Fabulous Functional Frontends

Mark Allibone

Head of Mobile

Noser Engineering AG

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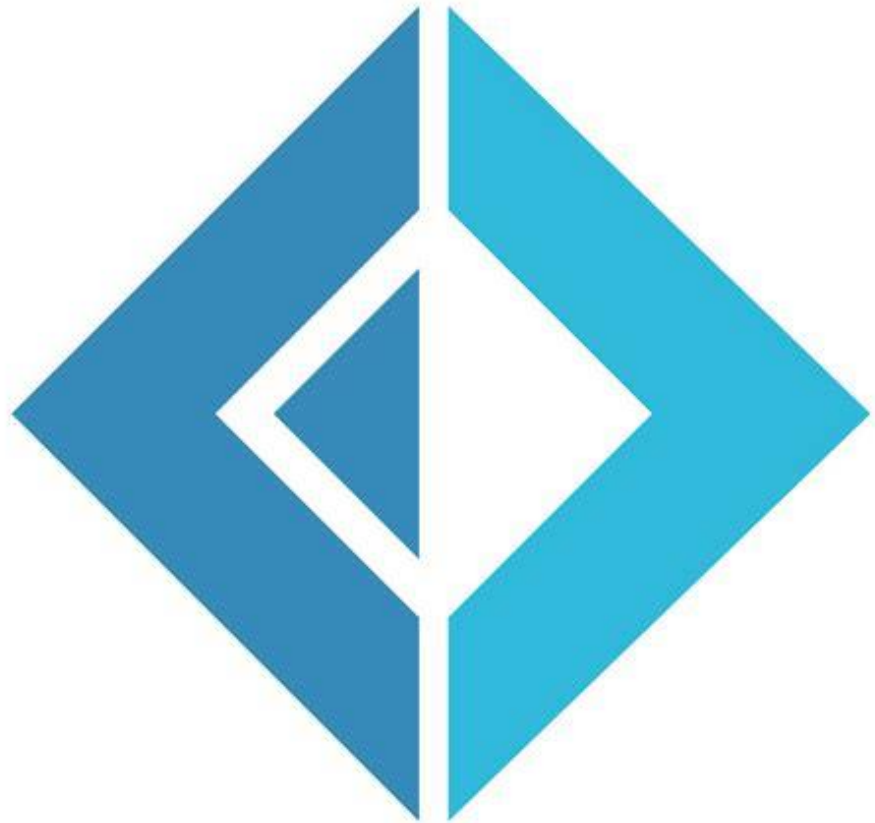
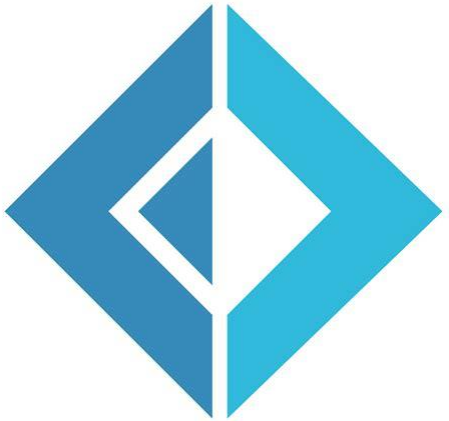


- No Nulls
- No mutable variables
- Data handling
- Declarative Programming
- Based on .Net



F# is great for BLOBs, FLOBs – overall a great general purpose language

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Fabulous – a functional Wrapper for F# around Xamarin.Forms

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Why not just Xamarin Forms?!

