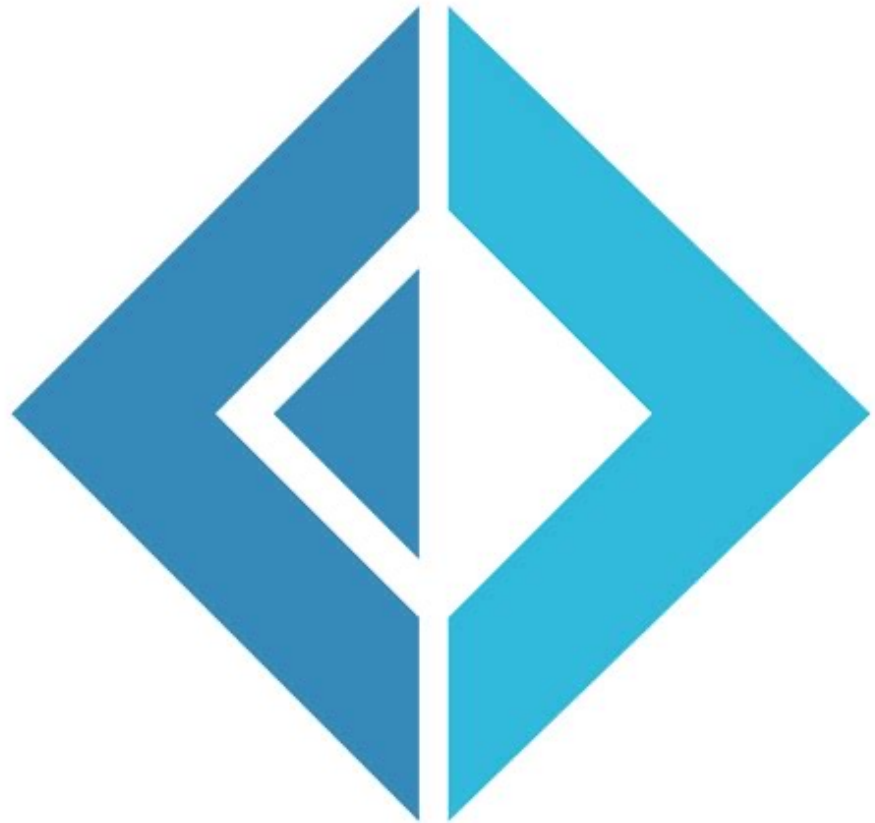
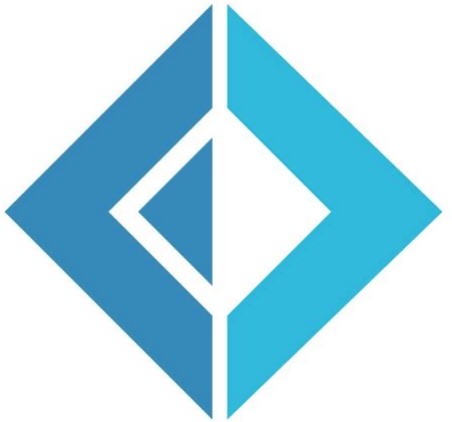

DWX
DEVELOPER WEEK '21
Fabulous Functional Frontends
Mark Allibone
Mobile Lead
Rey Technology
#dwx21
@mallibone



- No Nulls
- Immutability
- Declarative Programming
- Based on .NET



F# is great for BLOBs – overall a great general-purpose .NET language

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Why not just use Xamarin Forms?!

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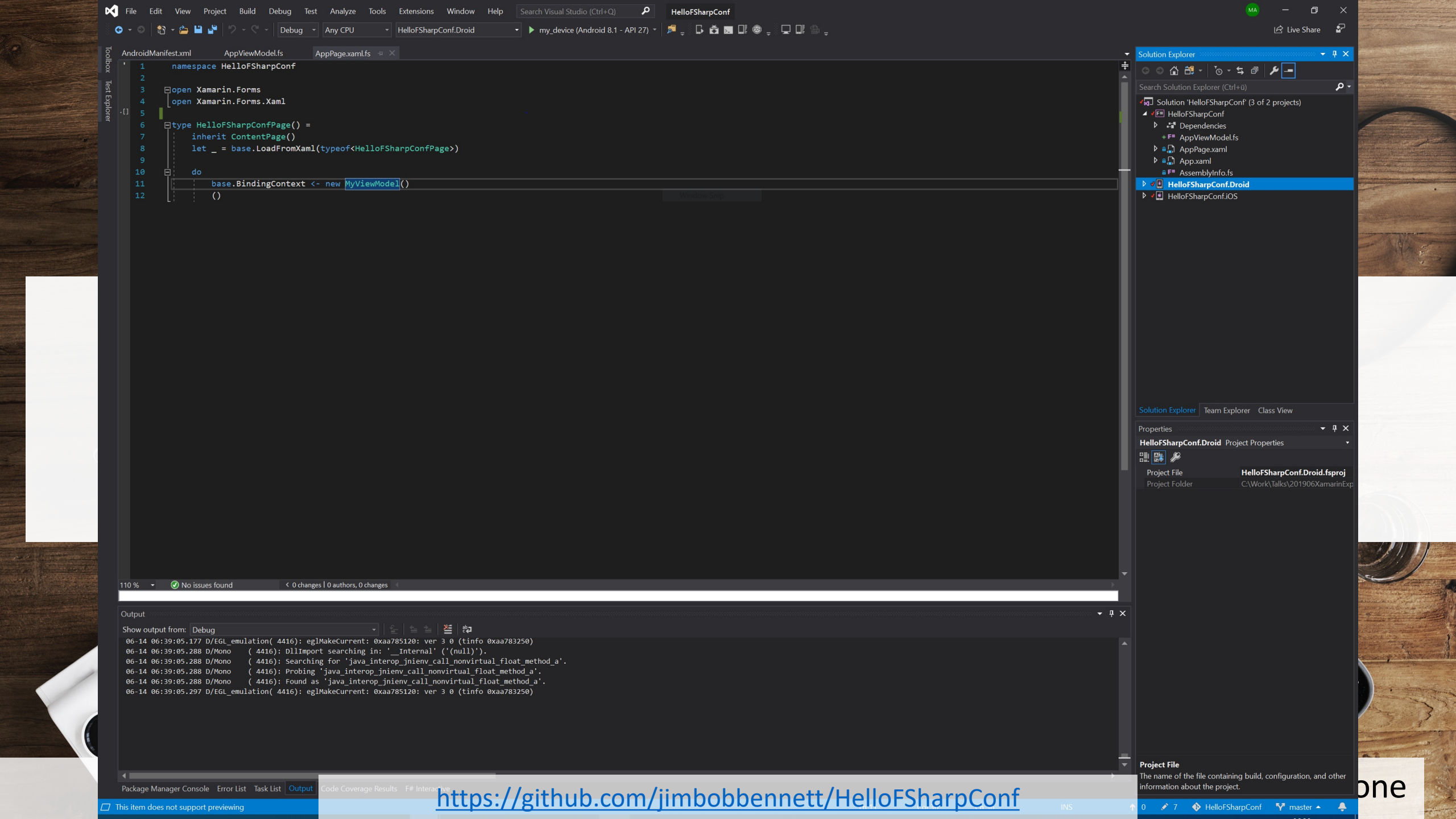
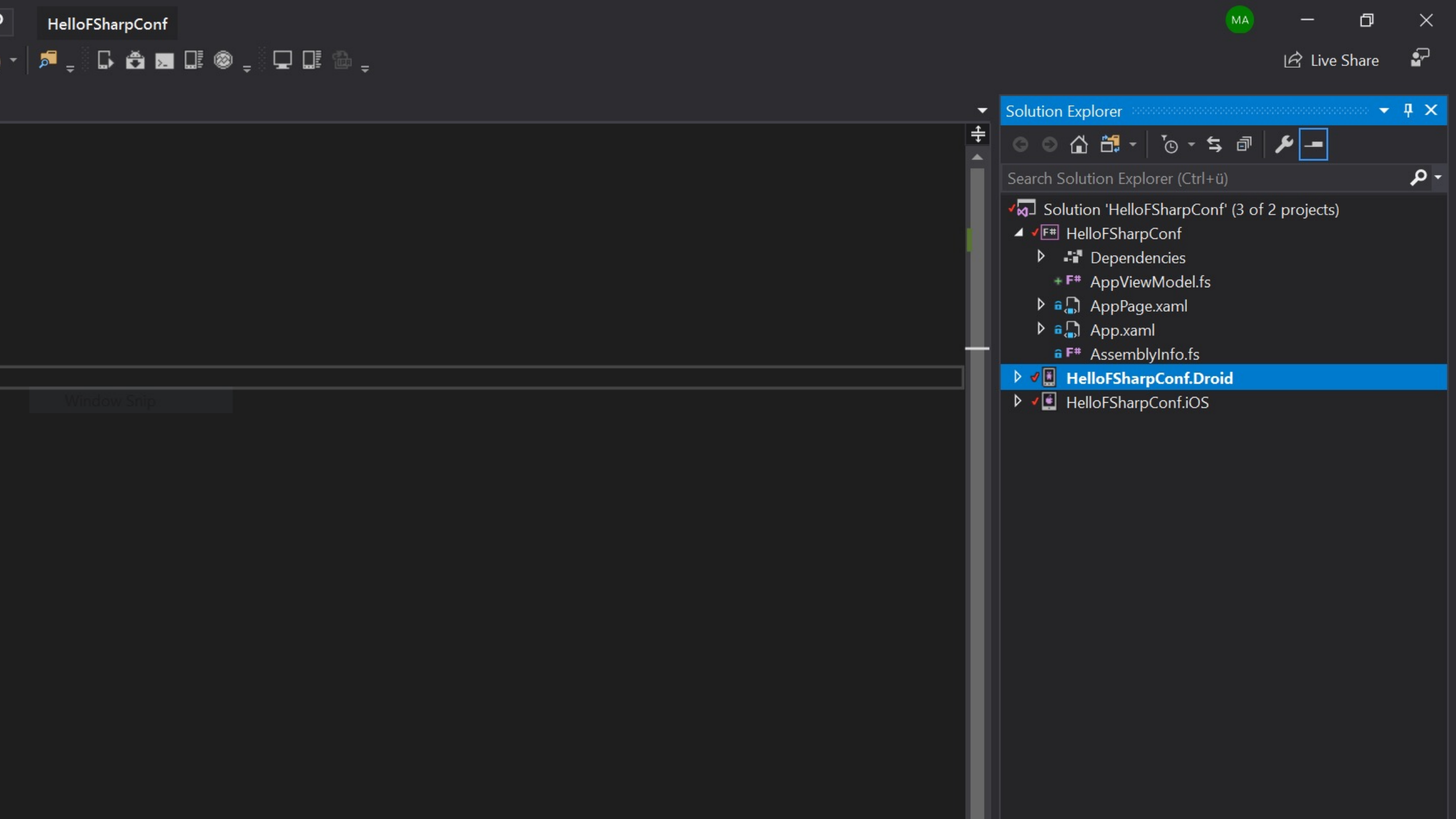
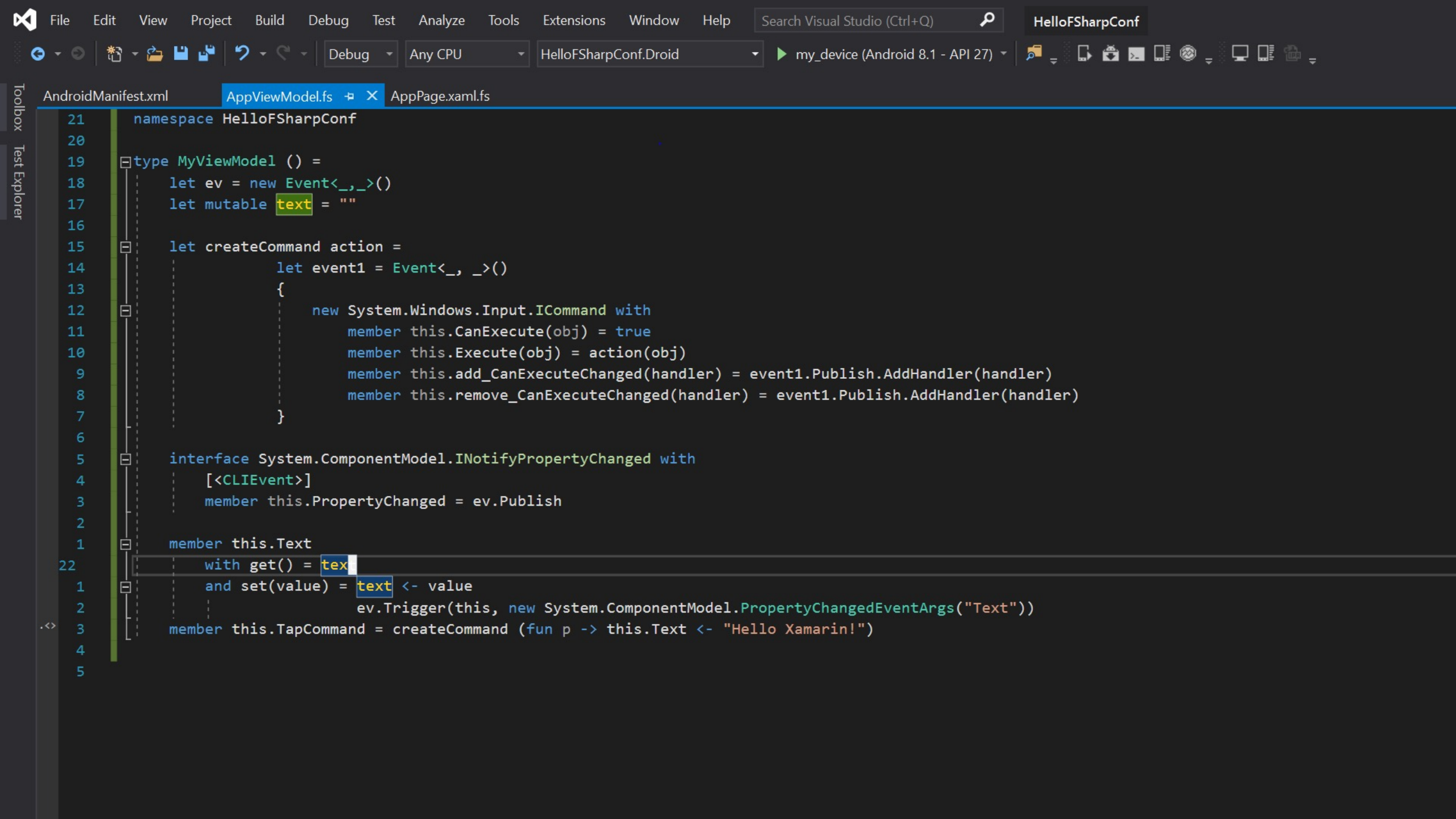


https://github.com/jimbobbennett/HelloFSharpConf


HelloFSharpConf
MA
Live Share
Solution Explorer
Search Solution Explorer (Ctrl+ü)
Solution 'HelloFSharpConf' (3 of 2 projects)
HelloFSharpConf
Dependencies
AppViewModel.fs
AppPage.xaml
App.xaml
AssemblyInfo.fs
HelloFSharpConf.Droid
HelloFSharpConf.iOS


