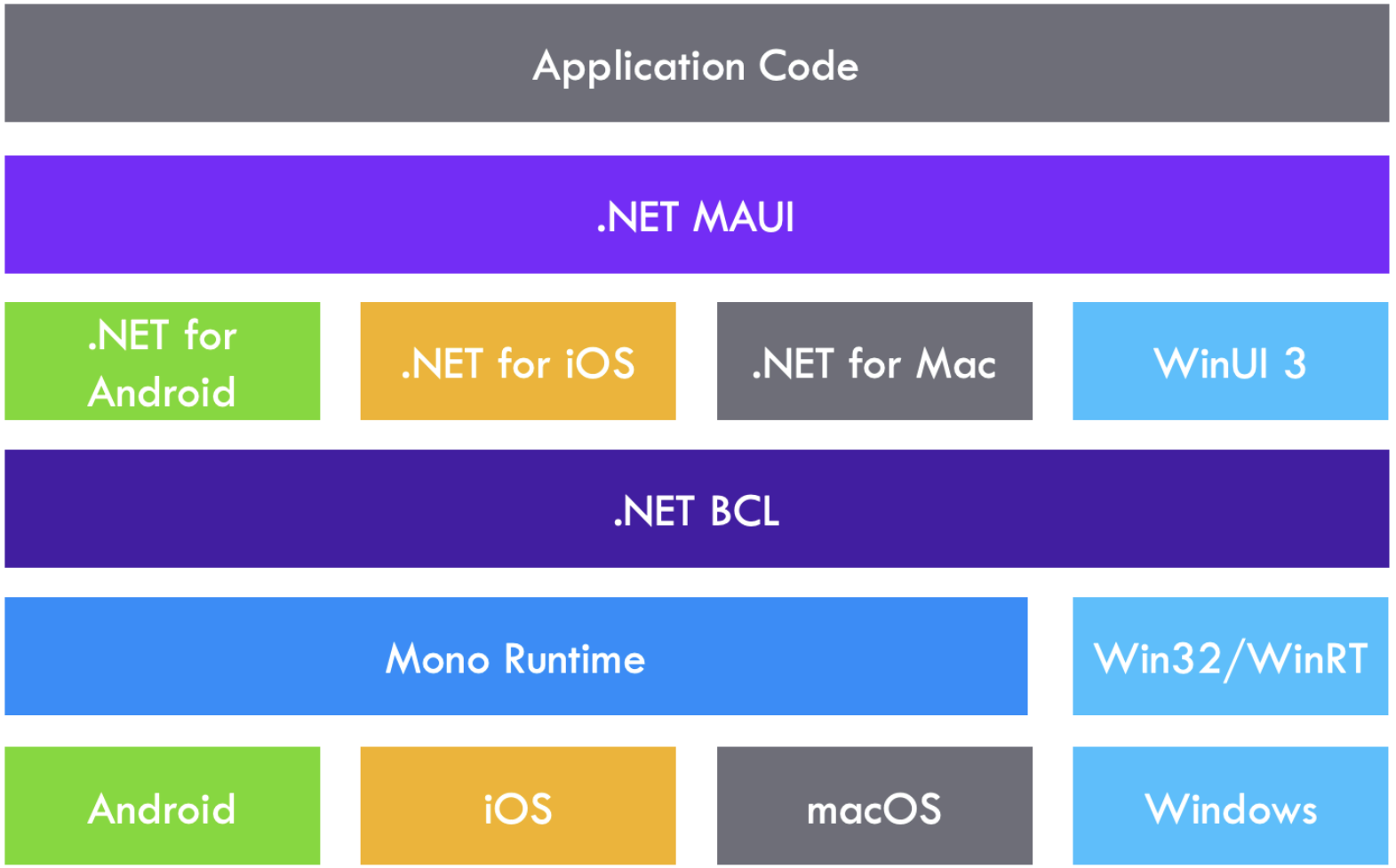
- Fully ahead-of-time (AOT) compiled to native ARM binary



How it Works - macOS & Windows

- MacOS
  - Using Mac Catalyst
  - Apple’s solution to bring iOS Apps to desktop
  - Provides access to Mac OS APIs
- Windows
  - WinUI 3 library
  - Native apps and UWP