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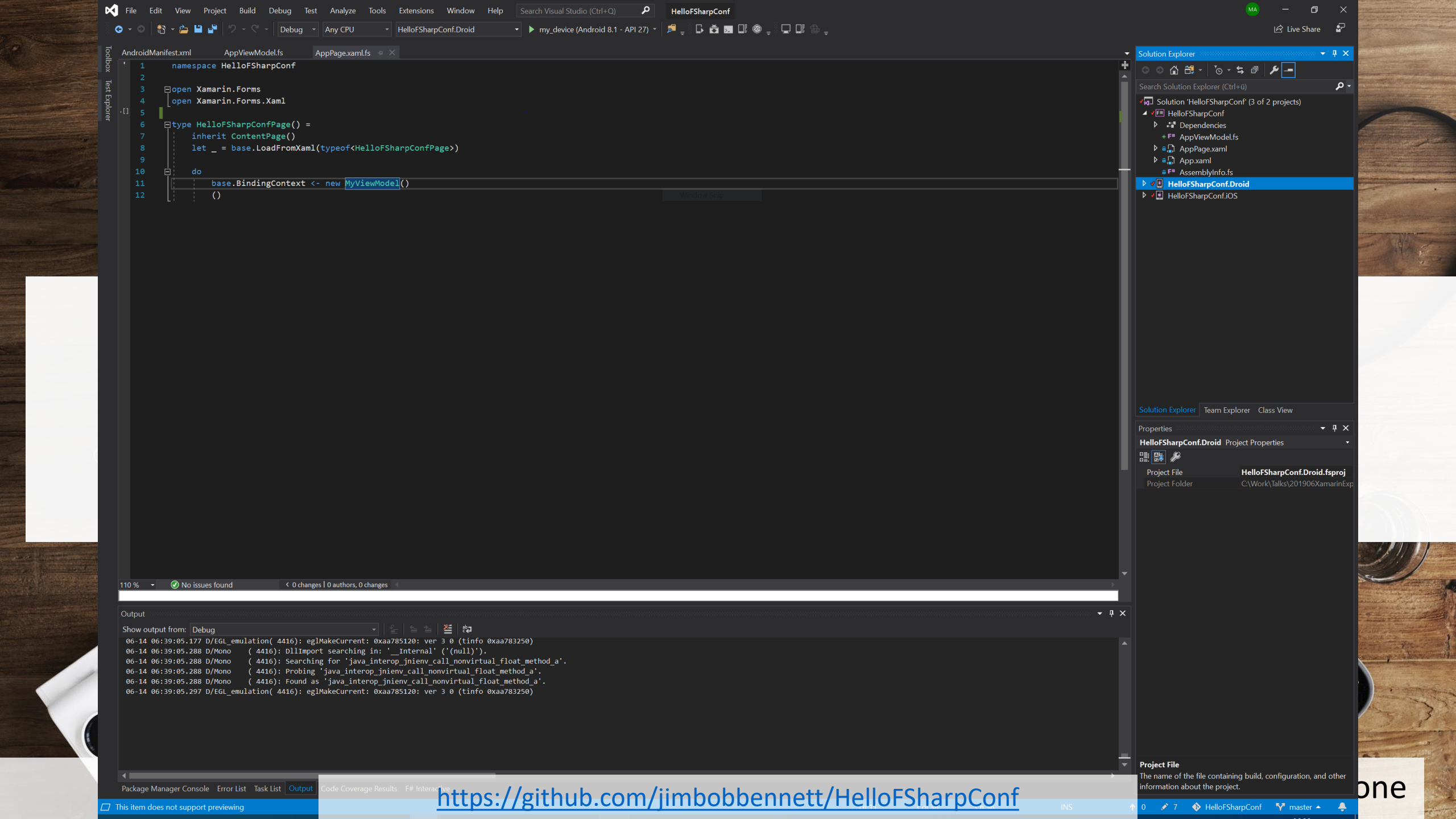