File Edit View Project Build Debug Test Analyze Tools Extensions Window Help
Search Visual Studio (Ctrl+Q)
HelloFSharpConf
Debug
Any CPU
HelloFSharpConf.Droid
my_device (Android 8.1 - API 27)
AndroidManifest.xml
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AppPage.xaml.fs
Toolbox
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member this.PropertyChanged = ev.Publish
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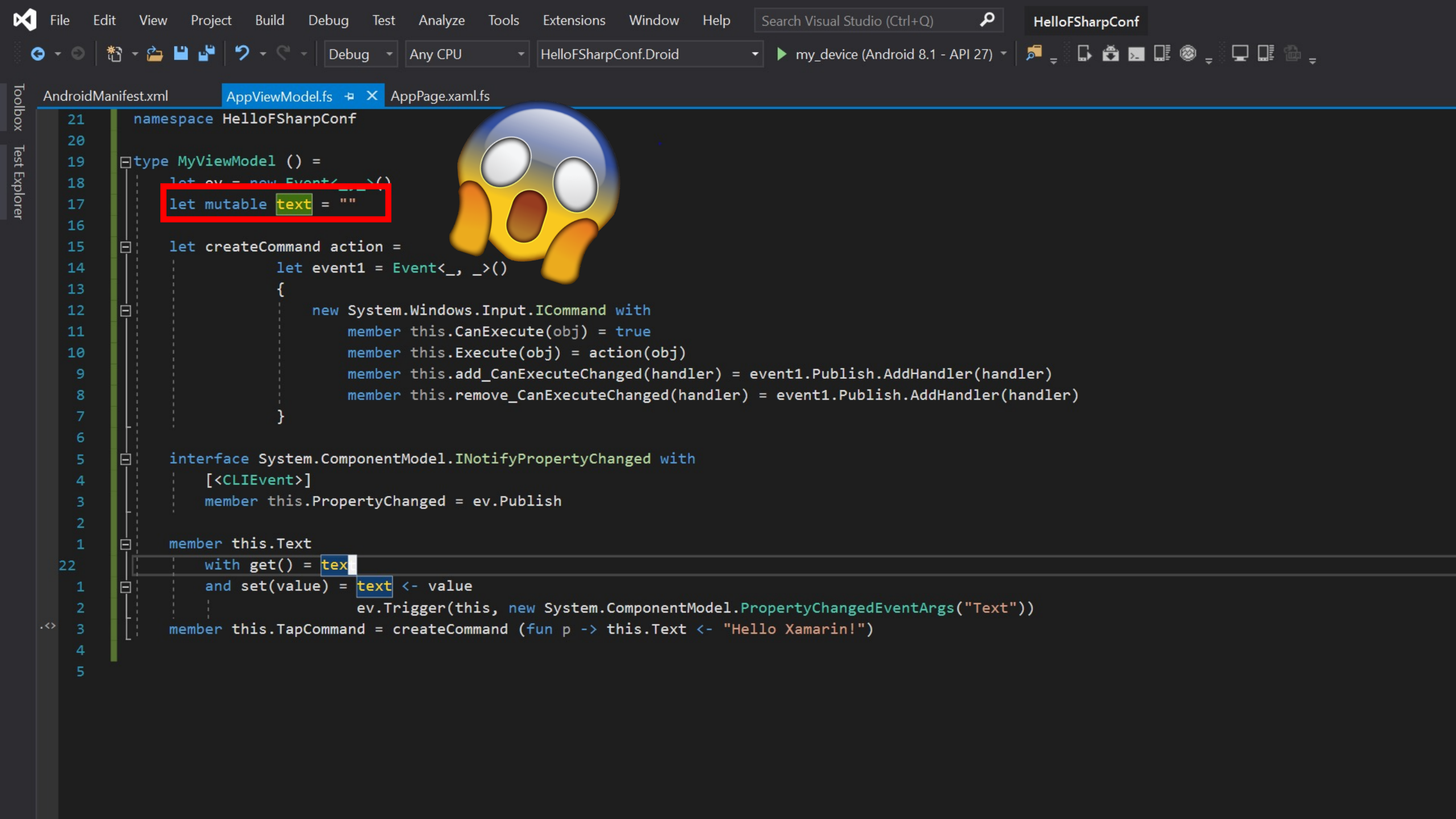
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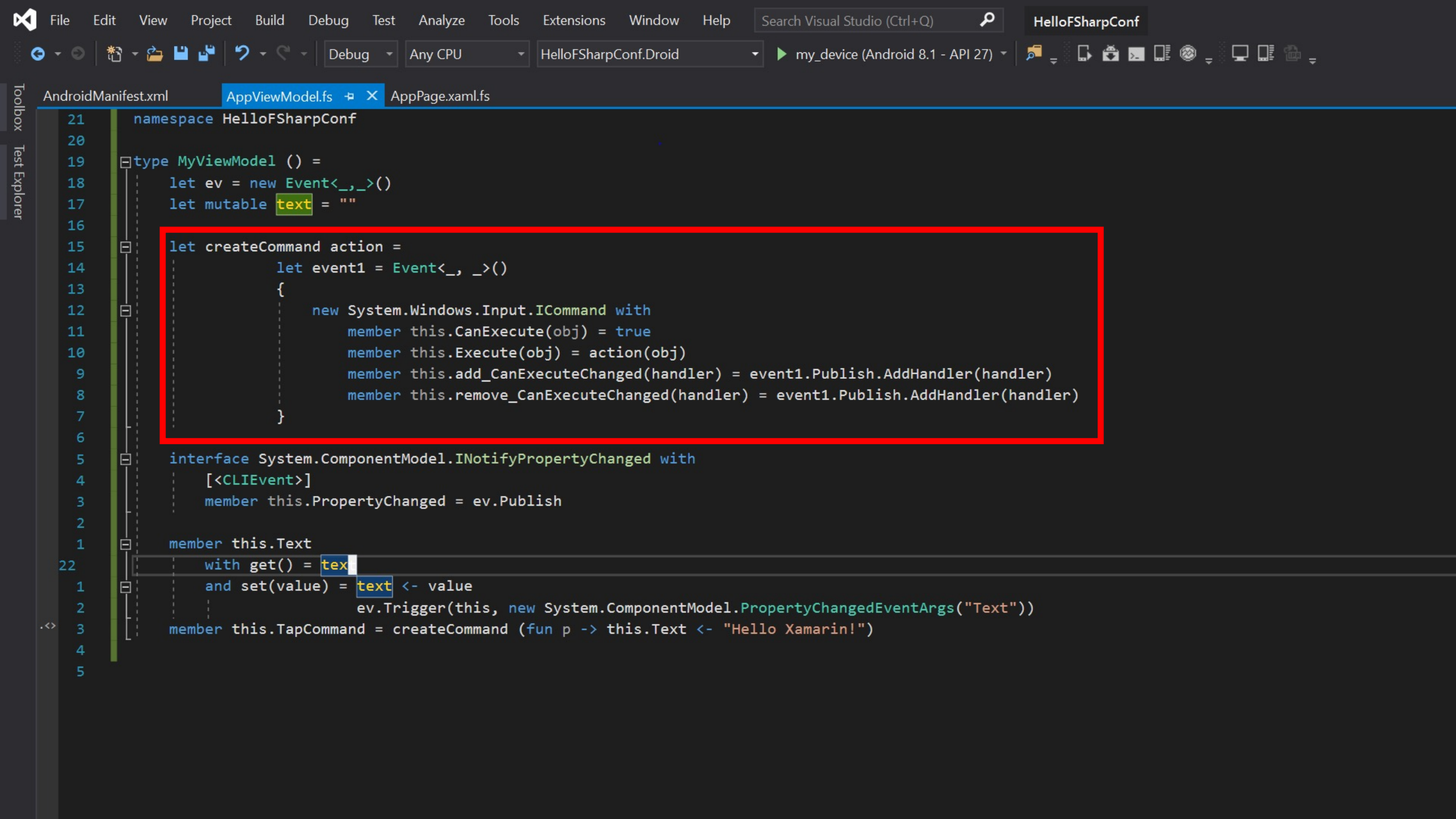
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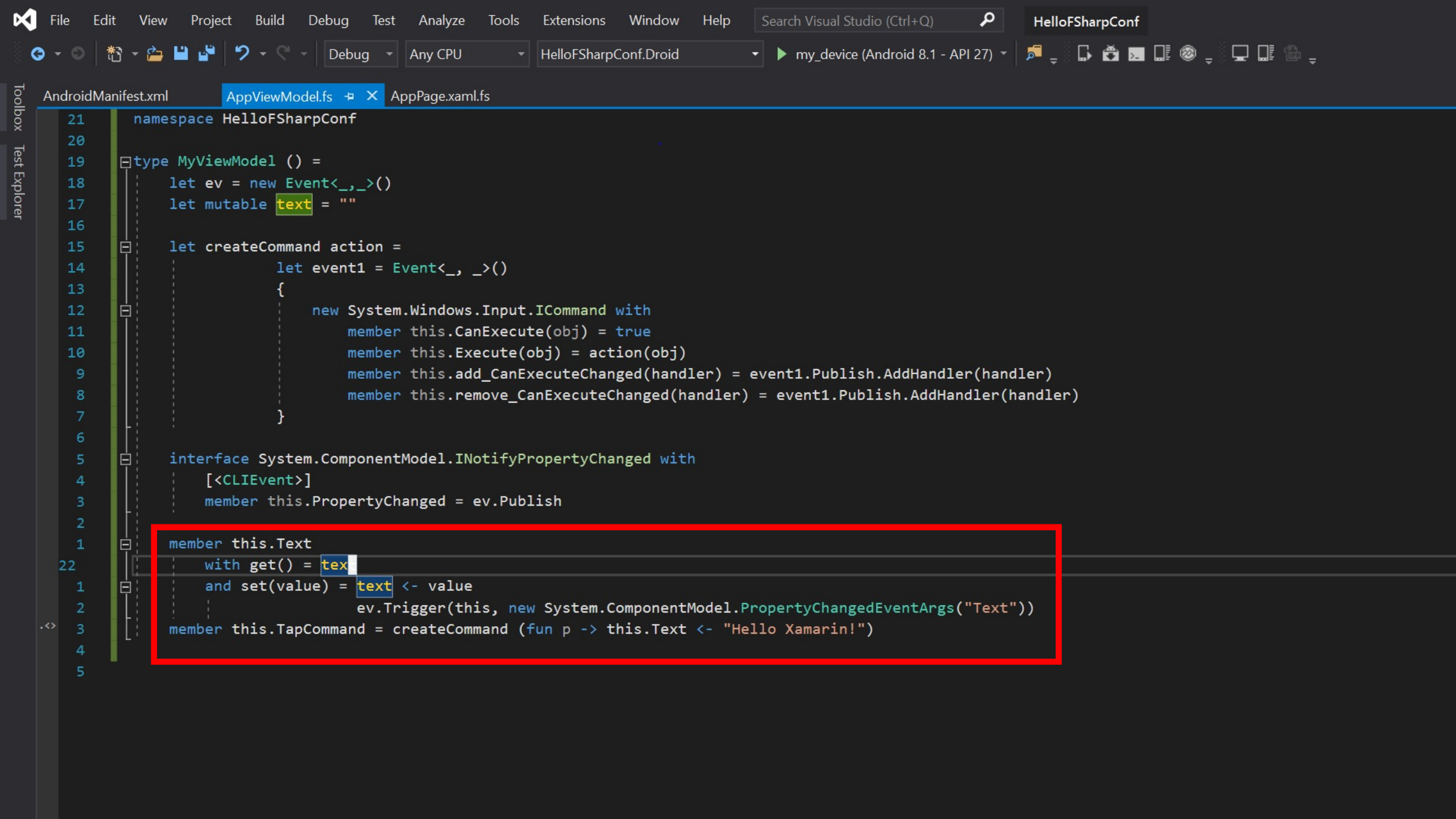
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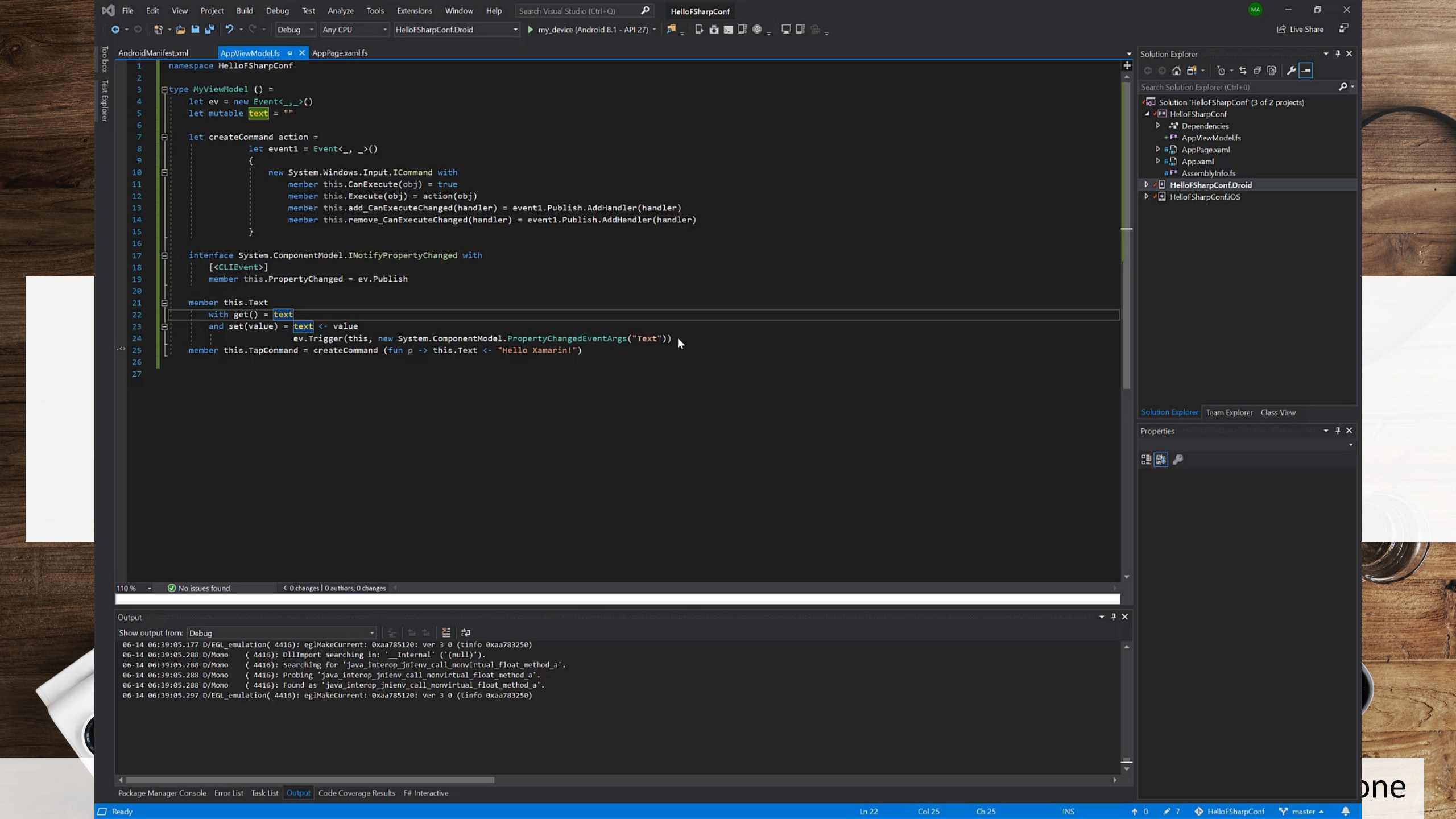
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110 %
No issues found
0 changes | 0 authors, 0 changes
Solution Explorer
Search Solution Explorer (Ctrl+ü)
Solution 'HelloFSharpConf' (3 of 2 projects)
HelloFSharpConf
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AppViewModel.fs
AppPage.xaml
App.xaml
AssemblyInfo.fs
HelloFSharpConf.Droid
HelloFSharpConf.iOS
Solution Explorer
Team Explorer
Class View
Properties
Output
Show output from: Debug
06-14 06:39:05.177 D/EGL_emulation(4416): eglMakeCurrent: 0xaa785120: ver 3 0 (tinfo 0xaa783250)
06-14 06:39:05.288 D/Mono (4416): DllImport searching in: '__Internal' ('(null)').
06-14 06:39:05.288 D/Mono (4416): Searching for 'java_interop_jnienv_call_nonvirtual_float_method_a'.
06-14 06:39:05.288 D/Mono (4416): Probing 'java_interop_jnienv_call_nonvirtual_float_method_a'.
06-14 06:39:05.288 D/Mono (4416): Found as 'java_interop_jnienv_call_nonvirtual_float_method_a'.
06-14 06:39:05.297 D/EGL_emulation(4416): eglMakeCurrent: 0xaa785120: ver 3 0 (tinfo 0xaa783250)
Package Manager Console
Error List
Task List
Output
Code Coverage Results
F# Interactive
Ready
Ln 22
Col 25
Ch 25
INS
HelloFSharpConf
master

F# can do OO programming but it is functional first

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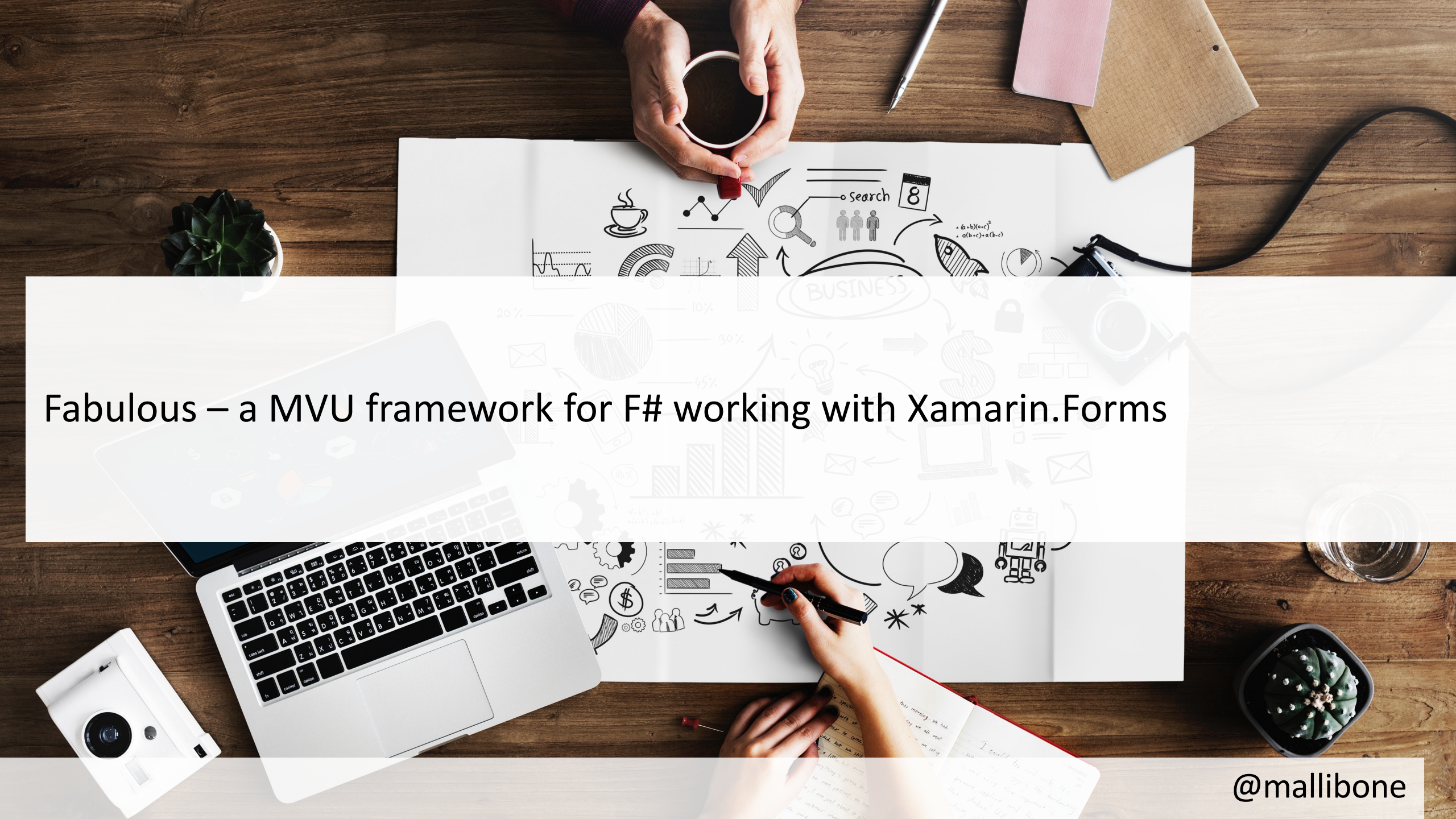