How .NET MAUI Works



.NET MAUI

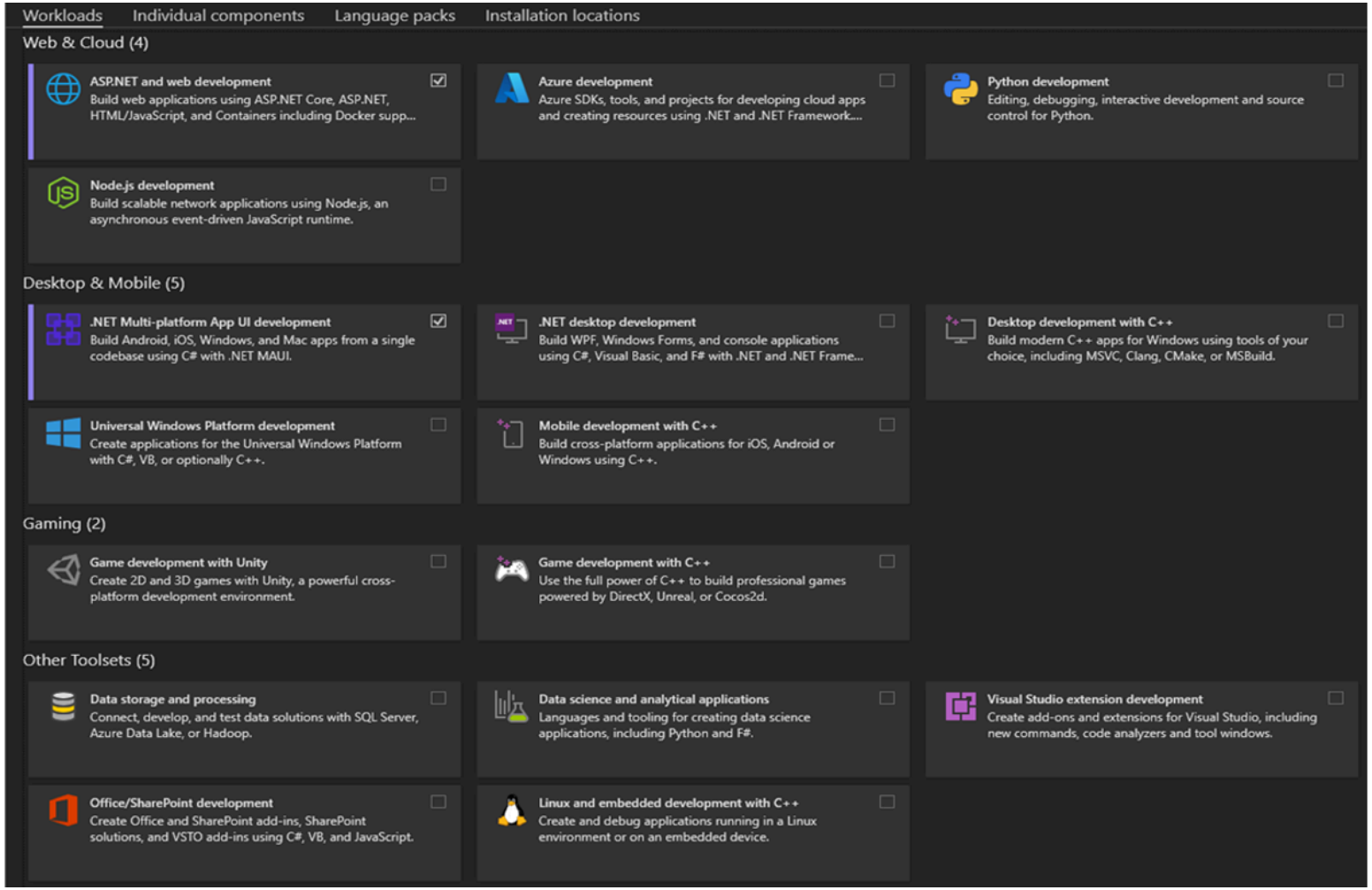
- Collection of Controls
- Layout engine for pages
- Navigation – pages, drawers
- Customizable handlers – enable platform specific controls
- APIs for native device features – GPS, accelerometer…
- Graphics library for 2D drawing code
- Single project, multi-targeting system
- .NET hot reload