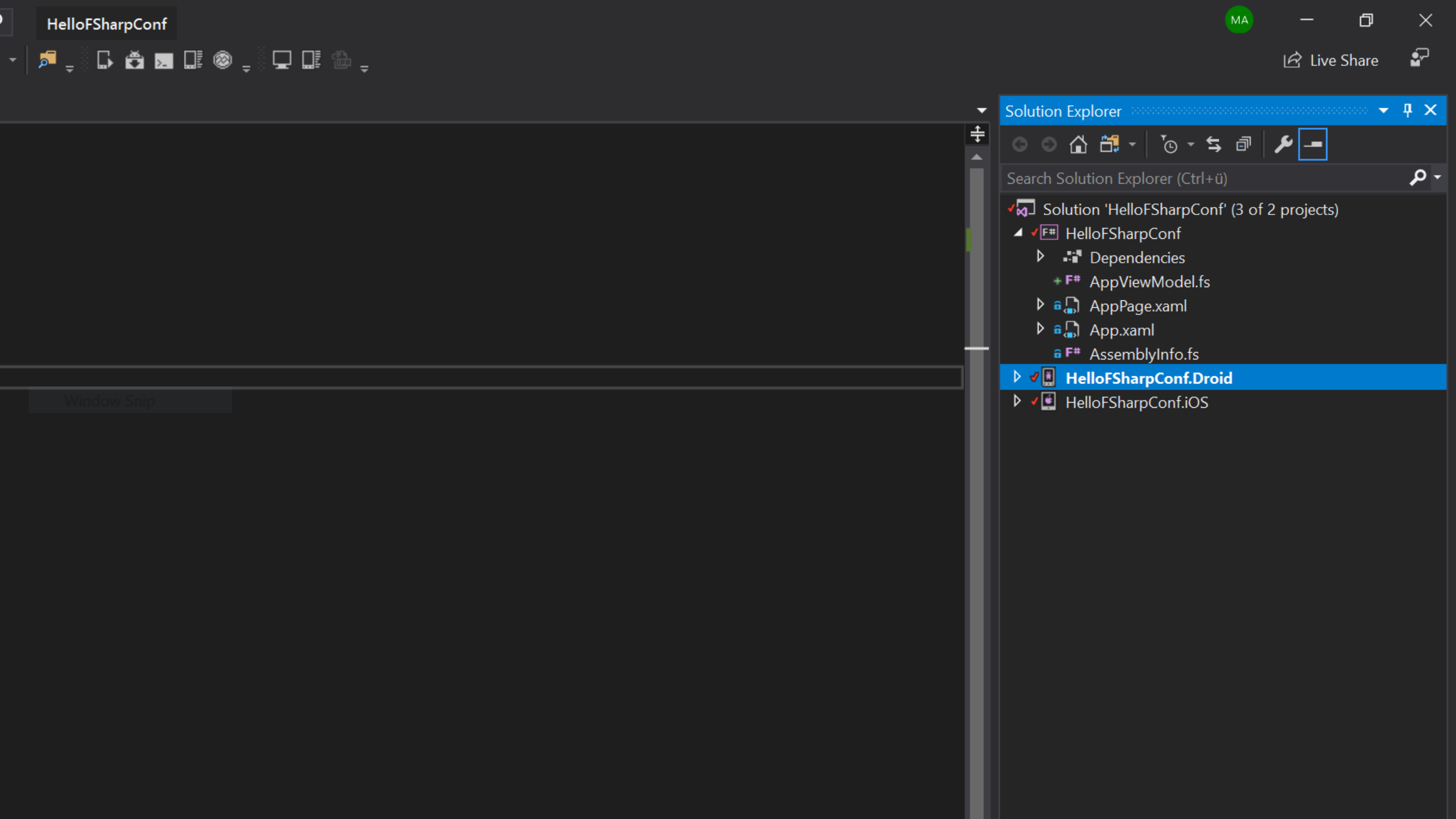
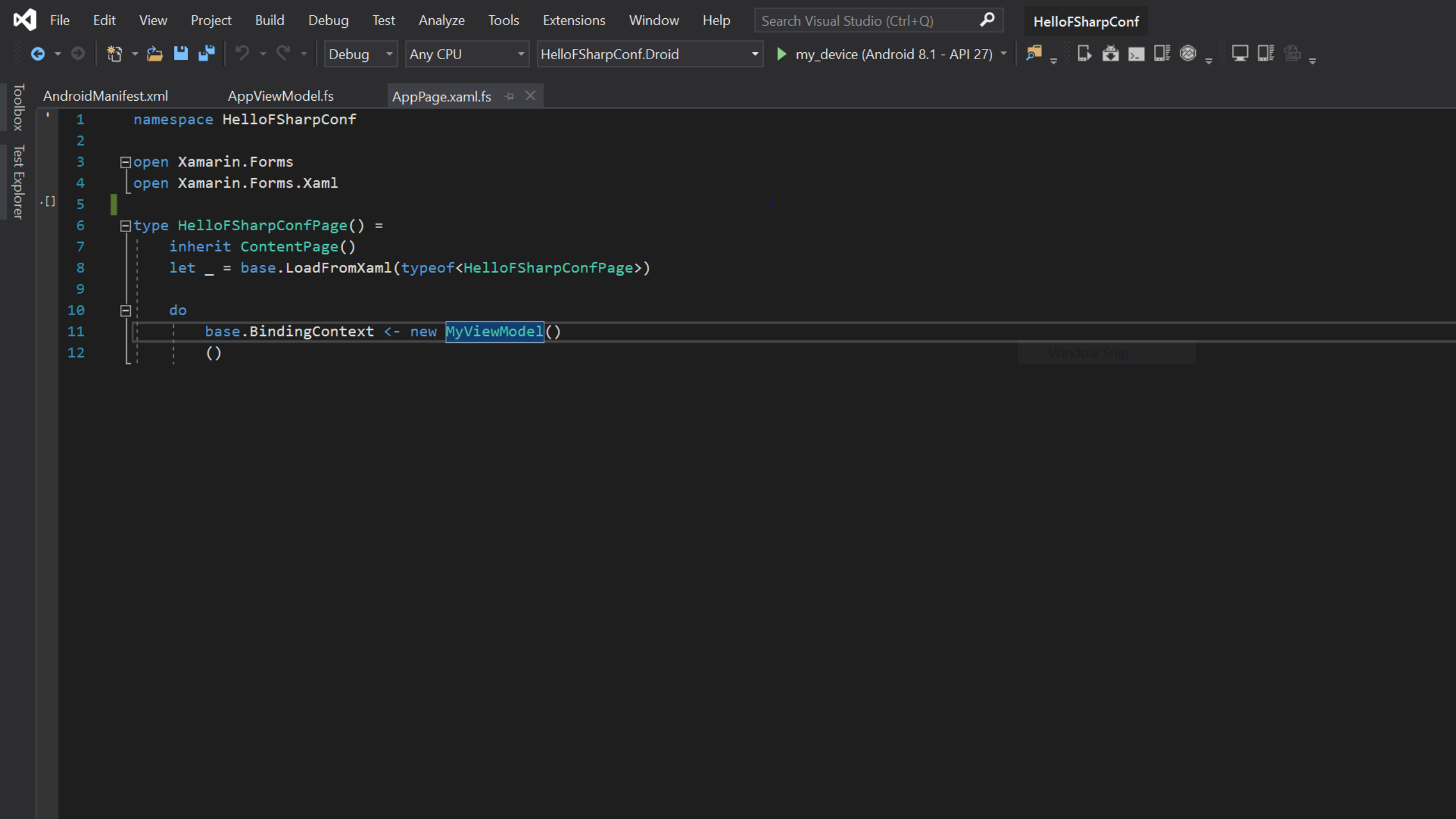
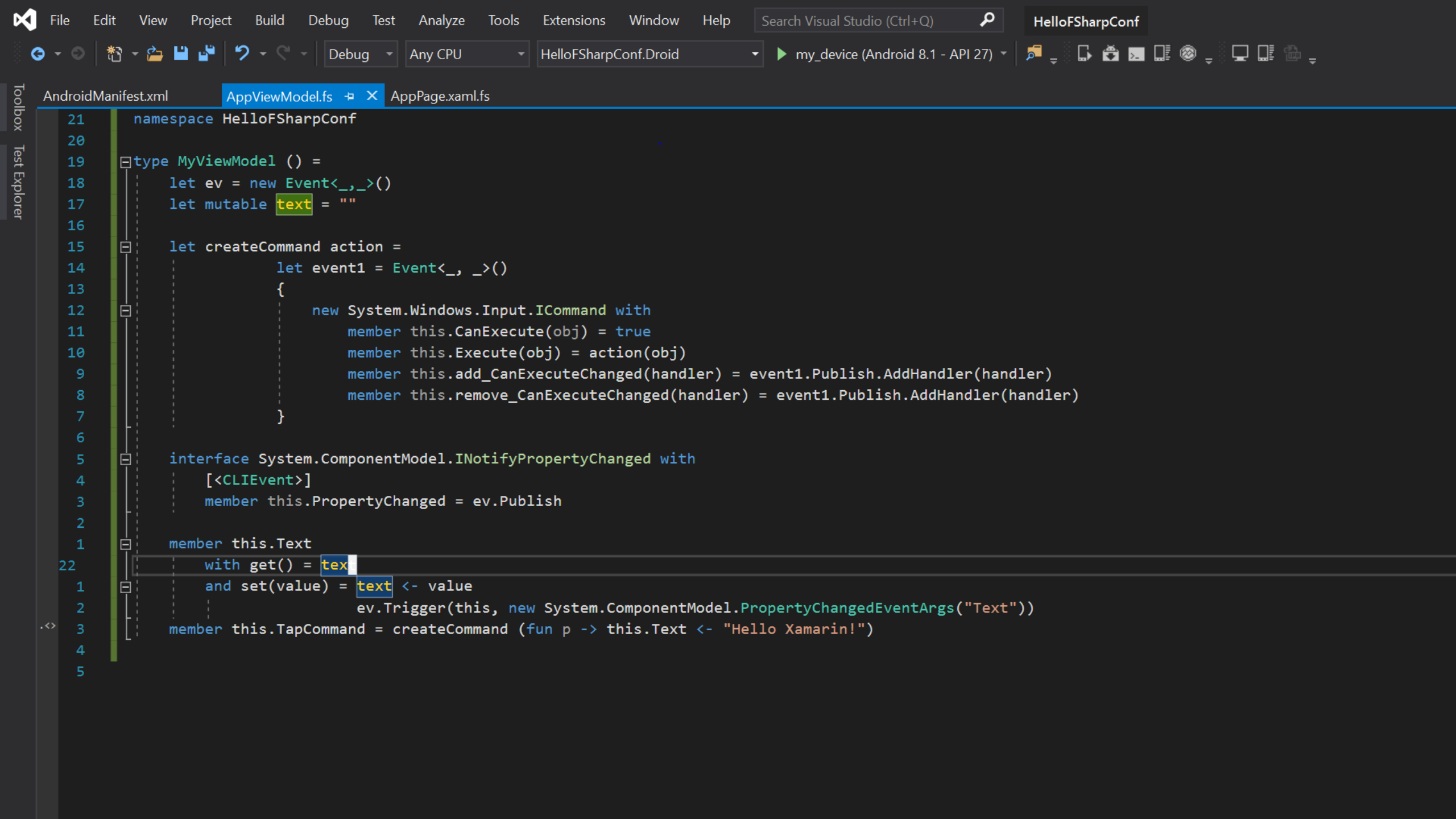