Fabulous – a MVU framework for F# working with Xamarin.Forms

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MVU the functional MV* Pattern

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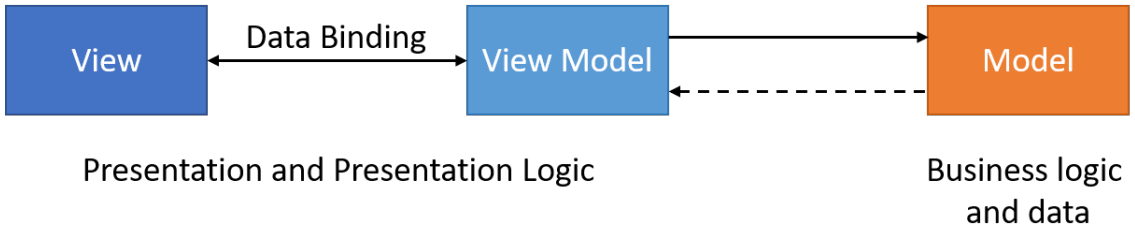
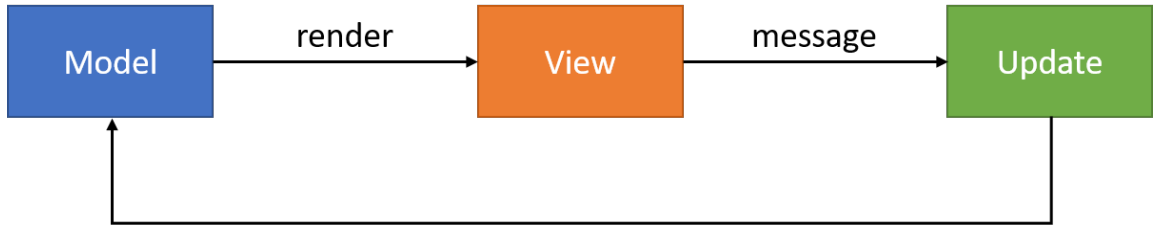
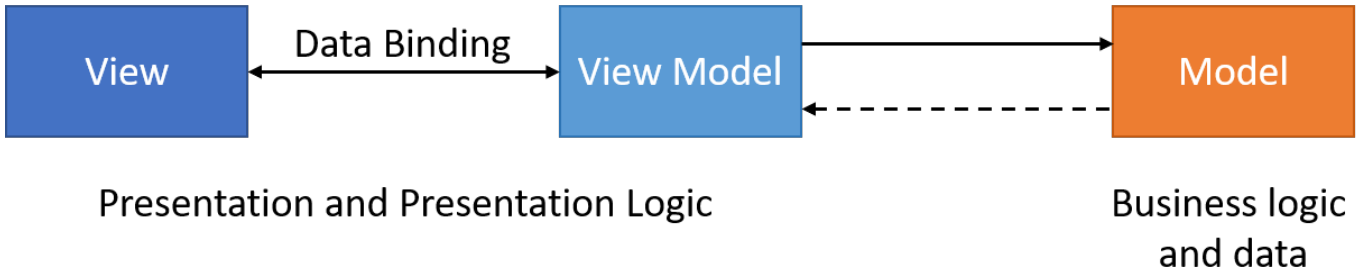
MVVM vs MVU

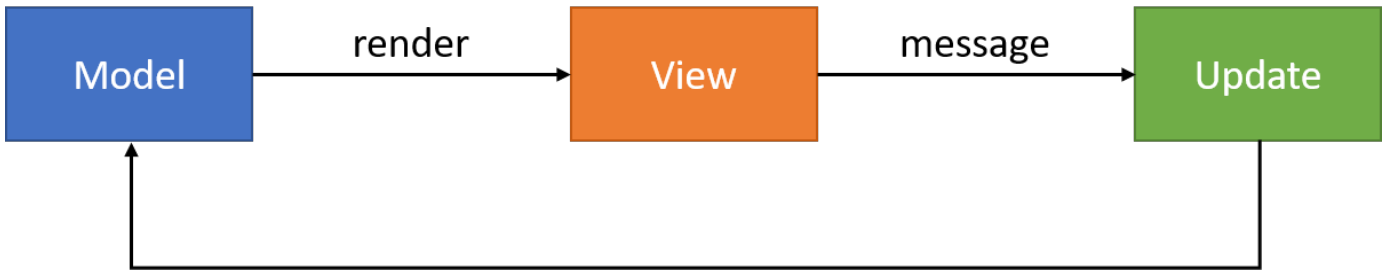

View
Data Binding
View Model
Model
Presentation and Presentation Logic
Business logic
and data


Model
render
View
message
Update

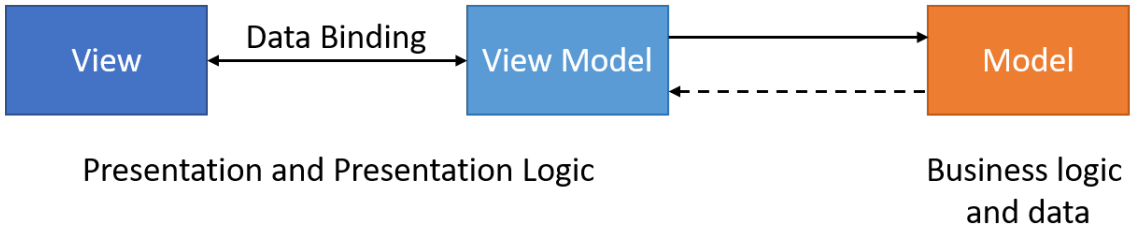
Model View View Model



Model View Update



MVVM vs MVU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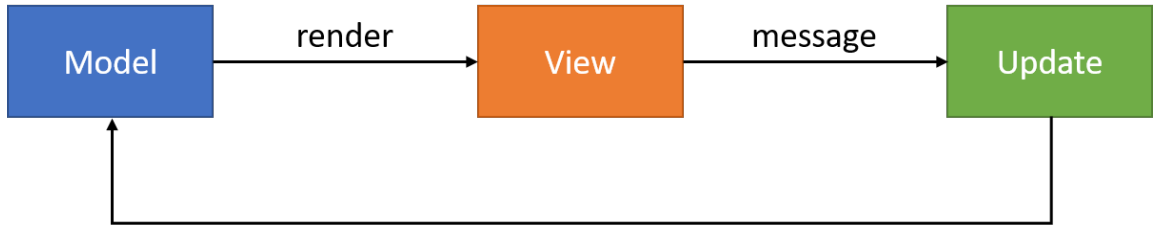

Model
render
View
message
Update

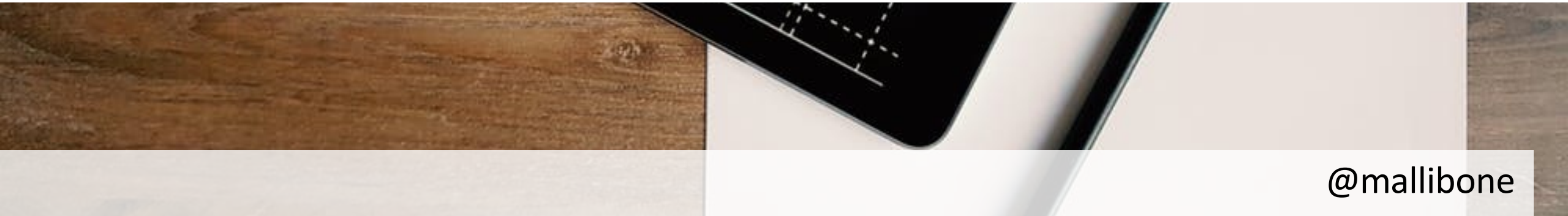
Functional Frontends

Getting started

1. Install Visual Studio or Visual Studio for Mac and enable both Xamarin and .NET Core support, these are listed as 'Mobile development with .NET' and '.NET Core Cross-platform development' respectively.

2. Open a command prompt window and install the template pack by entering:

```
dotnet new -i Fabulous.XamarinForms.Templates
```



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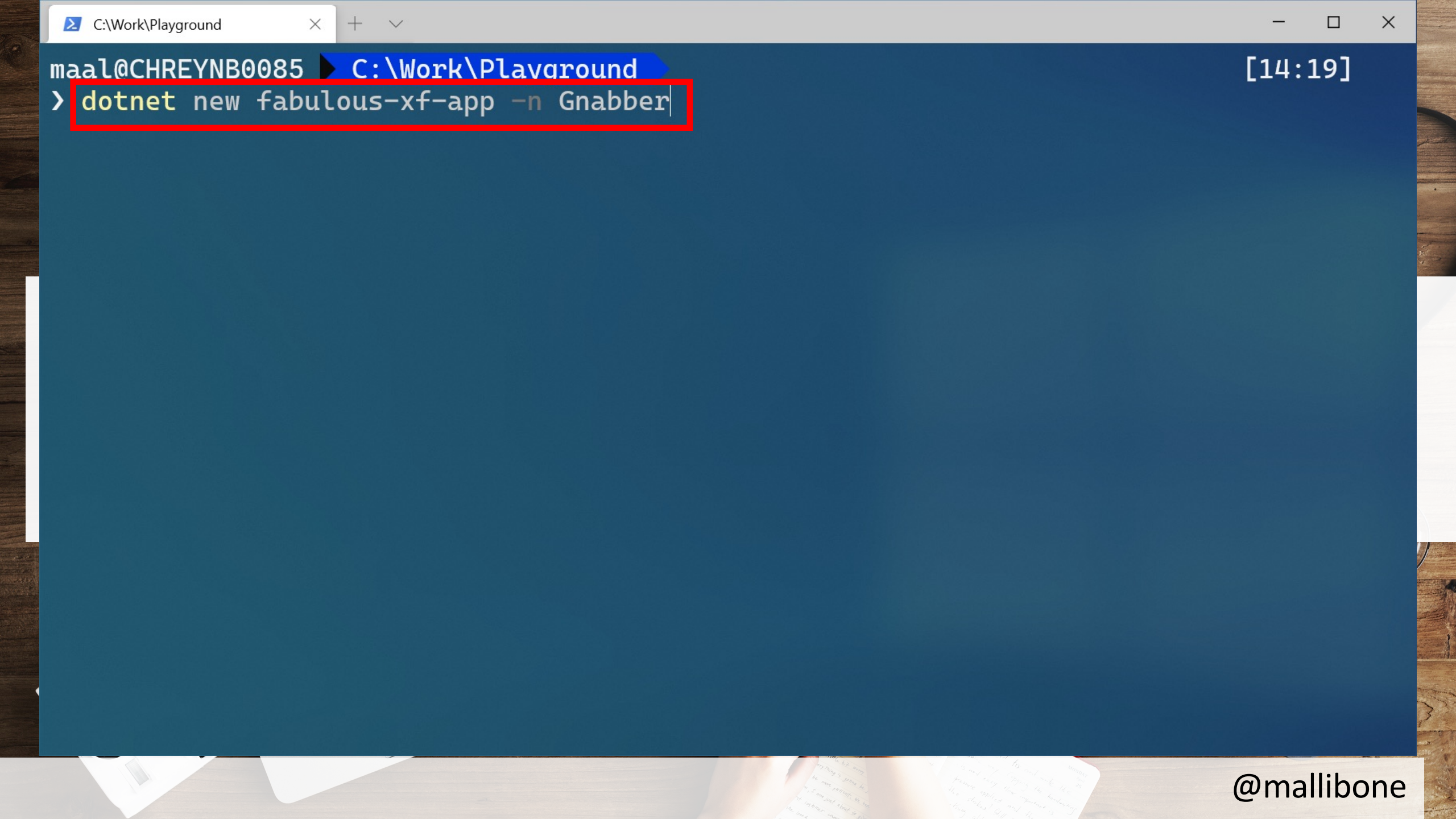
C:\Work\Playground
maal@CHREYNB0085 C:\Work\Playground
[14:19]
dotnet new fabulous-xf-app -n Gnabber