Setup


Visual Studio
for Windows


C#
.NET MAUI
.NET MAUI
extension for VS Code

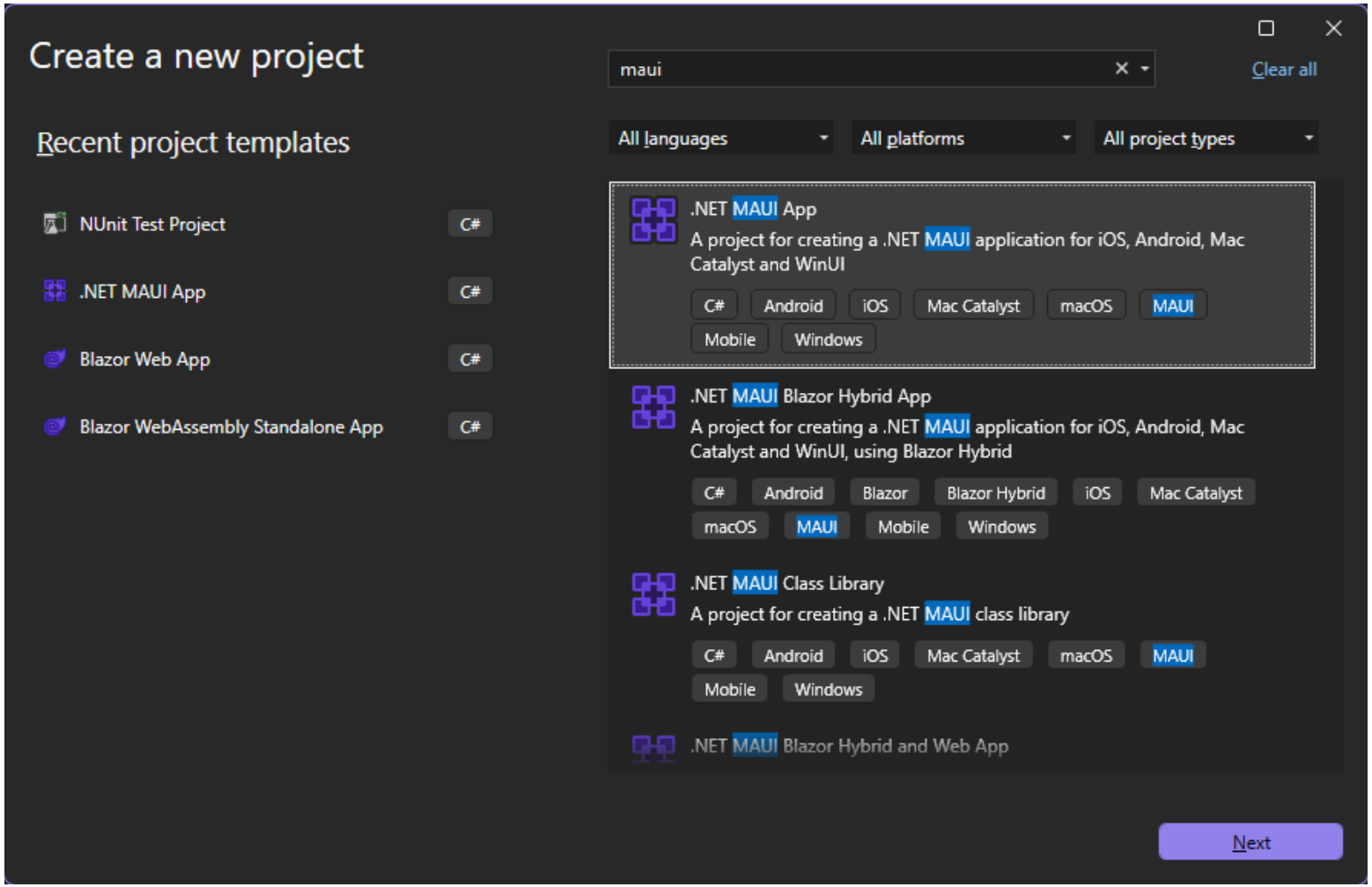
Visual Studio Workloads



iOS Development

- You need Mac Agent to compile the application
- Compilation runs on a Mac OS device
- Simulator and development can be done on Windows