https://github.com/jimbobbennett/HelloFSharpConf


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
Window Snip


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
AppViewModel.fs
AppPage.xaml.fs
Toolbox
Test Explorer
1 namespace HelloFSharpConf
2
3 open Xamarin.Forms
4 open Xamarin.Forms.Xaml
5
6 type HelloFSharpConfPage() =
7 inherit ContentPage()
8 let _ = base.LoadFromXaml(typeof<HelloFSharpConfPage>)
9
10 do
11 base.BindingContext <- new MyViewModel()
12 ()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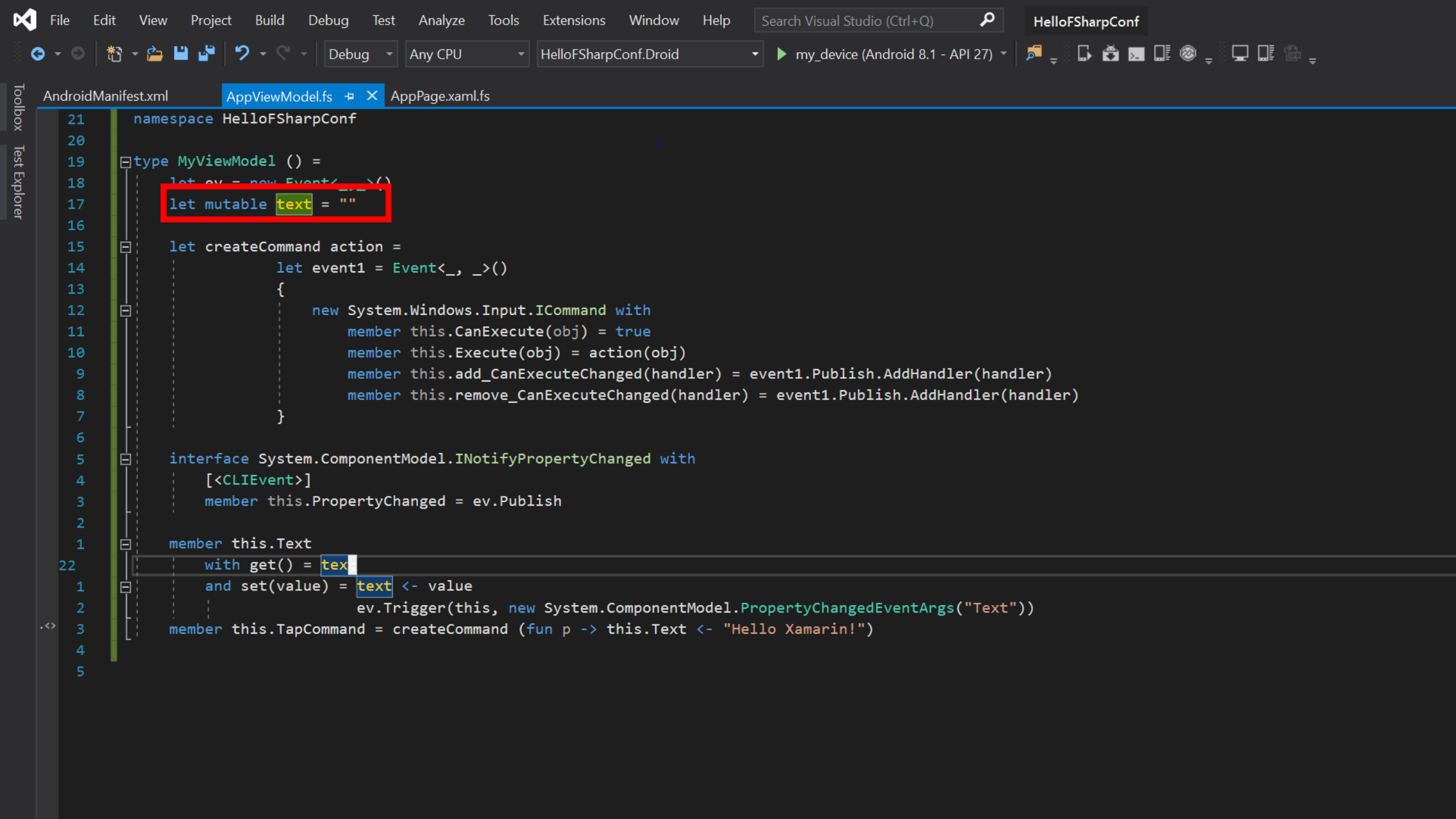
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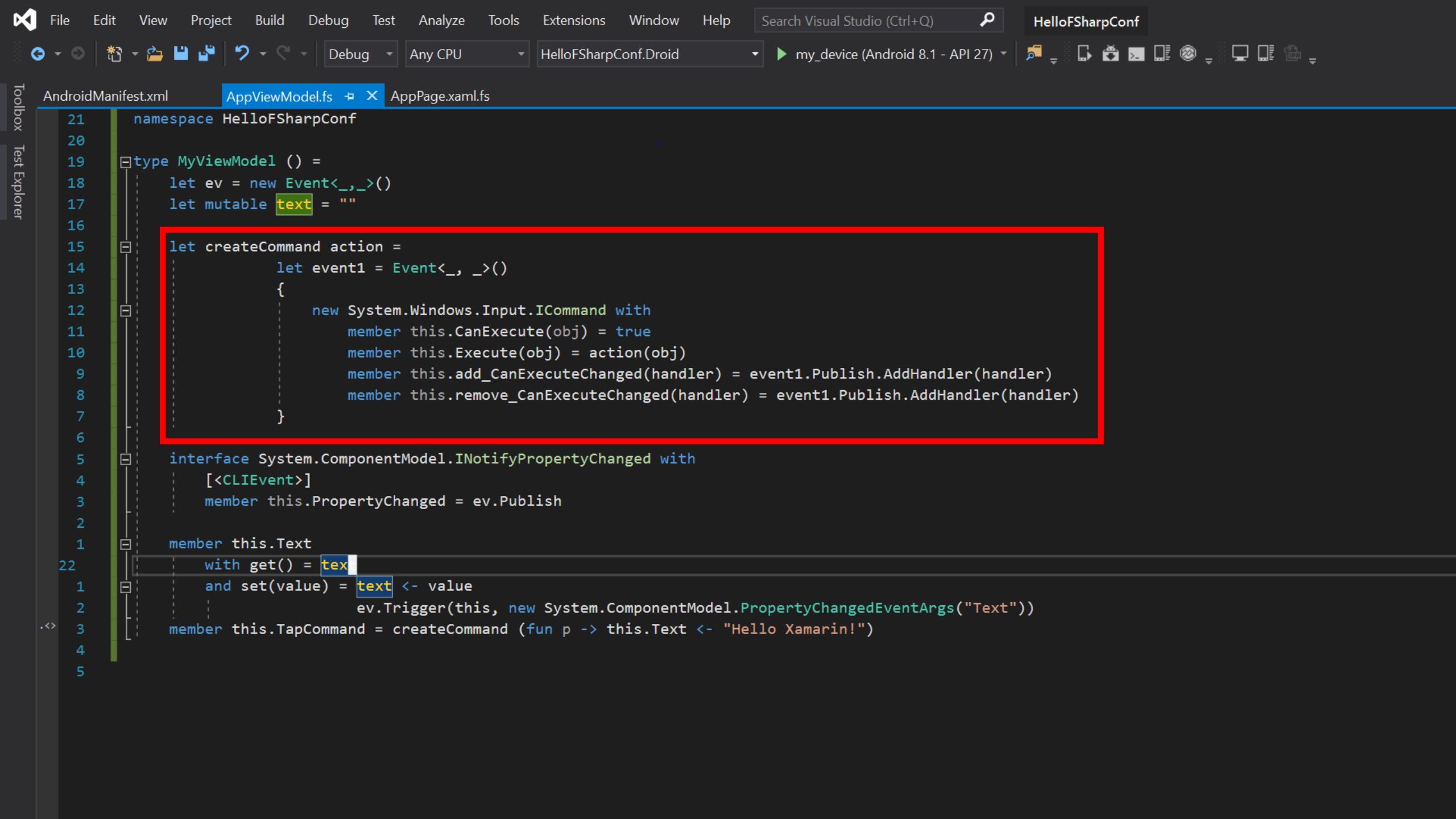
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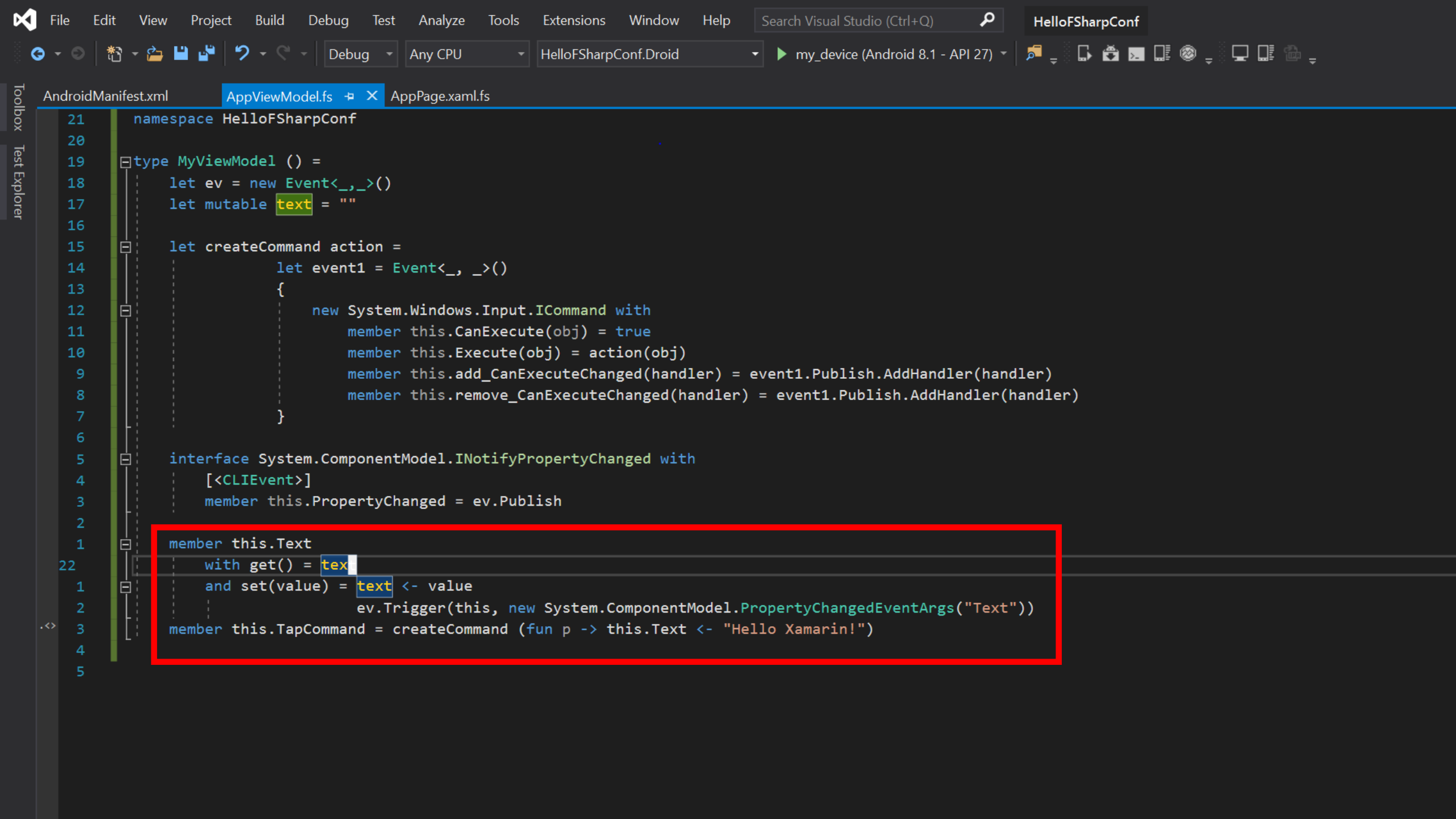
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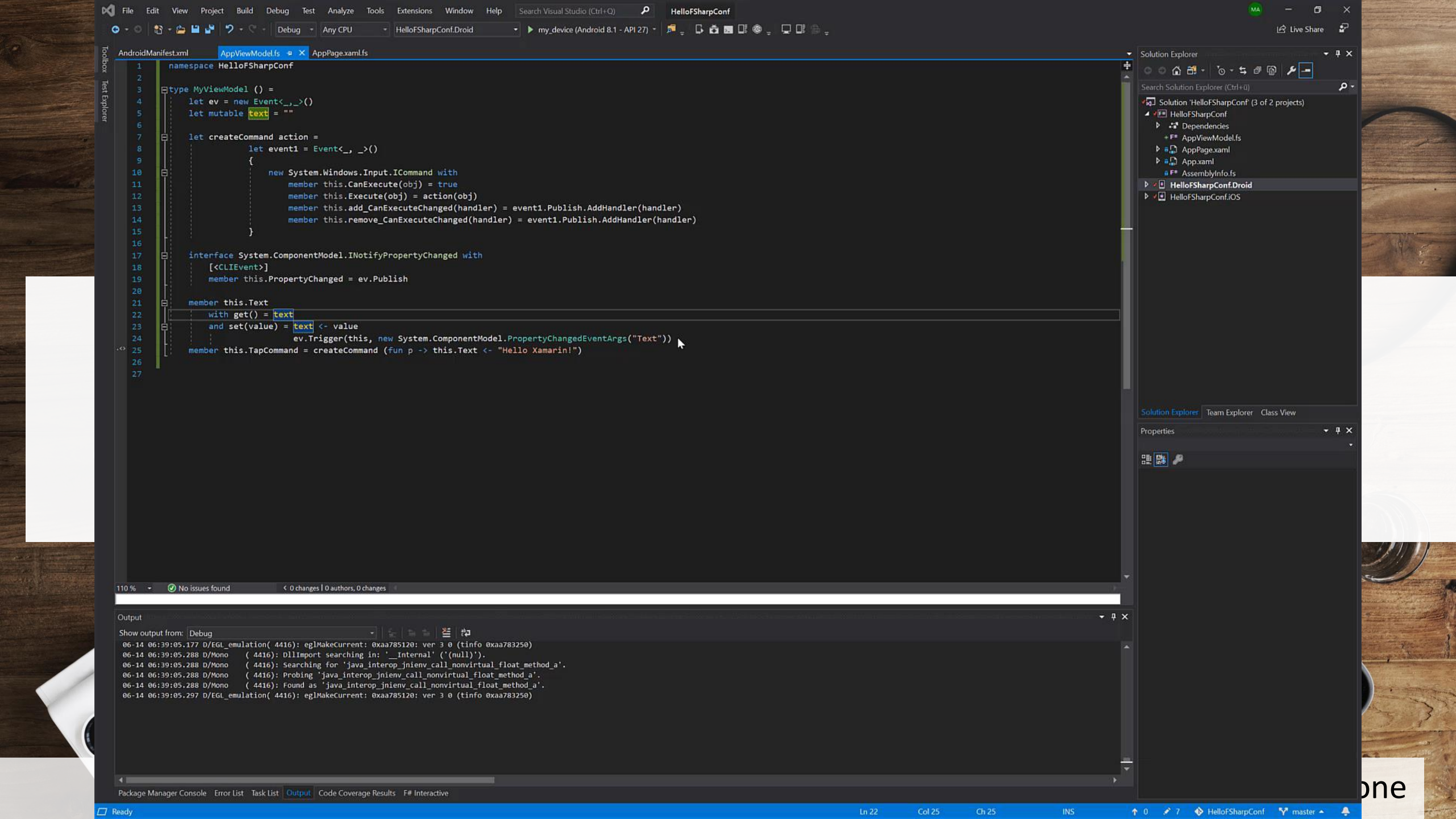
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110 %
No issues found
0 changes | 0 authors, 0 changes
Solution Explorer
Search Solution Explorer (Ctrl+ü)
Solution 'HelloFSharpConf' (3 of 2 projects)
HelloFSharpConf
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AppViewModel.fs
AppPage.xaml
App.xaml
AssemblyInfo.fs
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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
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Col 25
Ch 25
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HelloFSharpConf
master