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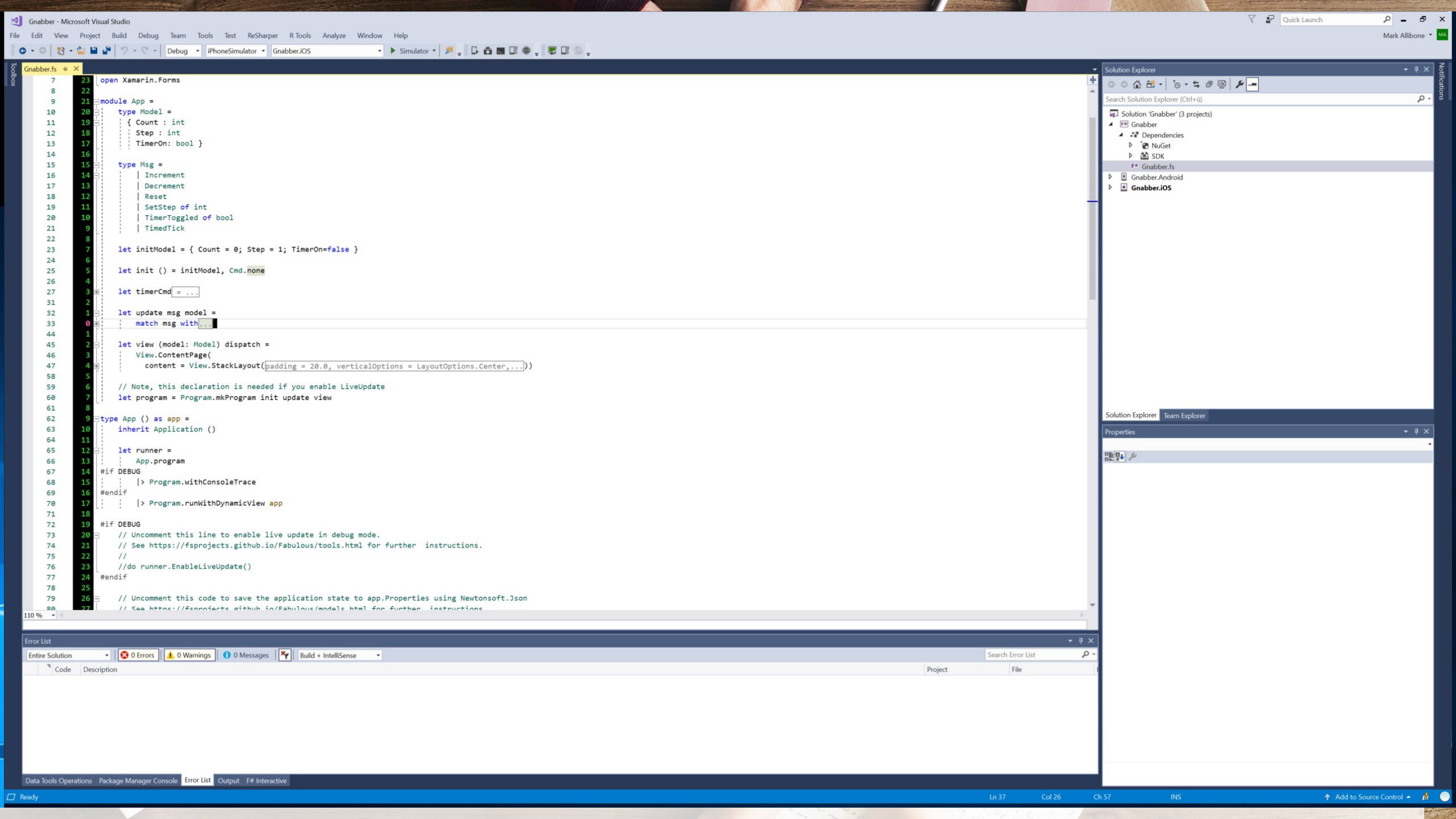
Gnabber - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test ReSharper R Tools Analyze Window Help
Debug iPhoneSimulator Gnabber.iOS Simulator
Gnabber.fs
open Xamarin.Forms
module App =
type Model =
{ Count : int
Step : int
TimerOn: bool }
type Msg =
| Increment
| Decrement
| Reset
| SetStep of int
| TimerToggled of bool
| TimedTick
let initModel = { Count = 0; Step = 1; TimerOn=false }
let init () = initModel, Cmd.none
let timerCmd = ...
let update msg model =
match msg with ...
let view (model: Model) dispatch =
View.ContentPage(
content = View.StackLayout(padding = 20.0, verticalOptions = LayoutOptions.Center,...))
// Note, this declaration is needed if you enable LiveUpdate
let program = Program.mkProgram init update view
type App () as app =
inherit Application ()
let runner =
App.program
#if DEBUG
|> Program.withConsoleTrace
#endif
|> Program.runWithDynamicView app
#if DEBUG
// Uncomment this line to enable live update in debug mode.
// See https://fsprojects.github.io/Fabulous/tools.html for further instructions.
//
//do runner.EnableLiveUpdate()
#endif
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Solution Explorer
Search Solution Explorer (Ctrl+ü)
Solution 'Gnabber' (3 projects)
Gnabber
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NuGet
SDK
Gnabber.fs
Gnabber.Android
Gnabber.iOS
Solution Explorer
Team Explorer
Properties
Error List
Entire Solution
0 Errors
0 Warnings
0 Messages
Build + IntelliSense
Search Error List
Code
Description
Project
File
Data Tools Operations
Package Manager Console
Error List
Output
F# Interactive
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Ch 57
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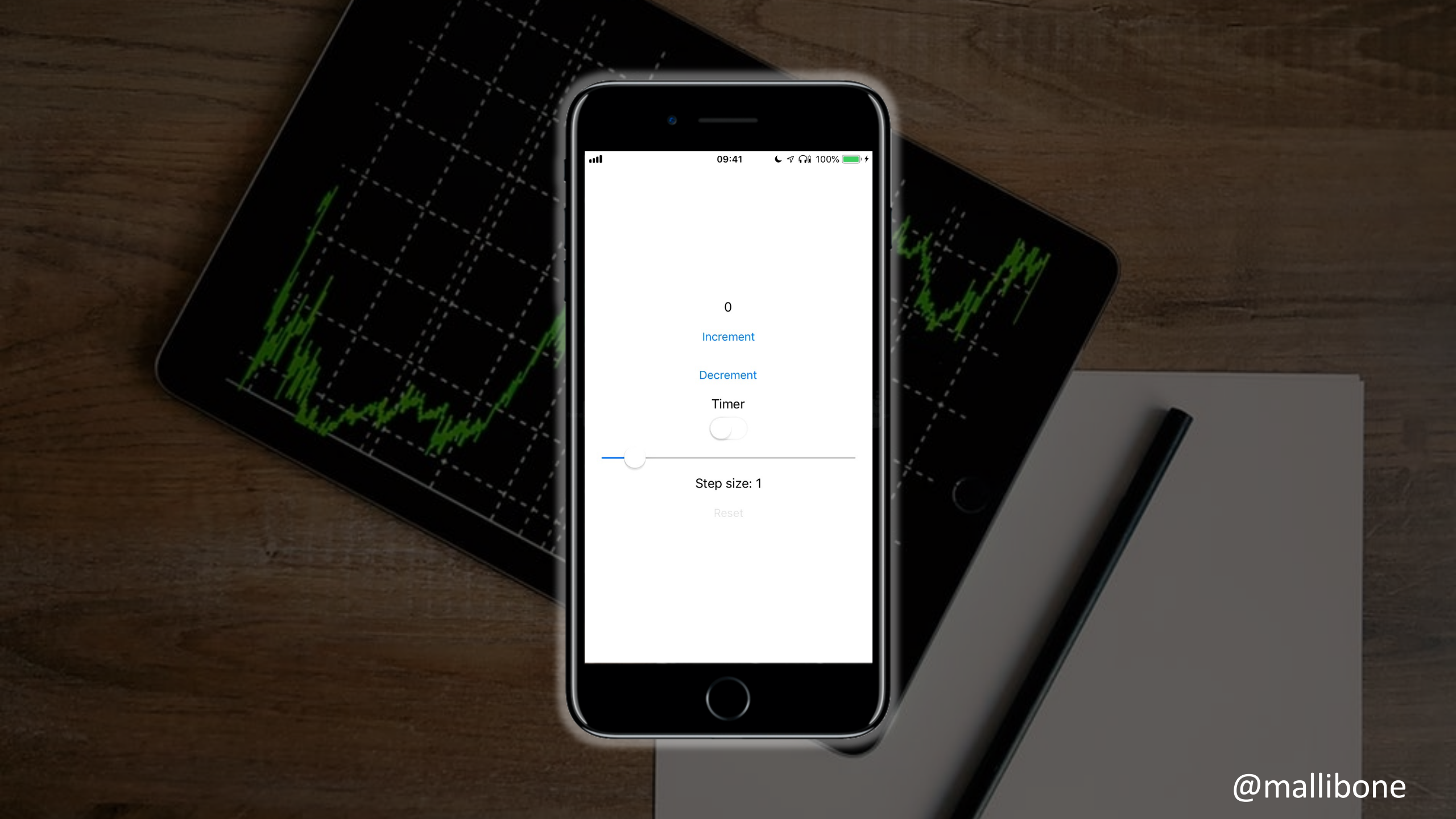
Add to Source Control



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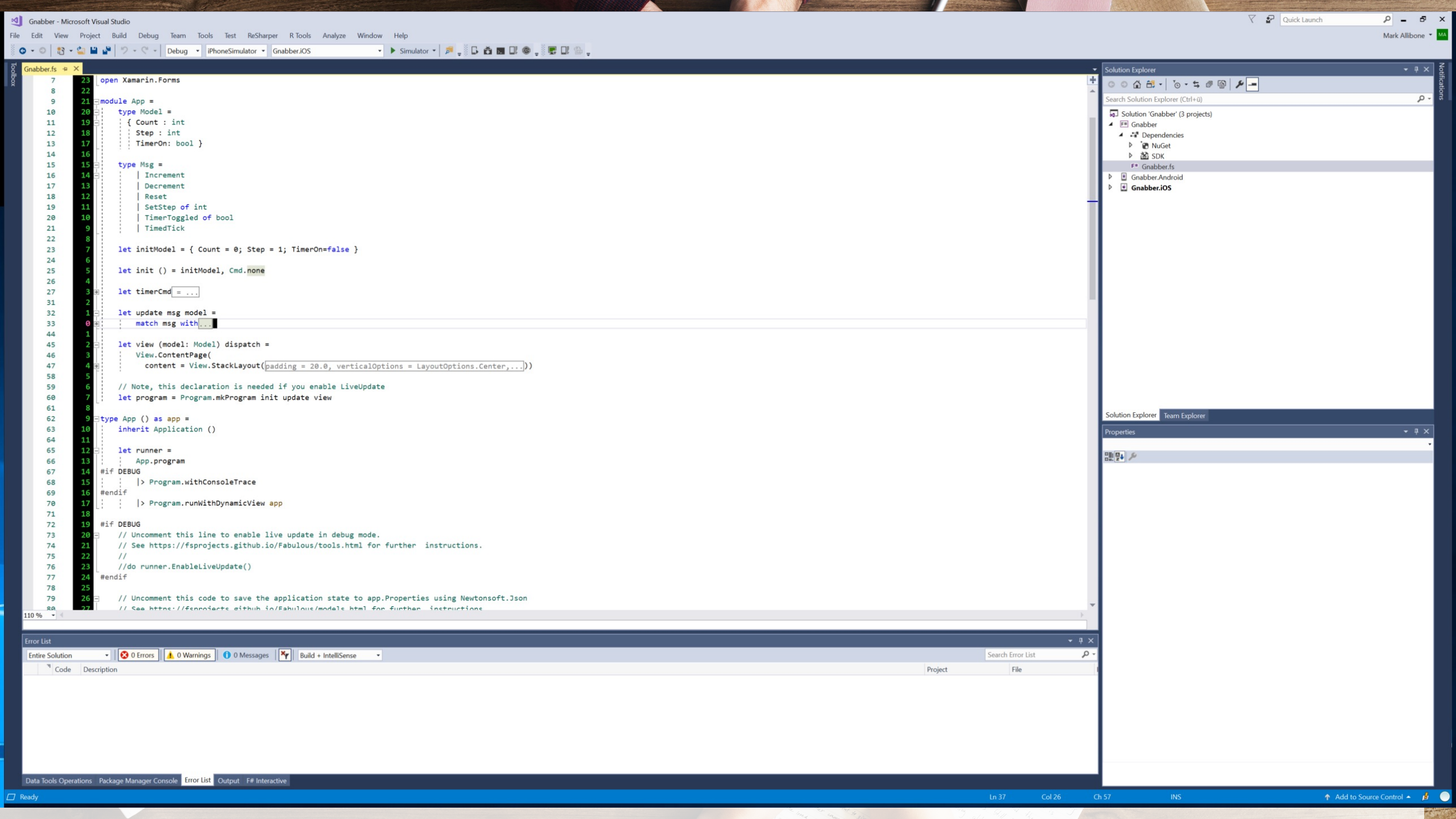
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Ch 57
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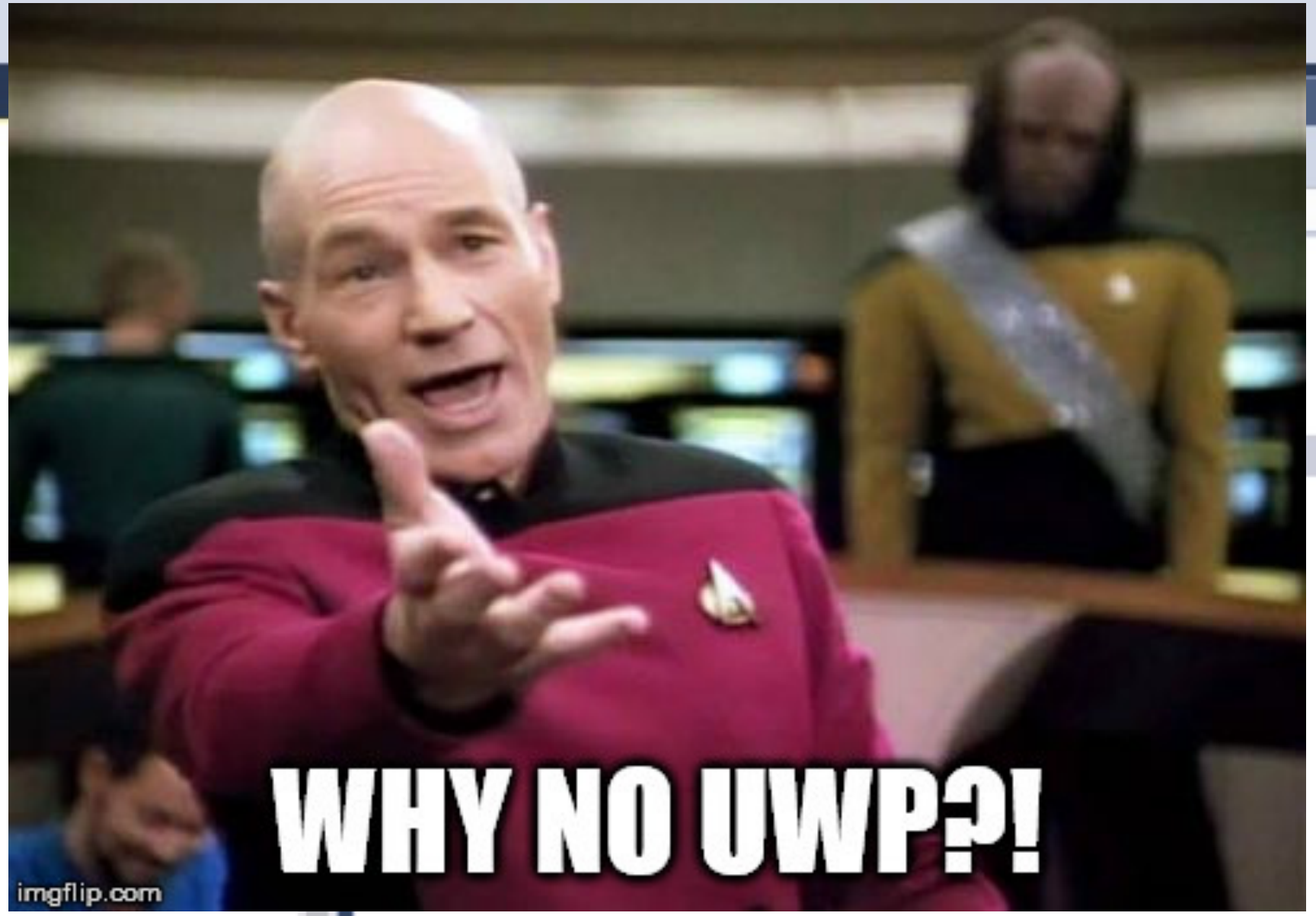
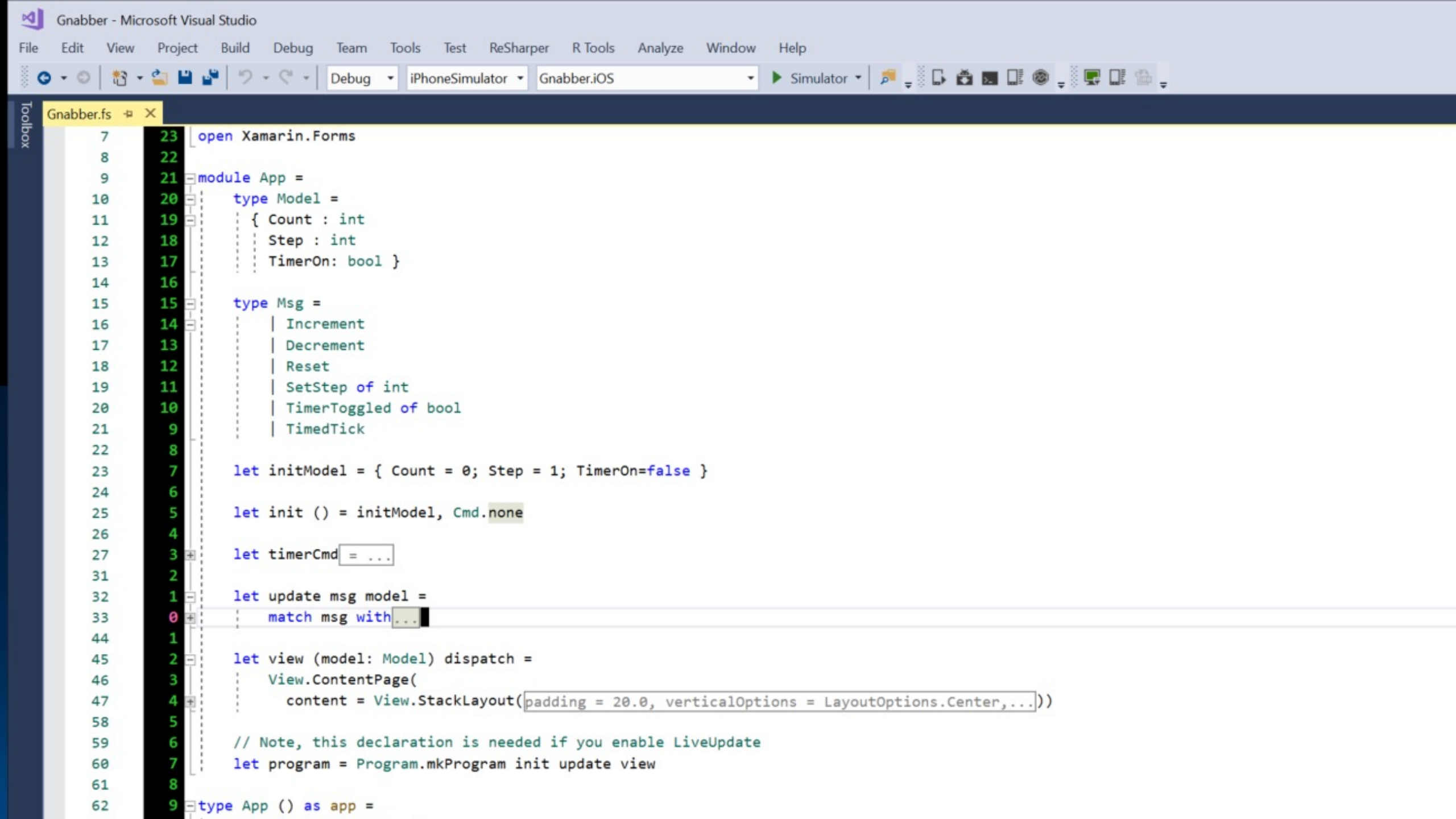