Create a New Project



Create a New Project

DEMO

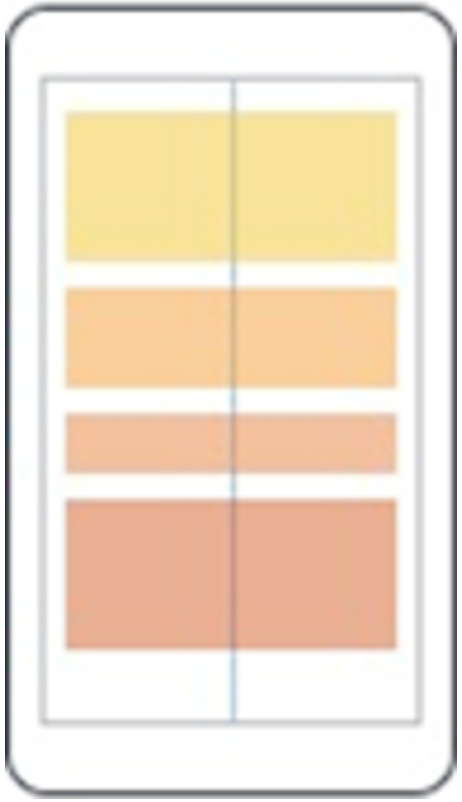
Project Structure

- One project for all platforms
- Shared code & resources (fonts, images, icons, splash screens…)
- Platforms folder:
  - Android – system colors, manifest
  - iOS – launch screen, Info.plist
  - Windows – package manifest, app manifest
  - Mac OS – Info.plist
  - Each platform
    - Application startup point
    - Custom handlers for application specific controls

Layouts

Grid

StackLayout



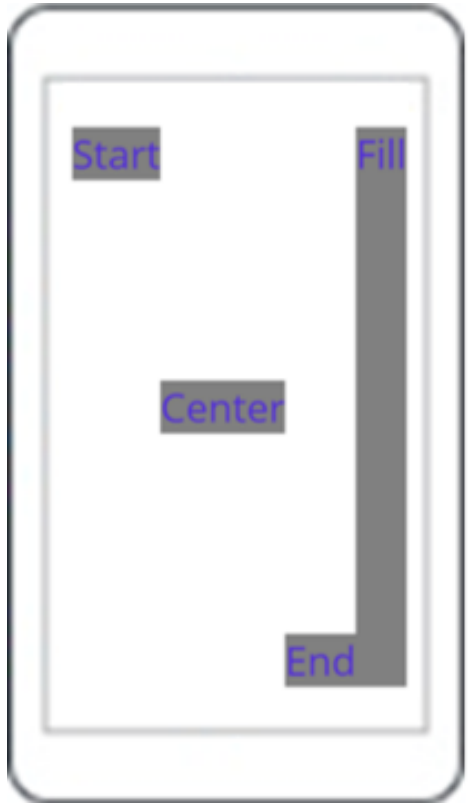
Grid

- Table-style layout
- RowDefinitions, ColumnDefinitions
  - Width / Height = 150 | * | Auto
- Grid.Row, Grid.Column – placement of control in the Grid
- Grid.RowSpan, Grid.ColumnSpan – control can span over multiple “cells”
- HorizontalSpacing, VerticalSpacing – empty space between “cells”

Layouts - StackLayout

VerticalStackLayout

HorizontalStackLayout

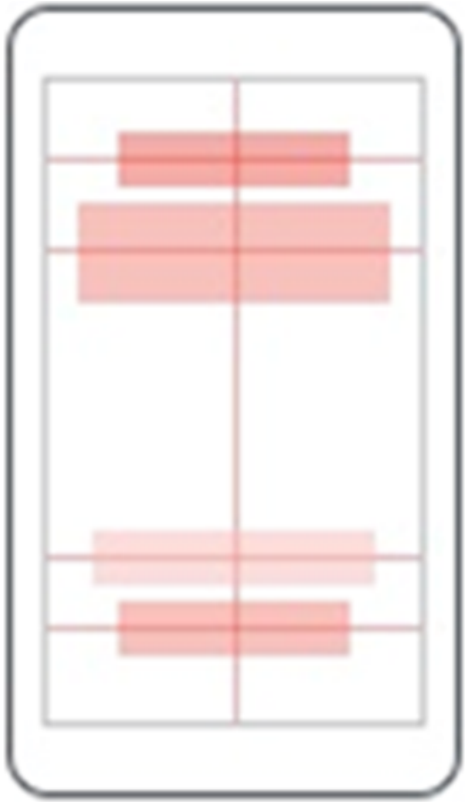


StackLayout...