F# can do Object Oriented programming but it is functional first

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MVU the functional MV* View Pattern

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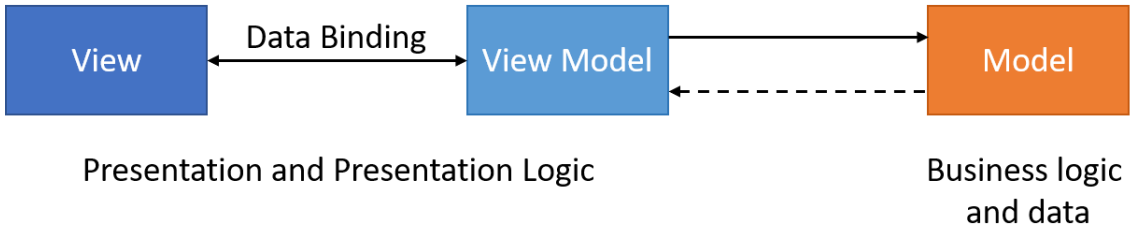
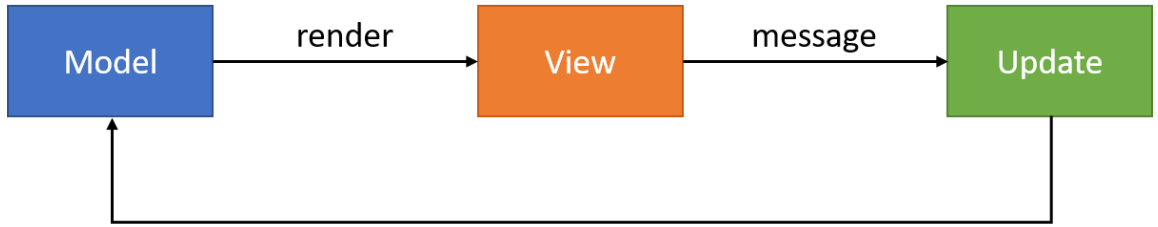
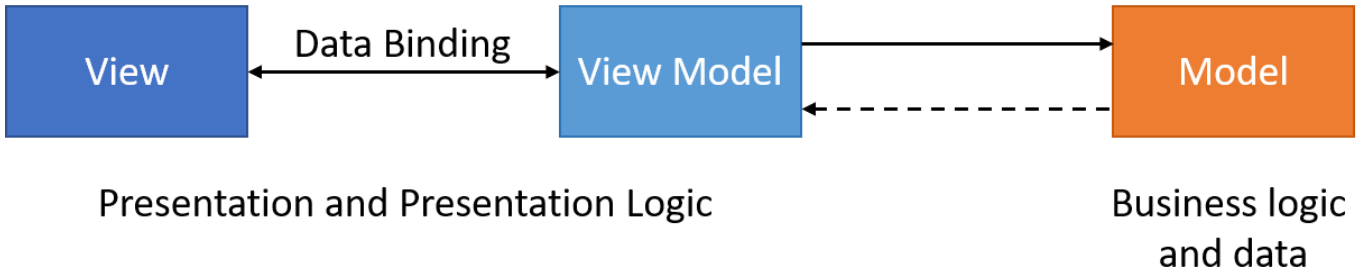
MVVM vs MVU

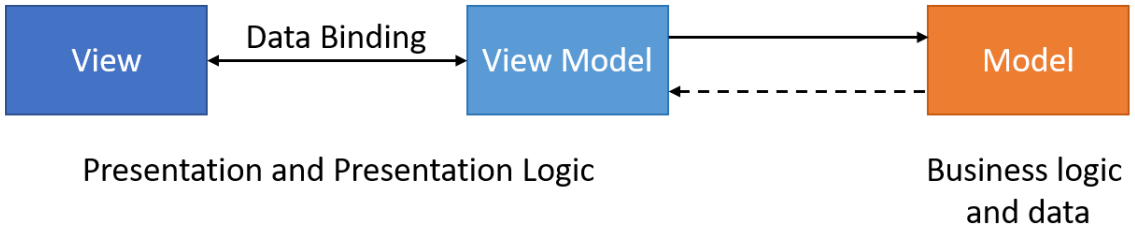

View
Data Binding
View Model
Model
Presentation and Presentation Logic
Business logic
and data


Model
render
View
message
Update

Model View View Model



MVVM vs MVU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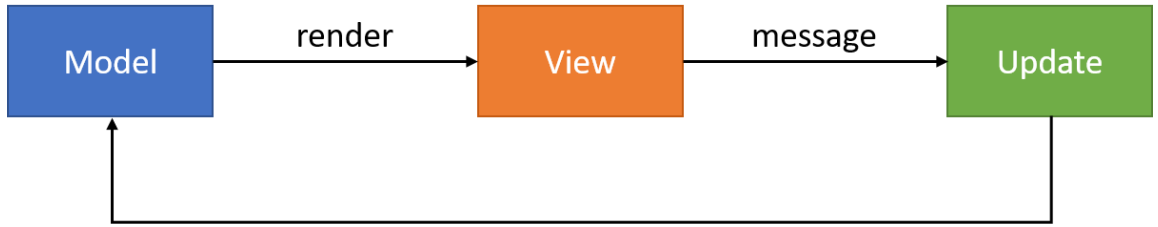
Model
render
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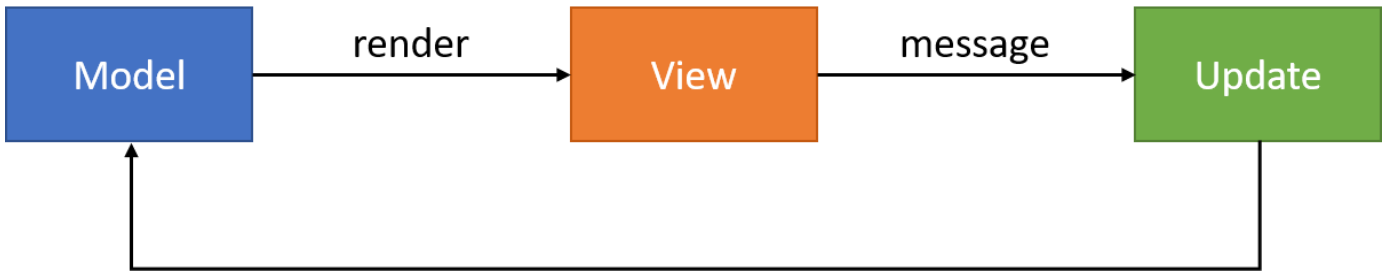
Model View Update