Quick Launch
Mark Allibone
MA
Notifications
WHY NO UWP?!
imgflip.com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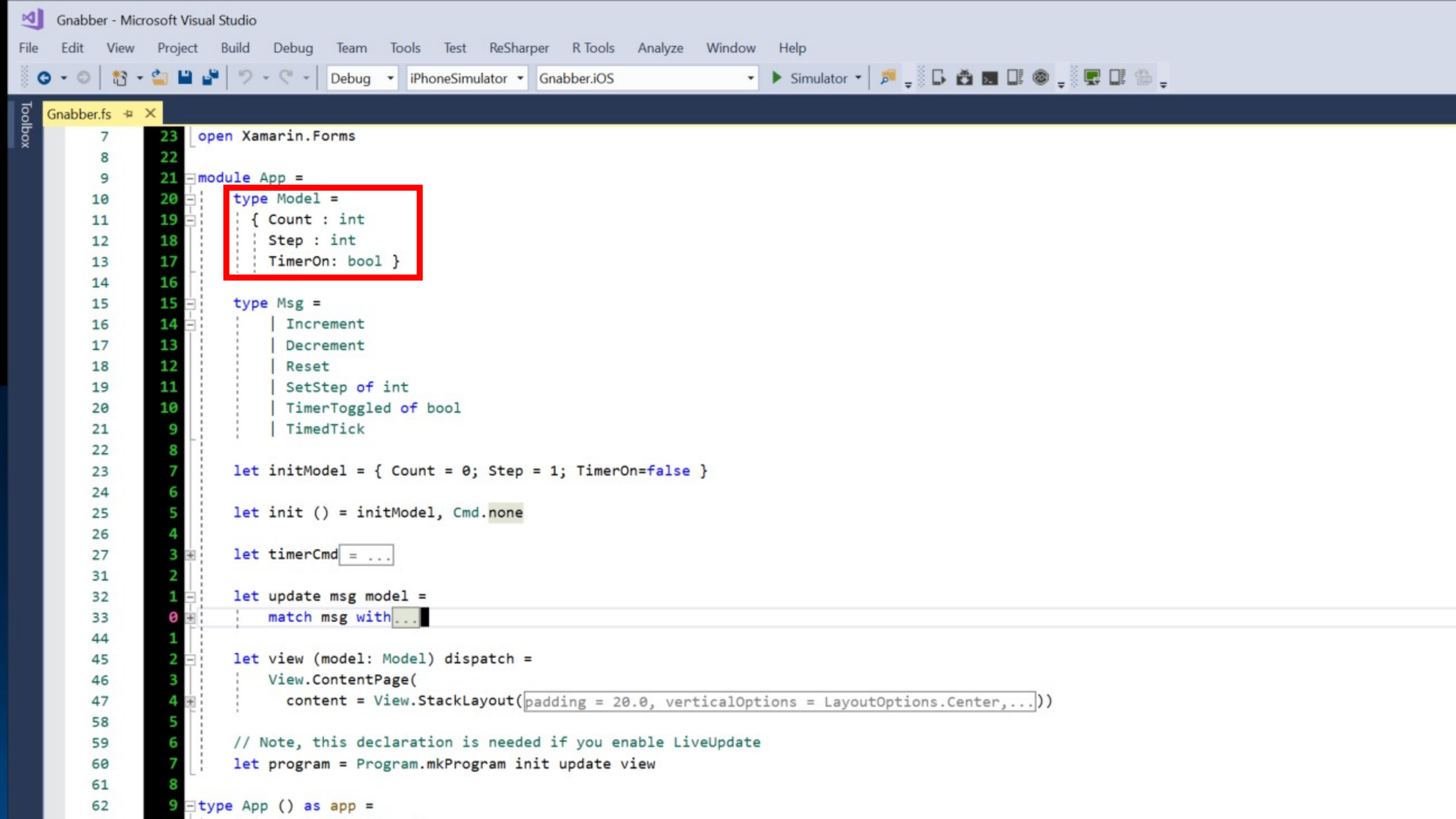
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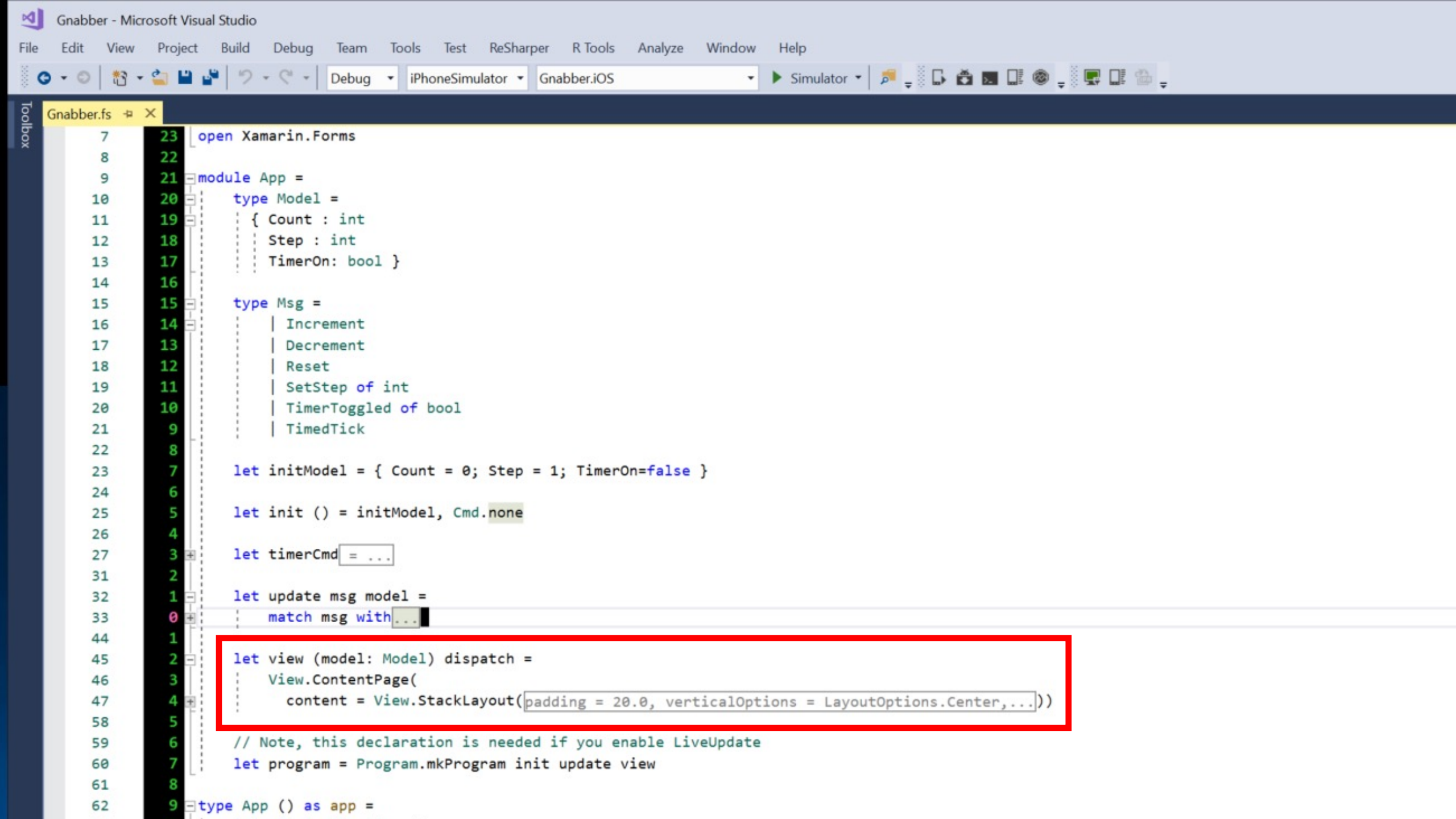
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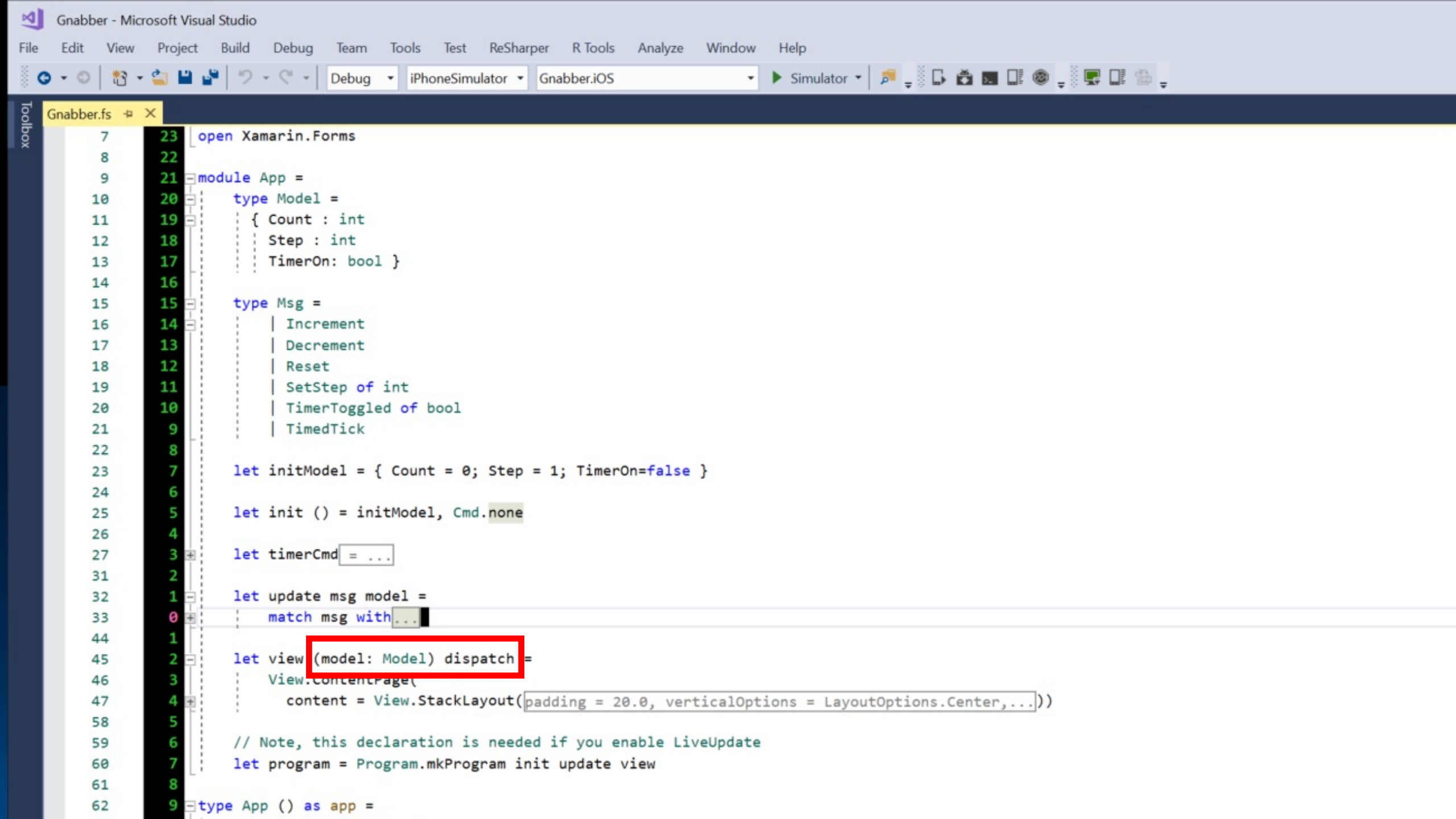
Toolbox
Gnabber.fs
open Xamarin.Forms
module App =
type Model =
{ Count : int
Step : int
TimerOn: bool }
type Msg =
| Increment
| Decrement
| Reset
| SetStep of int
| TimerToggled of bool
| TimedTick
let initModel = { Count = 0; Step = 1; TimerOn=false }
let init () = initModel, Cmd.none
let timerCmd = ...
let update msg model =
match msg with ...
let view (model: Model) dispatch =
View.ContentPage(
content = View.StackLayout(padding = 20.0, verticalOptions = LayoutOptions.Center,...))
// Note, this declaration is needed if you enable LiveUpdate
let program = Program.mkProgram init update view
type App () as app =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Debug iPhoneSimulator Gnabber.iOS Simulator
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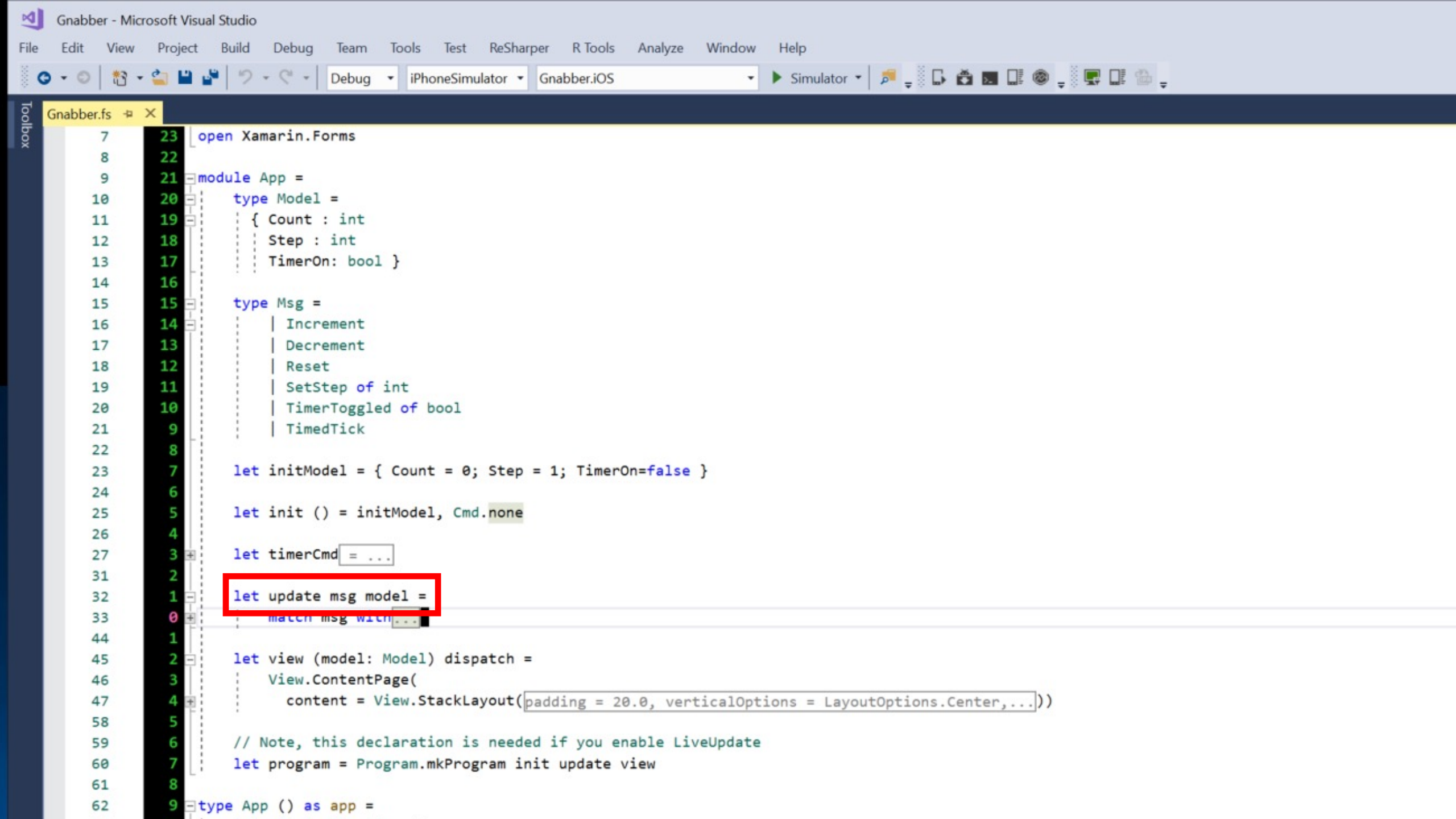
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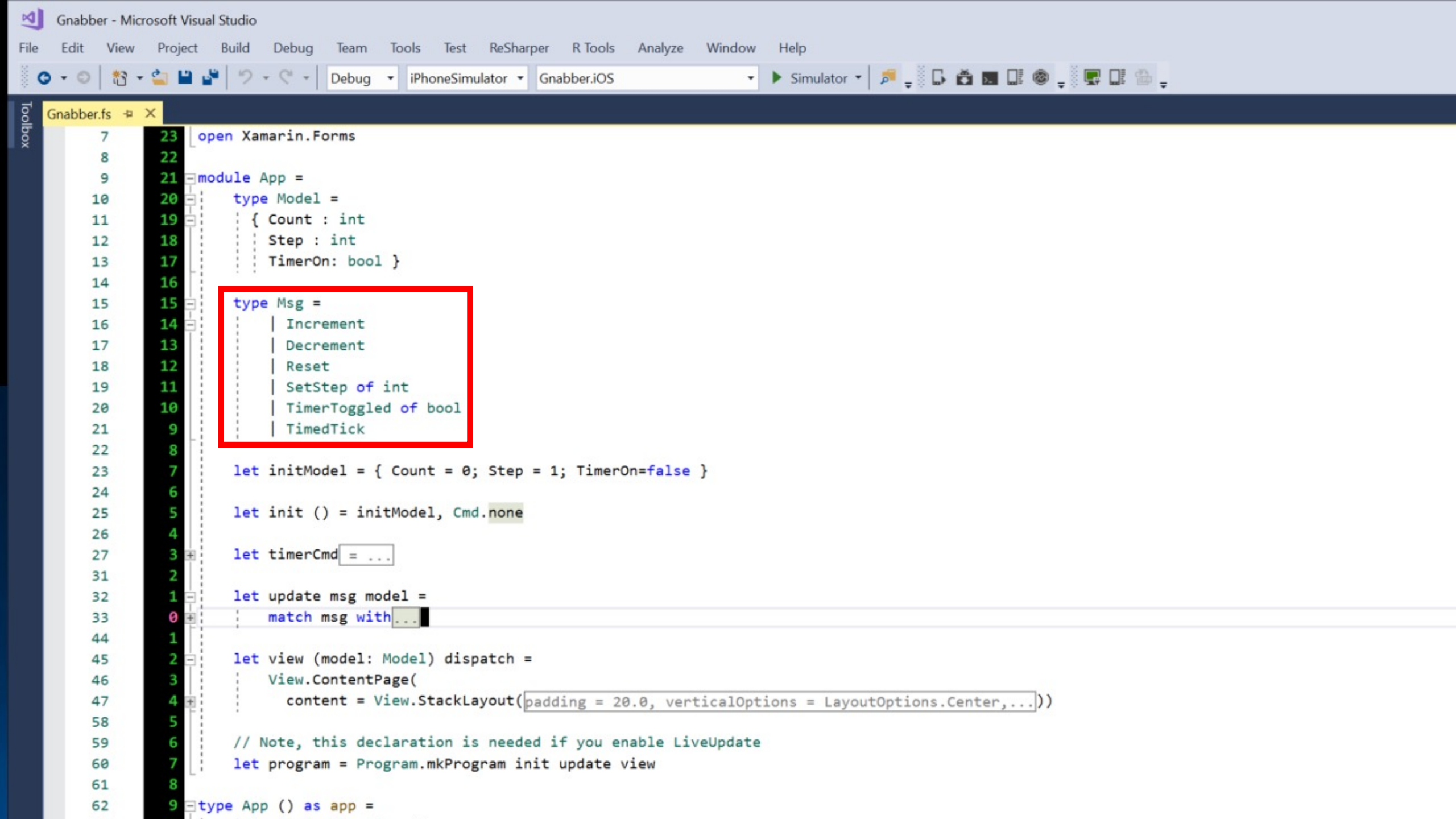
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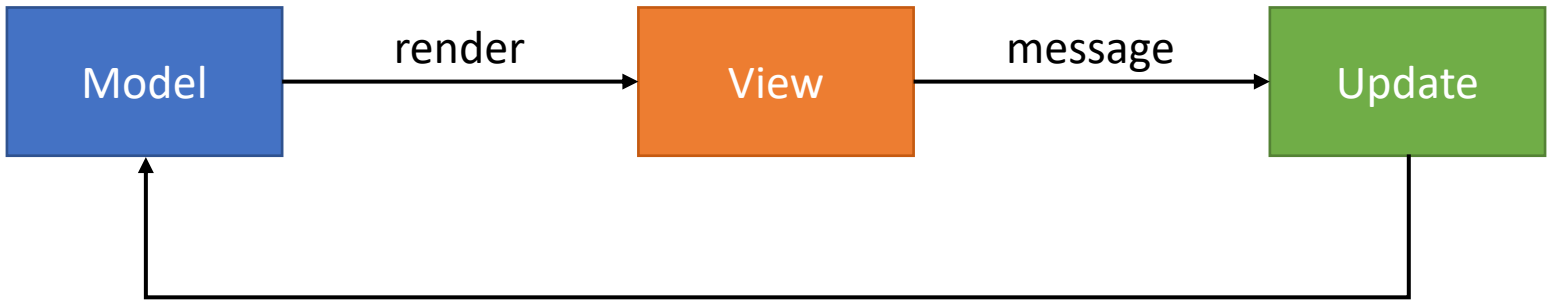
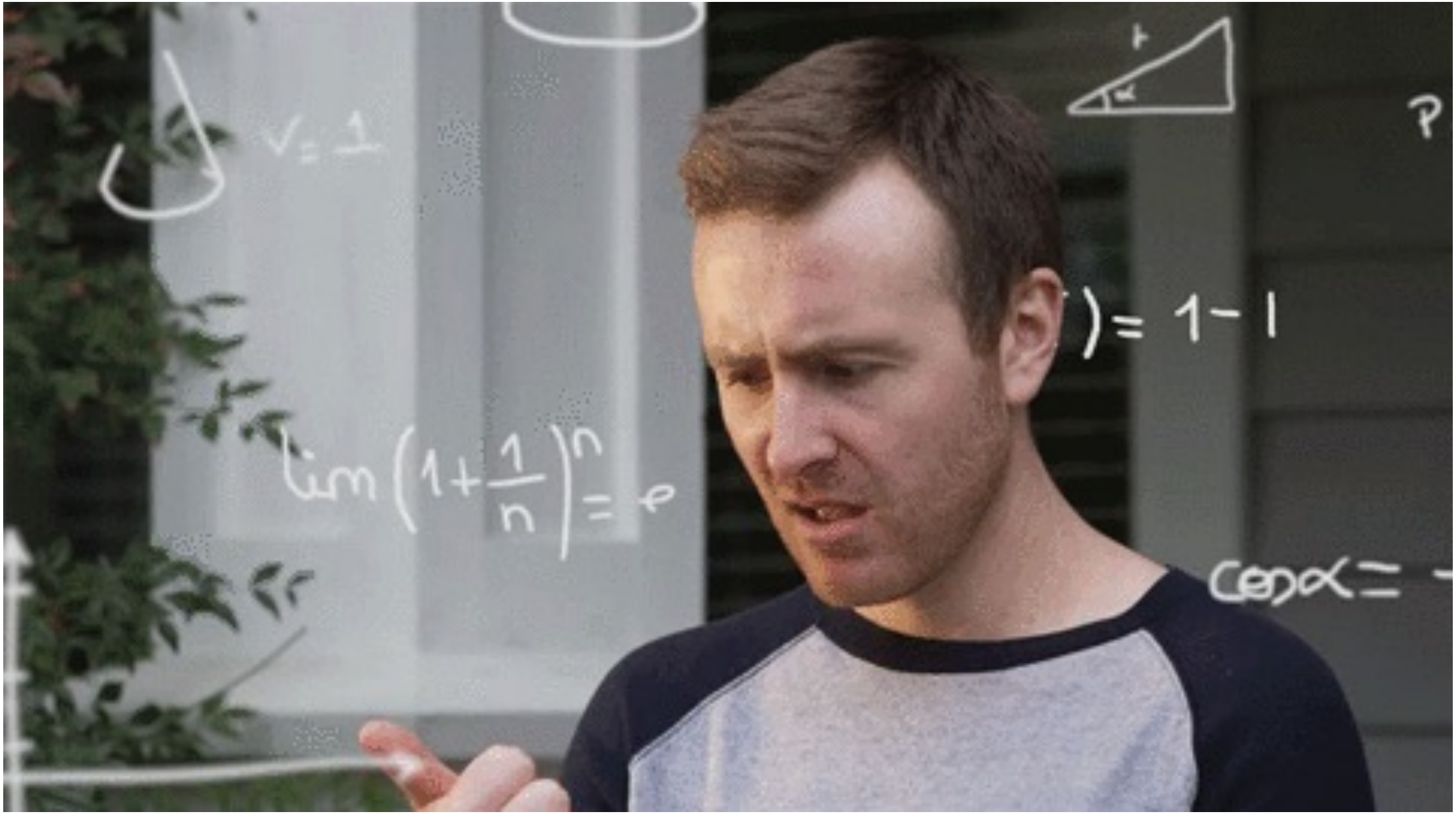
Model View Update