- HorizontalStackLayout, VerticalStackLayout
  - Individual layouts for single direction
  - Separate LayoutManagers with Measure methods
  - Recommended
- StackLayout
  - Wraps HorizontalStackLayout and VerticalStackLayout
  - Has Orientation
  - Useful for adaptive layouts

Layouts

AbsoluteLayout



FlexLayout

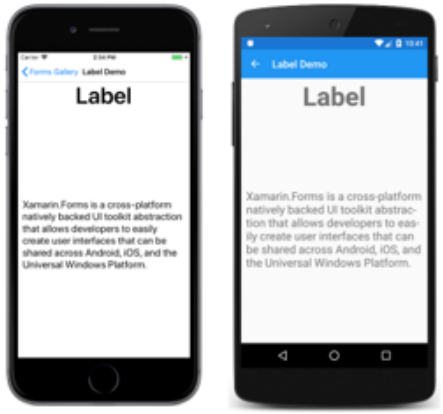
Layouts

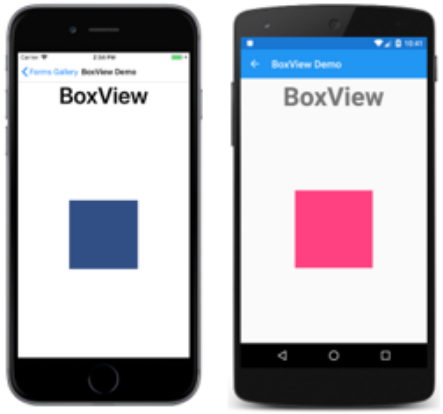
DEMO

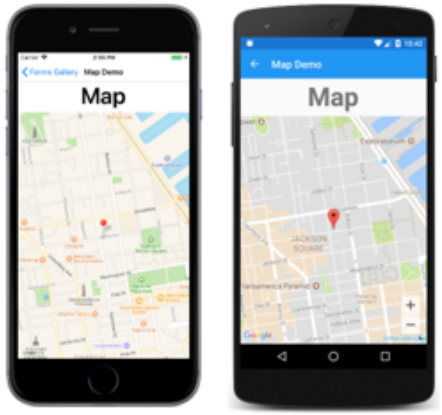
Controls

ActivityIndicator	BoxView	Button	DatePicker	Editor
Entry	Image	Label	TimePicker	Slider
OpenGLView	Picker	ProgressBar	SearchBar	Stepper
WebView	TableView	ListView	TextCell	EntryCell
ImageCell	SwitchCell	ViewCell	Map	...