$\lim\left(1+\frac{1}{n}\right)^n = e$

- Driven from the model
- All state changes are defined with messages
- Single place for change - the update method
- Uses Xamarin Forms

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Doing it with style

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XAML vs Coded UI


Demo
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- Interactive Development and Designing
- You can create good looking UIs
- Create reusable UI Components

ATOMS ▾ MOLECULES ▾ ORGANISMS ▾ TEMPLATES ▾ PAGES ▾ ALL SIZE 1251PX / 78.19EM S M L FULL RAND

https://patternlab.io/

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https://fsprojects.github.io/Fabulous/tools.html

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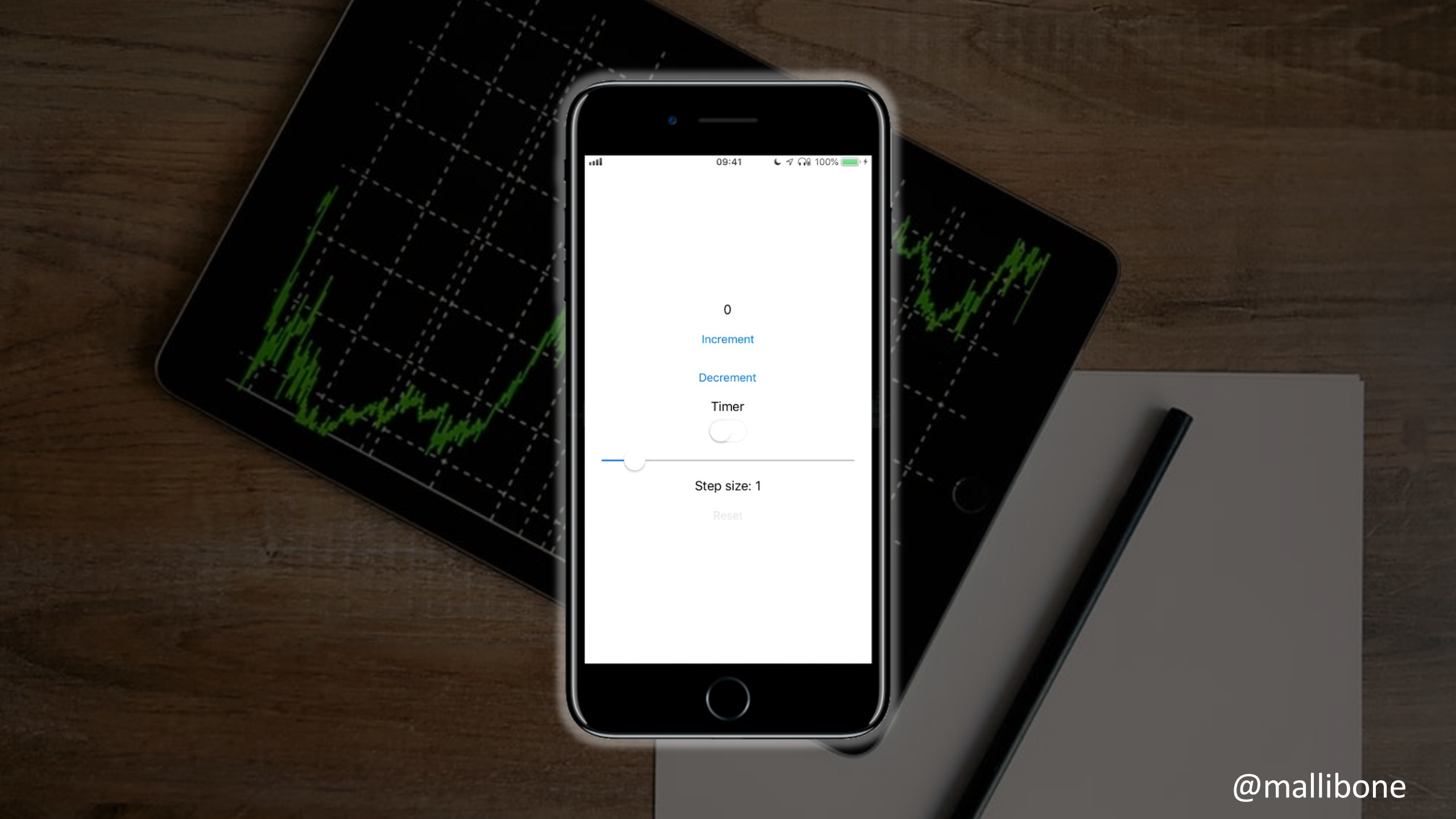
Photo by **Josh Hild** from **Pexels**



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```fsharp
let timerCmd =
    async { do! Async.Sleep 200
            return TimedTick }
    |> Cmd.ofAsyncMsg


let update msg model =
    match msg with
    // other messages
    | TimerToggled on -> { model with TimerOn = on }, (if on then timerCmd else Cmd.none)
    | TimedTick ->
        if model.TimerOn then
            { model with Count = model.Count + model.Step }, timerCmd
        else
            model, Cmd.none
```

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            model, Cmd.none
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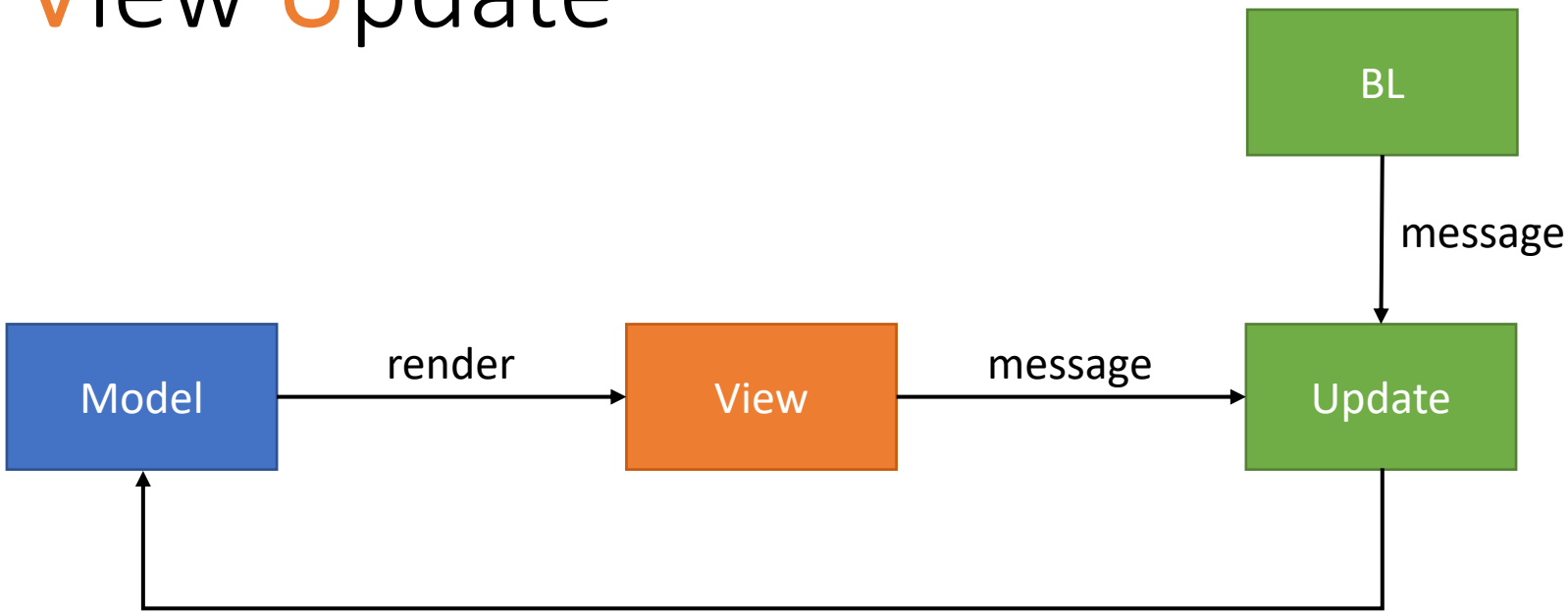
Model View Update




Demo
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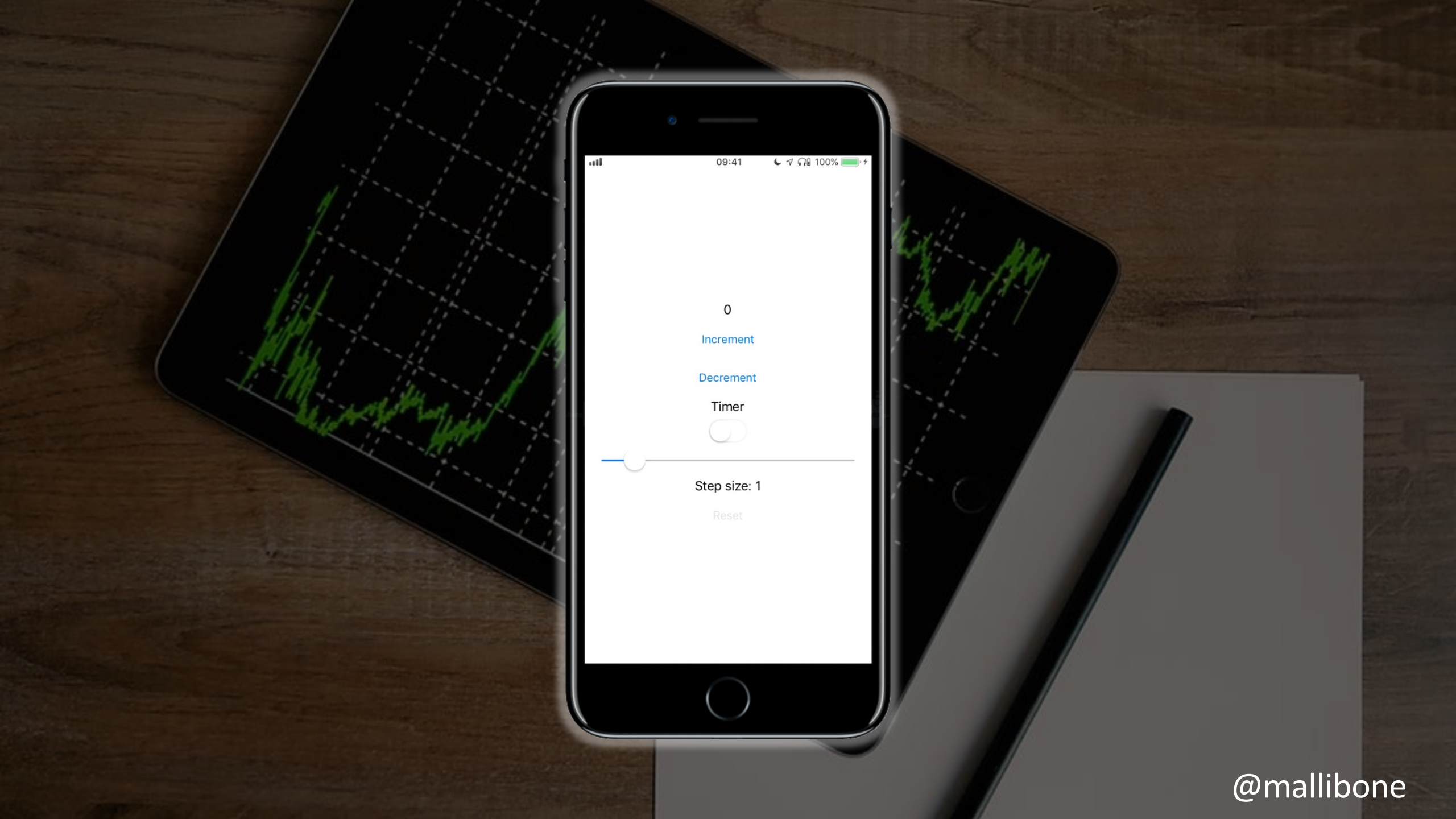
- Every state change is defined
- All changes run through the update method
- Update processes messages in sequence

Photo by **Torsten Dettlaff** from **Pexels**



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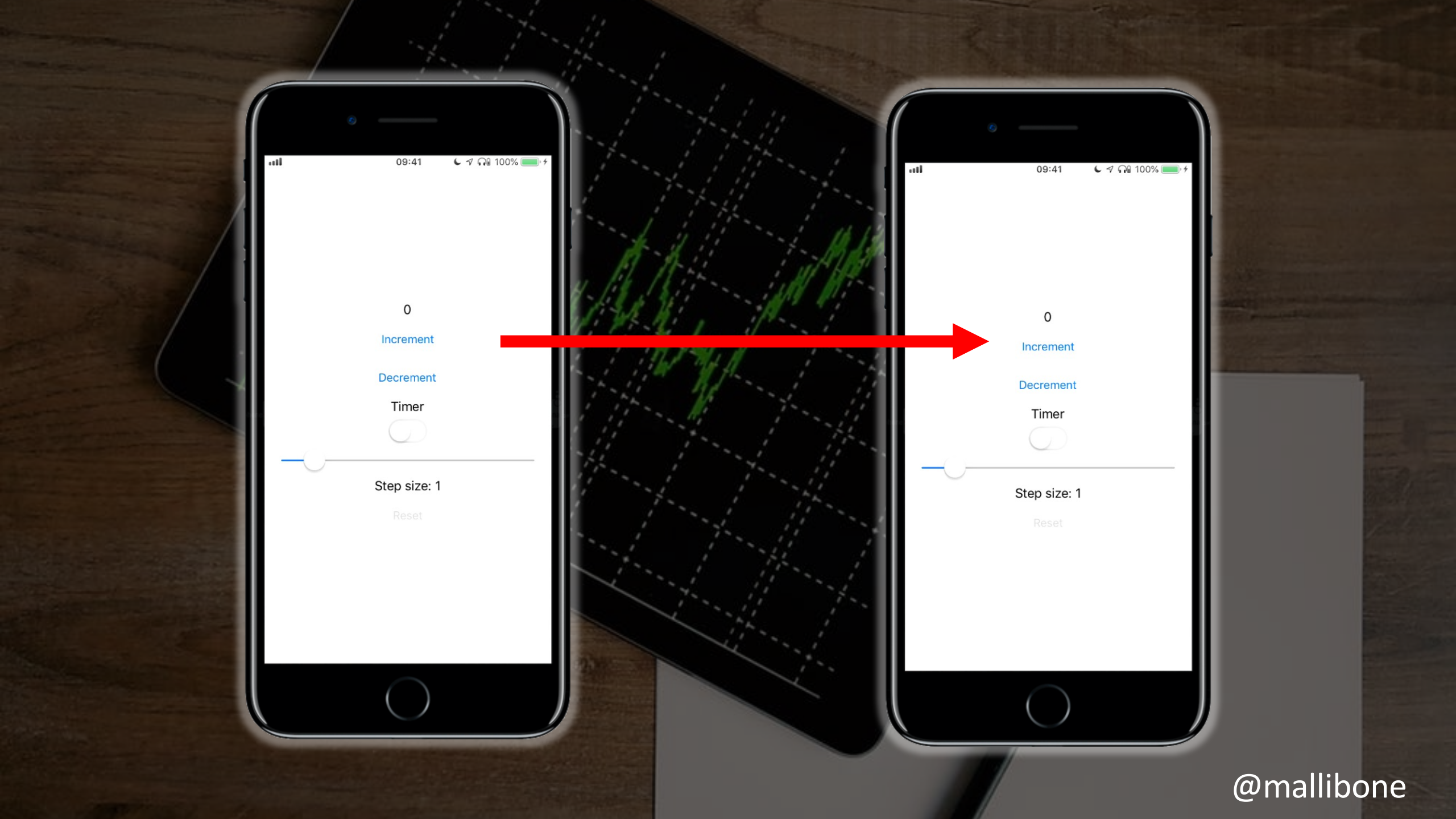
09:41
100%
0
Increment
Decrement
Timer
Step size: 1
Reset
09:41
100%
0
Increment
Decrement
Timer
Step size: 1
Reset

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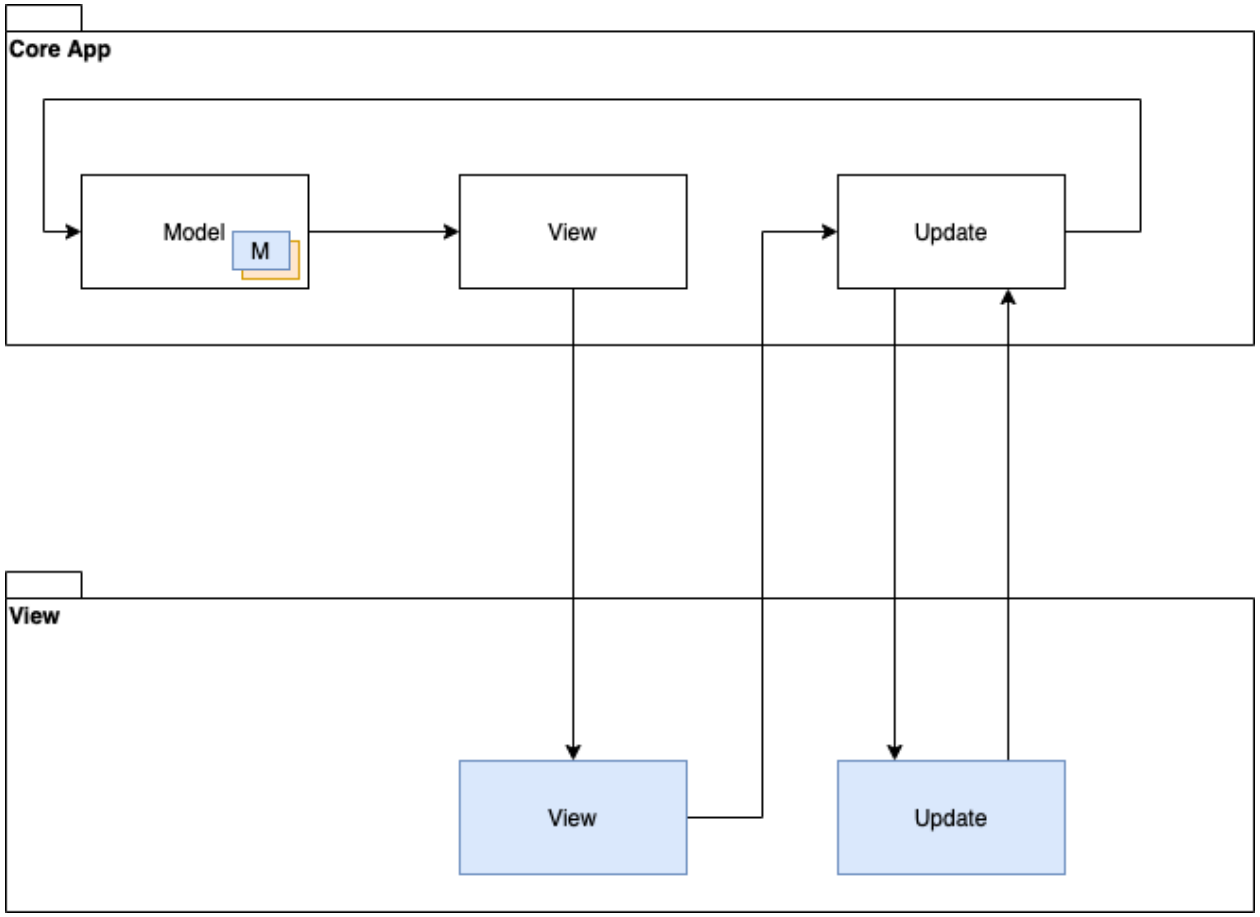
MVU with multiple pages




Demo
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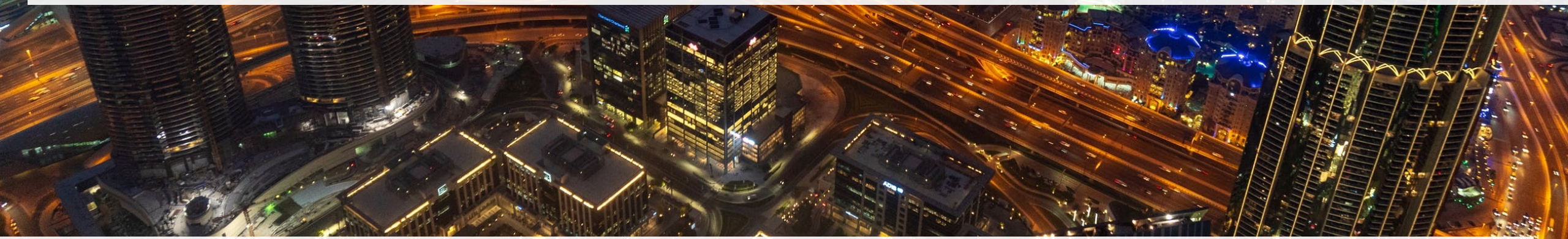
- The state of the app is stored in the model of the app
- Navigation Pages are updated in the core app view
- All updates pass through the core app update method

What about Shell? Visual Material? Or your other favorite Xamarin feature?




NuGet
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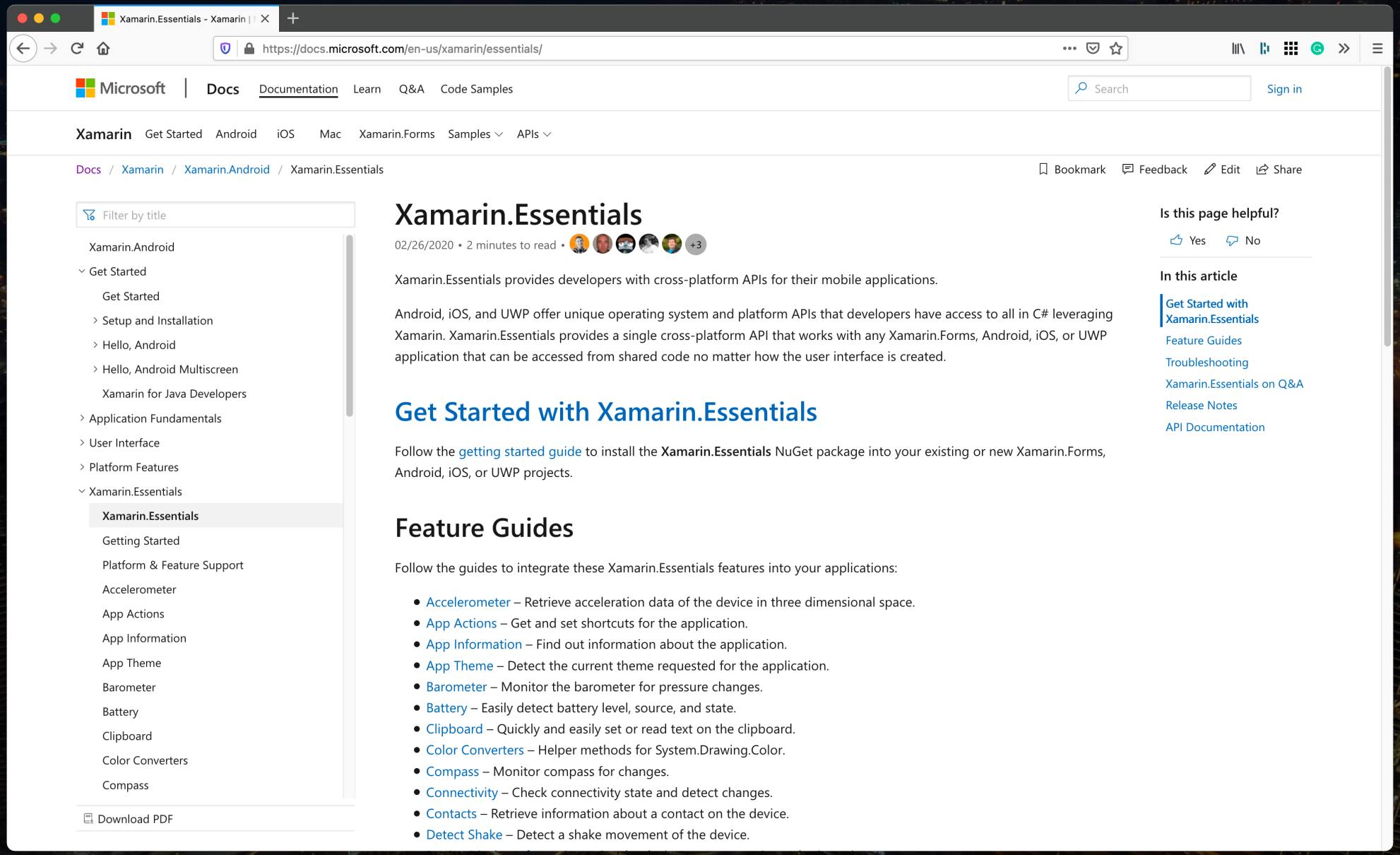
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Follow the getting started guide to install the Xamarin.Essentials NuGet package into your existing or new Xamarin.Forms, Android, iOS, or UWP projects.
Feature Guides
Follow the guides to integrate these Xamarin.Essentials features into your applications:
Accelerometer – Retrieve acceleration data of the device in three dimensional space.