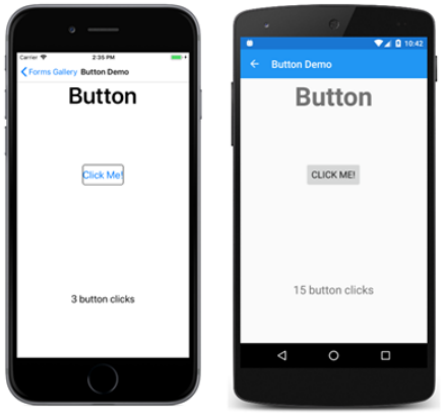
Content Presentation

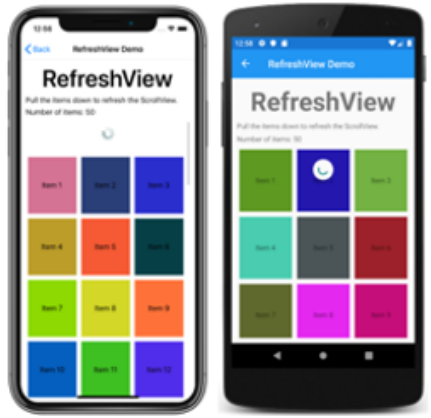


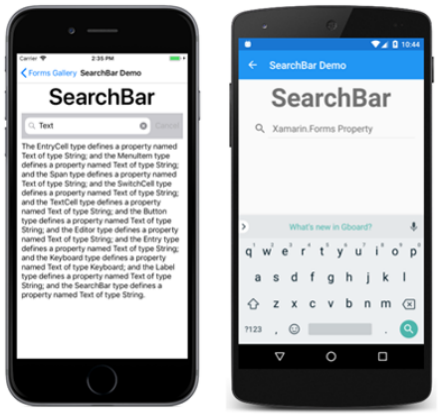


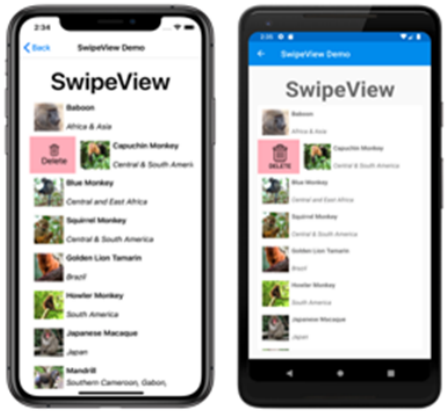


Actionable Controls

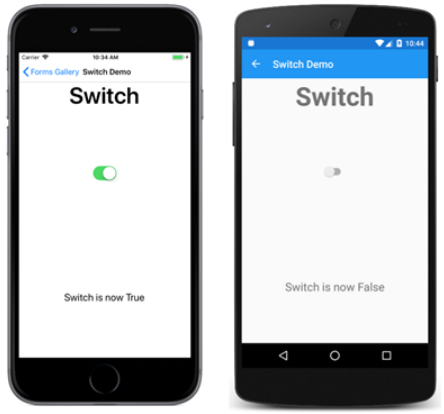


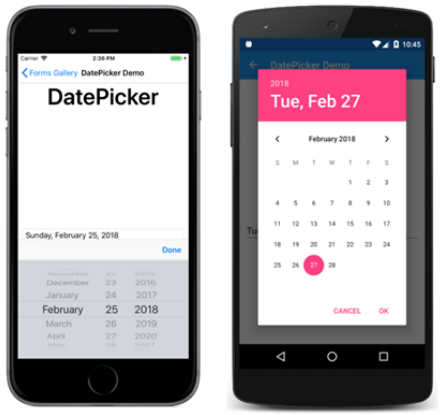


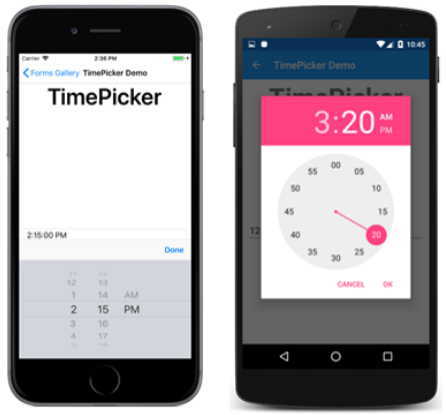




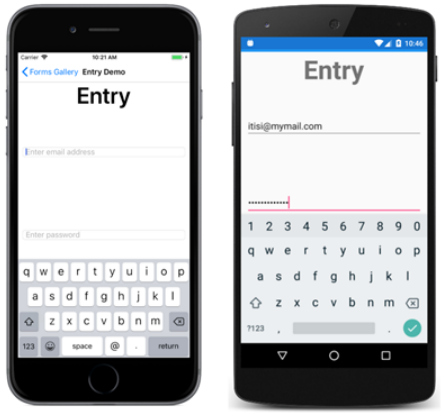
Setting Values

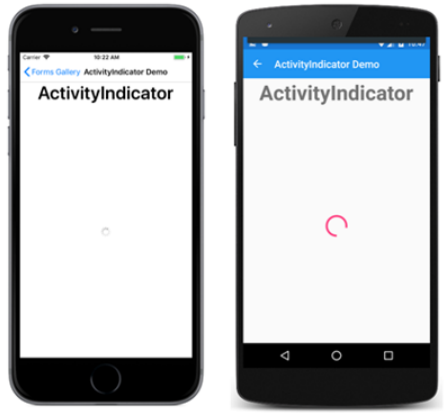


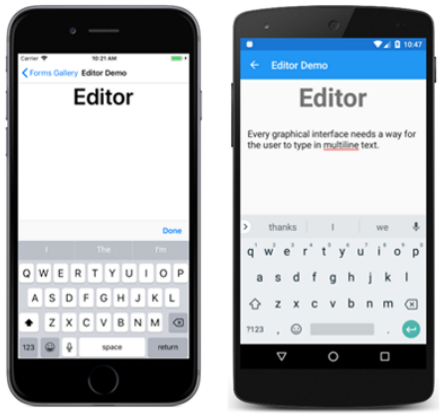




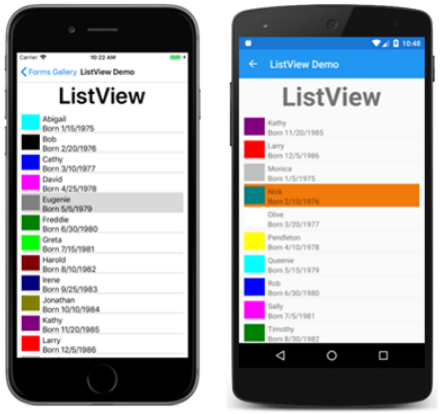
Editing Text & Activity Indication

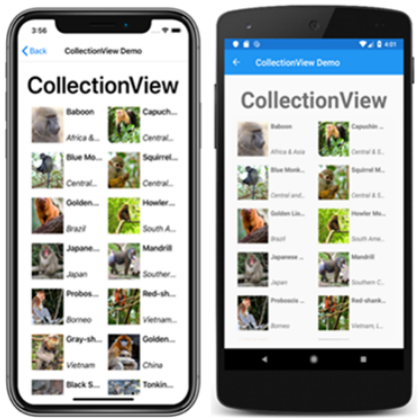


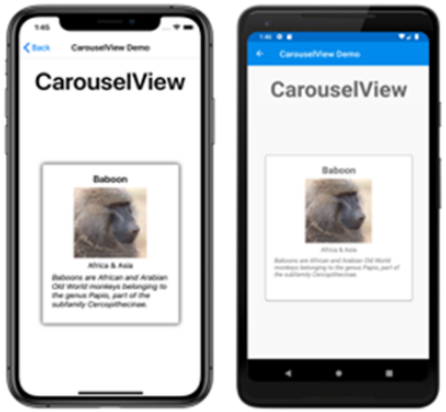


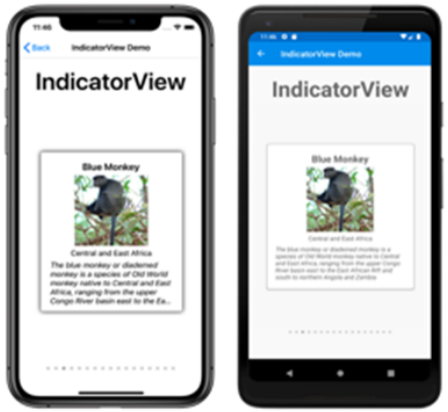


Collections

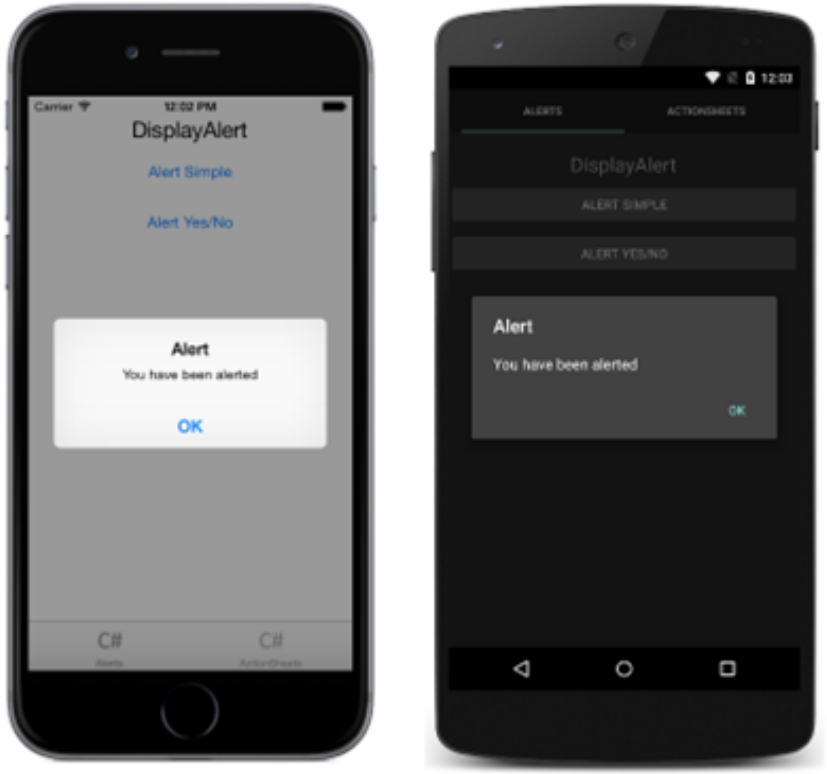


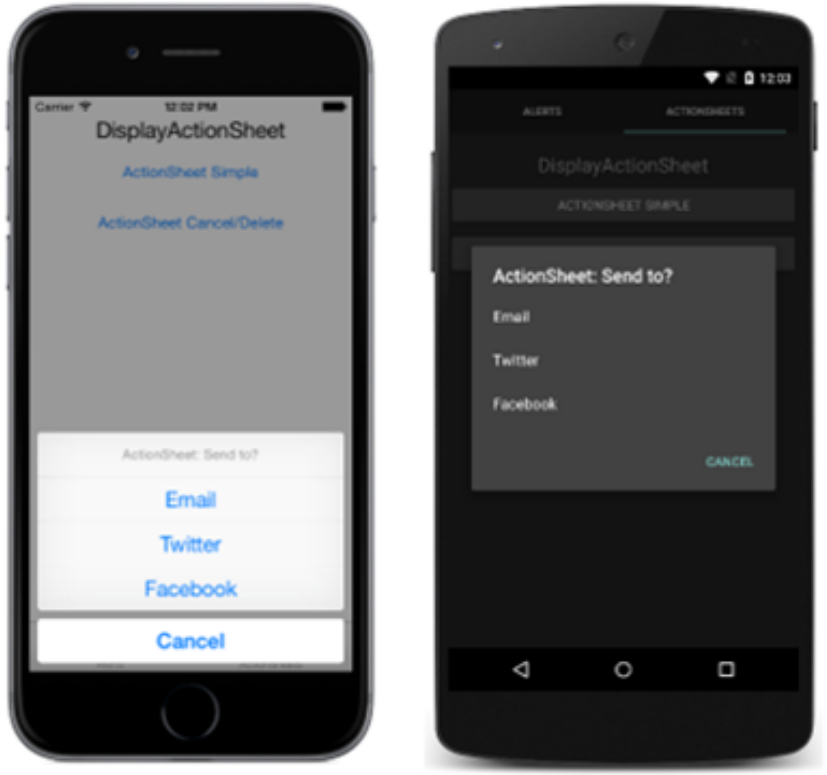






Pop-ups


DisplayAlert
Alert Simple
Alert Yes/No
Alert
You have been alerted
OK
C#
C#
DisplayAlert
ALERT SIMPLE
ALERT YES/NO
Alert
You have been alerted
OK


DisplayActionSheet
ActionSheet Simple
ActionSheet Cancel/Delete
ActionSheet: Send to?
Email
Twitter
Facebook
Cancel
DisplayActionSheet
ACTIONSHEET SIMPLE
ActionSheet: Send to?
Email
Twitter
Facebook
CANCEL

Commercial components

Additional content suggestions

- Useful tools - scrcpy, QuickTime/Mirror on Mac, adb uninstall, Appium Inspector, Android Studio, etc.
- Using AI in .NET MAUI development
- Application configuration
- Working with Bluetooth
- Media picker/file picker
- Realtime communication (chat app)
- Aspire, diagnostics, application metrics
- UI Testing
- Accessibility

Today's Goals

- People introduction
- Get in touch with .NET MAUI
- Go through environment setup
- Get to know available layouts and controls