App Actions – Get and set shortcuts for the application.
App Information – Find out information about the application.
App Theme – Detect the current theme requested for the application.
Barometer – Monitor the barometer for pressure changes.
Battery – Easily detect battery level, source, and state.
Clipboard – Quickly and easily set or read text on the clipboard.
Color Converters – Helper methods for System.Drawing.Color.
Compass – Monitor compass for changes.
Connectivity – Check connectivity state and detect changes.
Contacts – Retrieve information about a contact on the device.
Detect Shake – Detect a shake movement of the device.
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Yes
No
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Feature Guides
Troubleshooting
Xamarin.Essentials on Q&A
Release Notes
API Documentation

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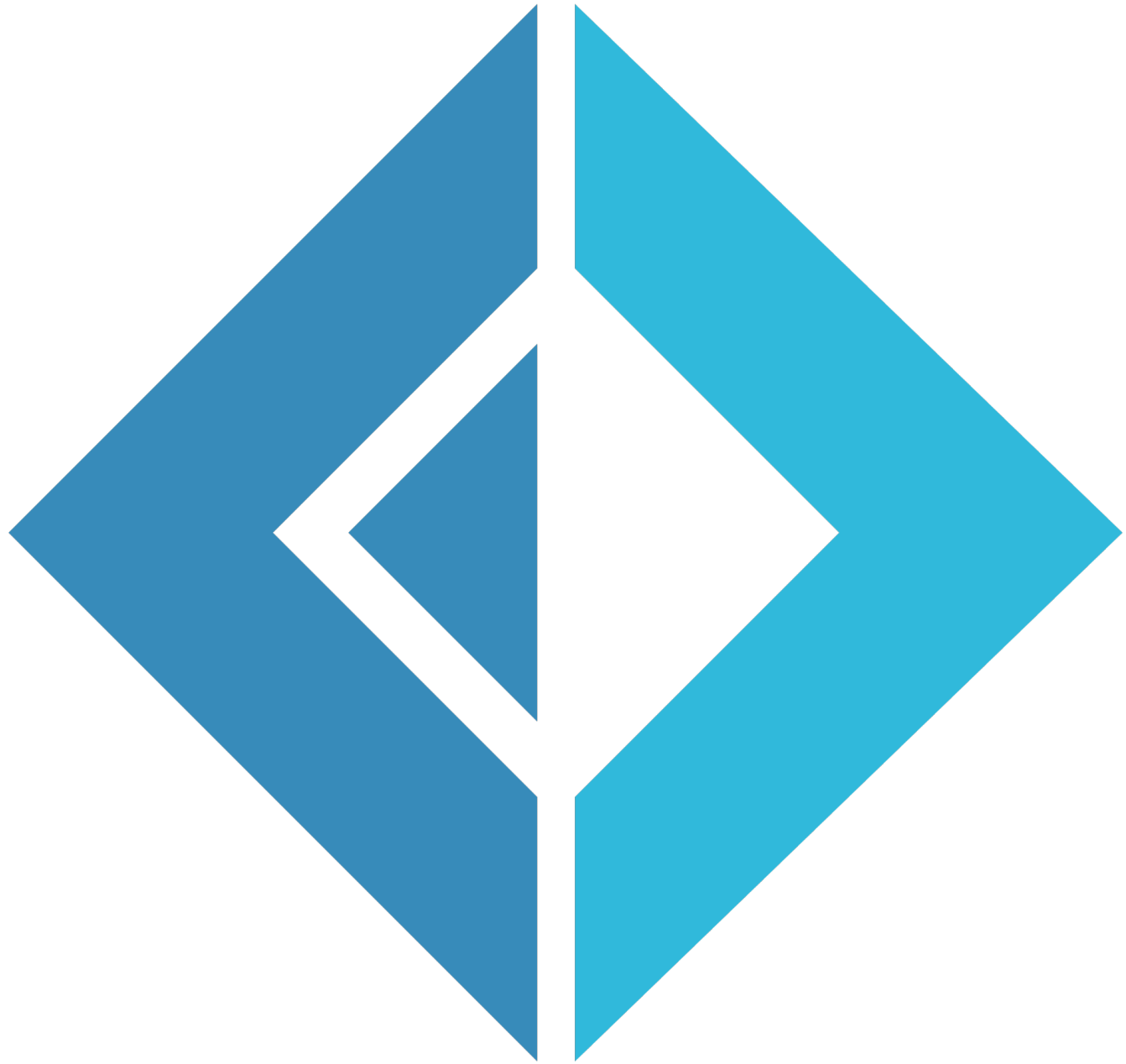
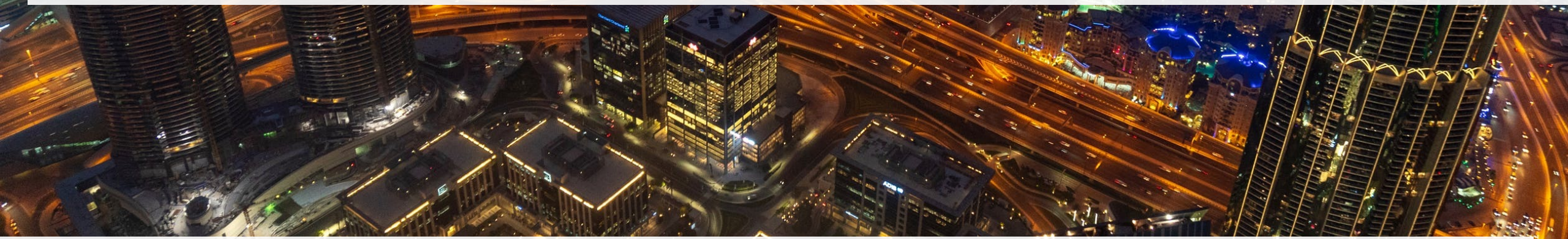


How to get started with F#?



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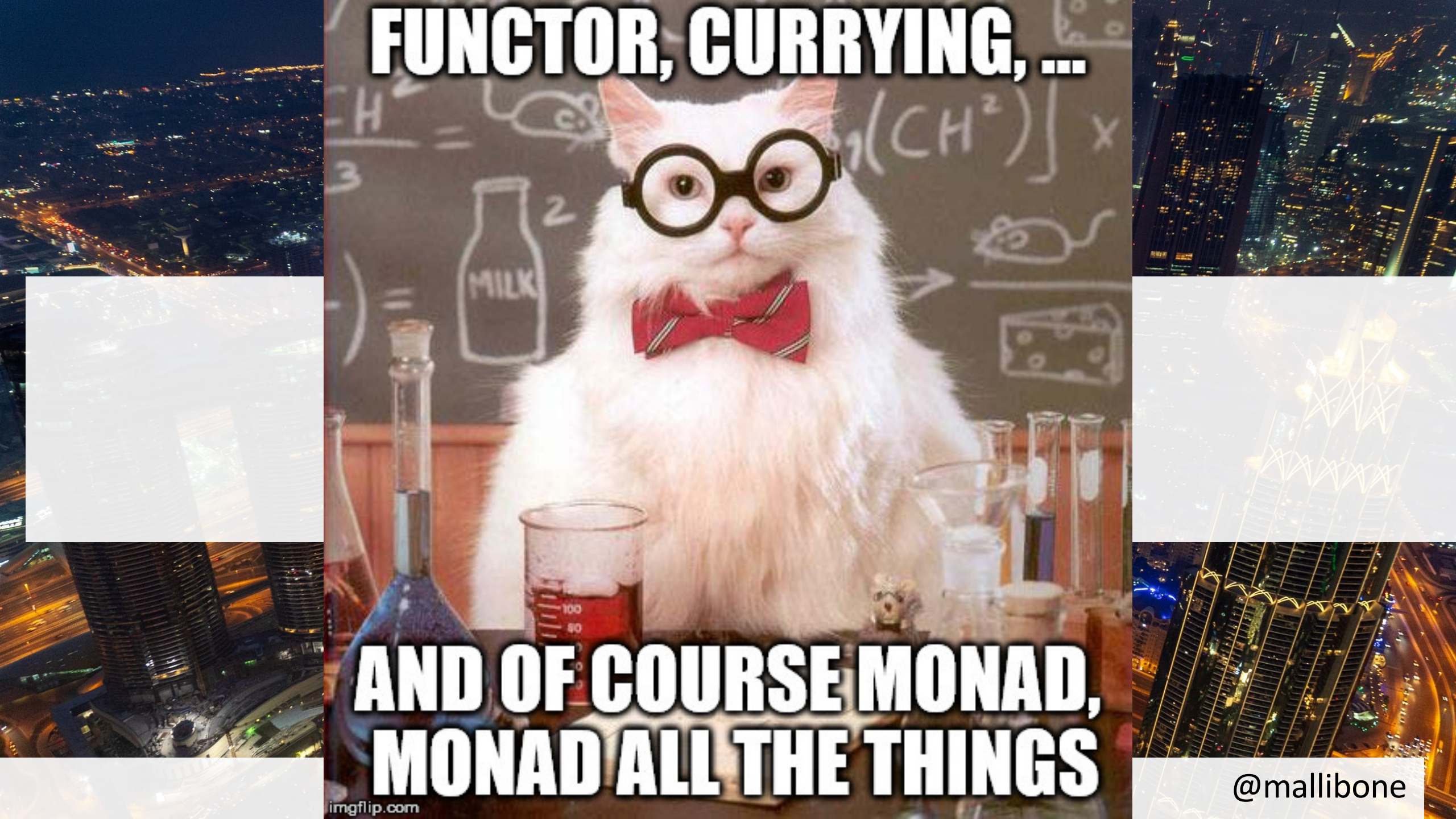
FUNCTOR, CURRYING, ...
AND OF COURSE MONAD,
MONAD ALL THE THINGS
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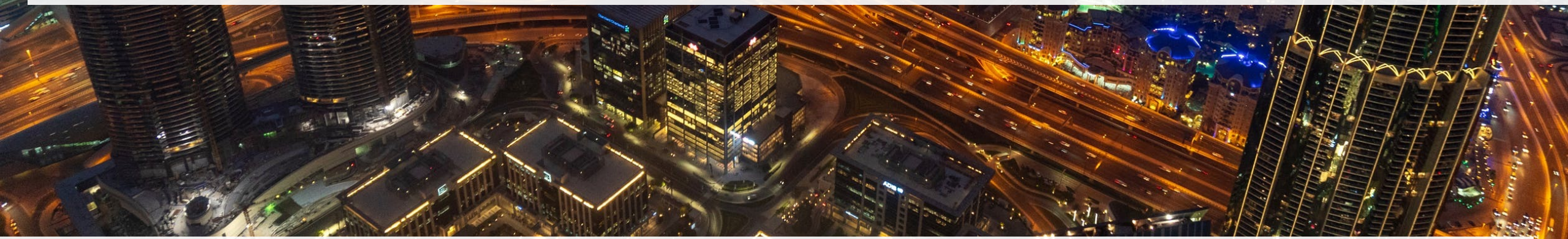
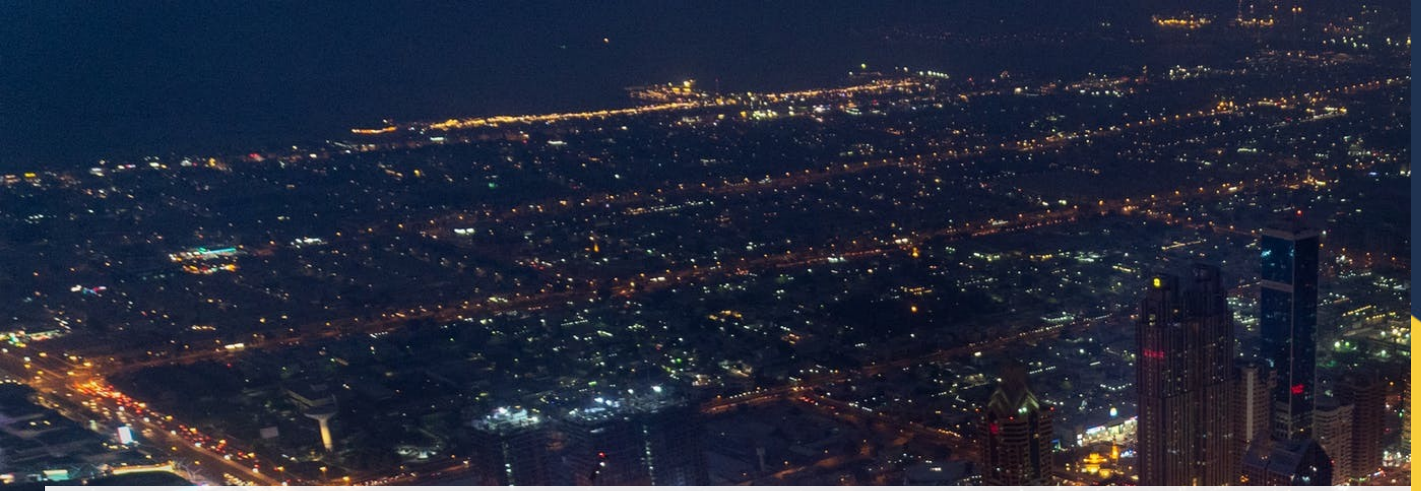
"HOLY FORKING SHIRT!"
#THEGOODPLACE
NBC

Learn Design patterns after learning the language





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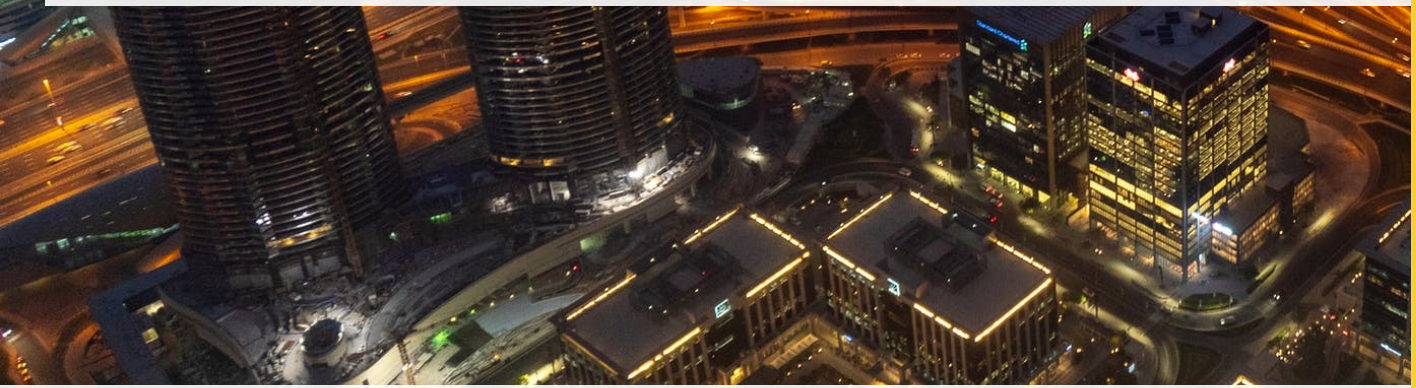

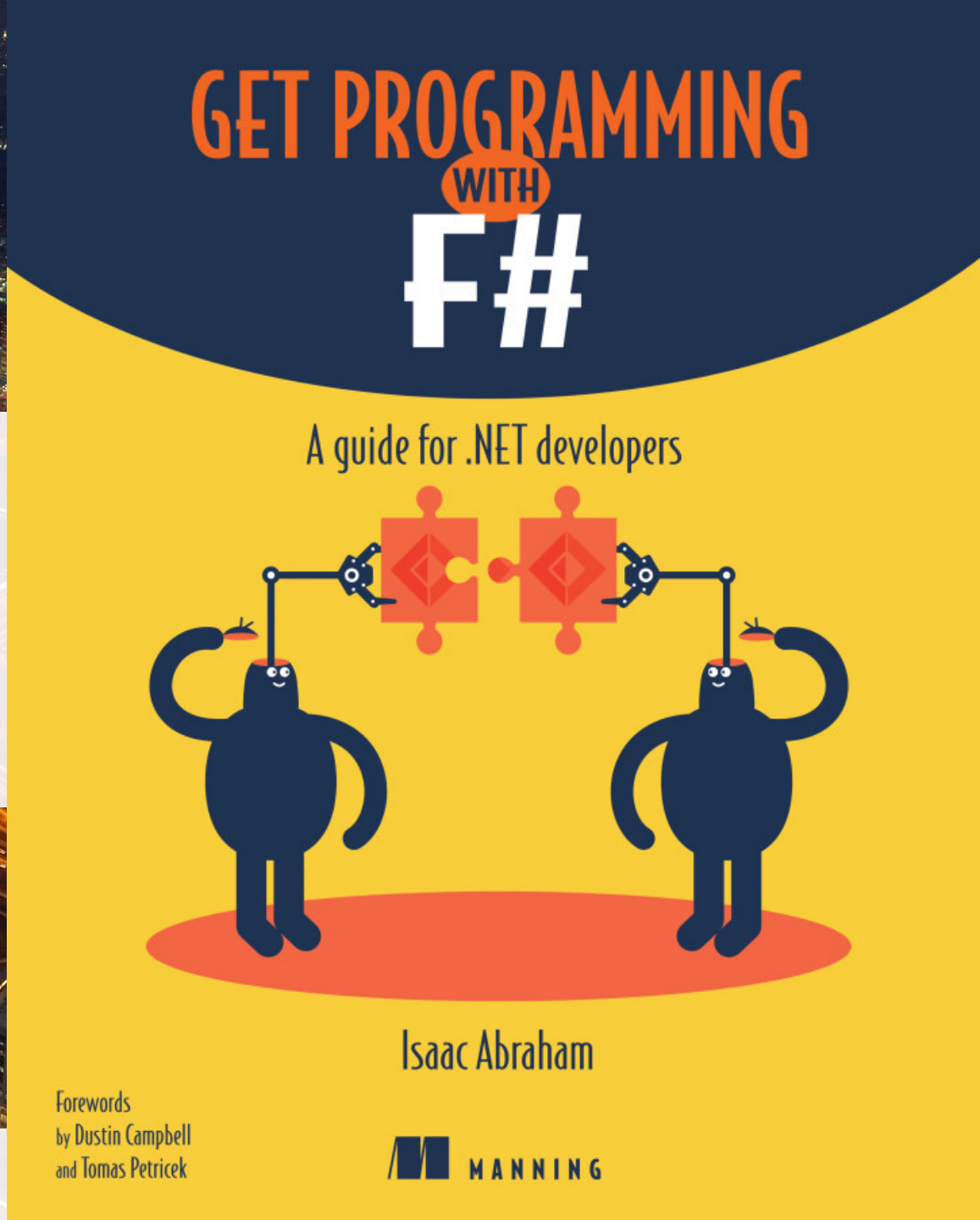

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Takeaways

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Takeaways

- F# is not scary it's just your friendly functional first .NET language
- Model View Update simplifies state handling in UI
- Fabulous is everywhere
- Have a Fabulous Day!

REY TECHNOLOGY

Thank you for your time!

Mark Allibone @mallibone

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