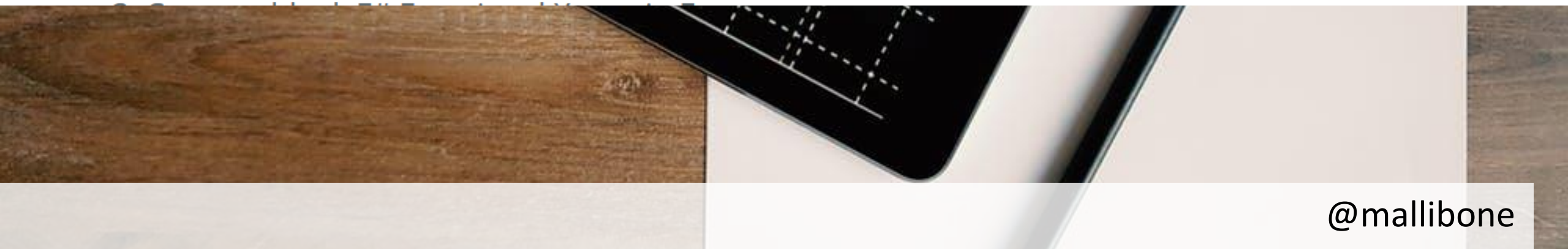
Functional Frontends

Getting started

1. Install Visual Studio or Visual Studio for Mac and enable both Xamarin and .NET Core support.

2. Install the template pack:

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



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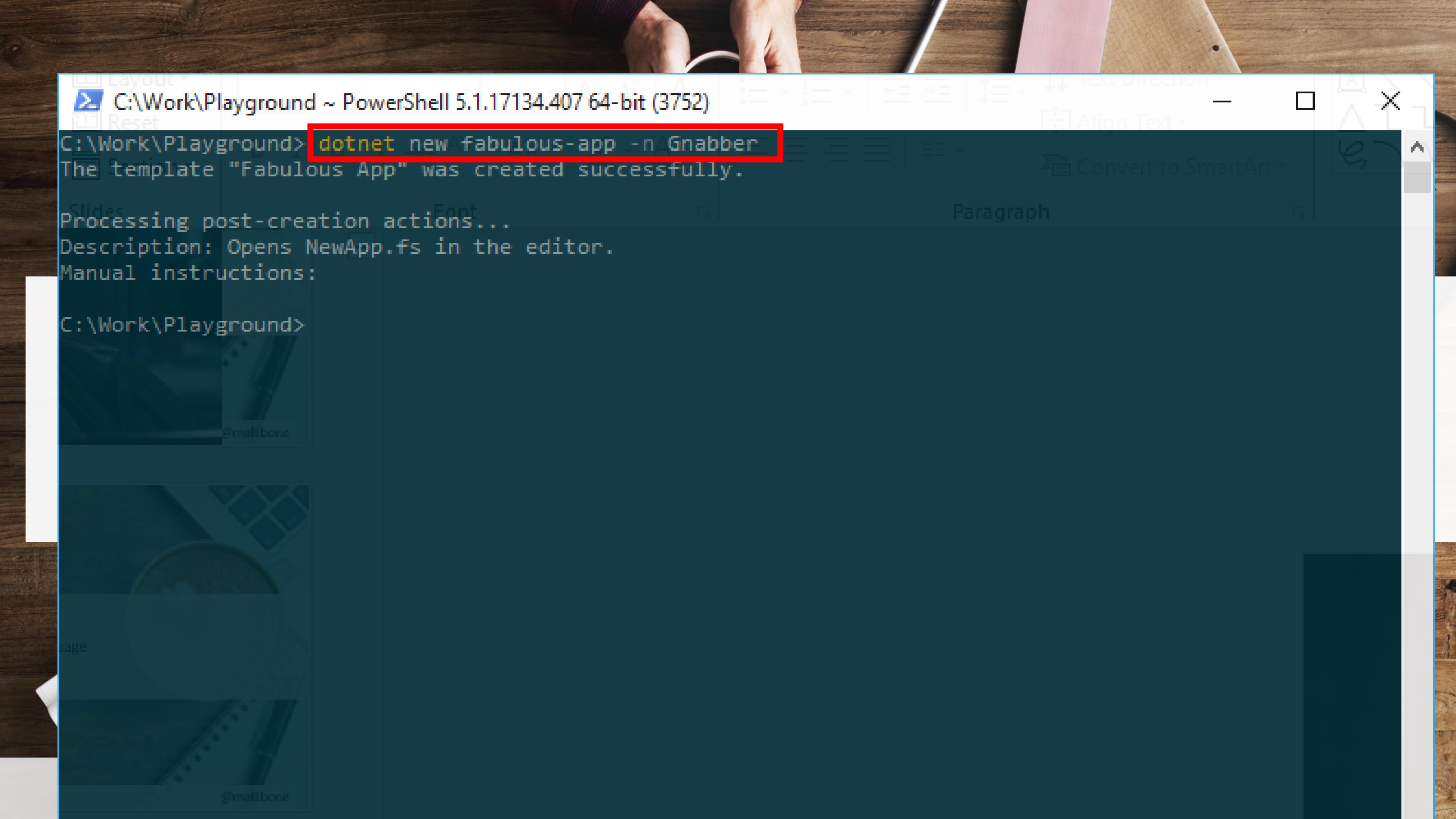
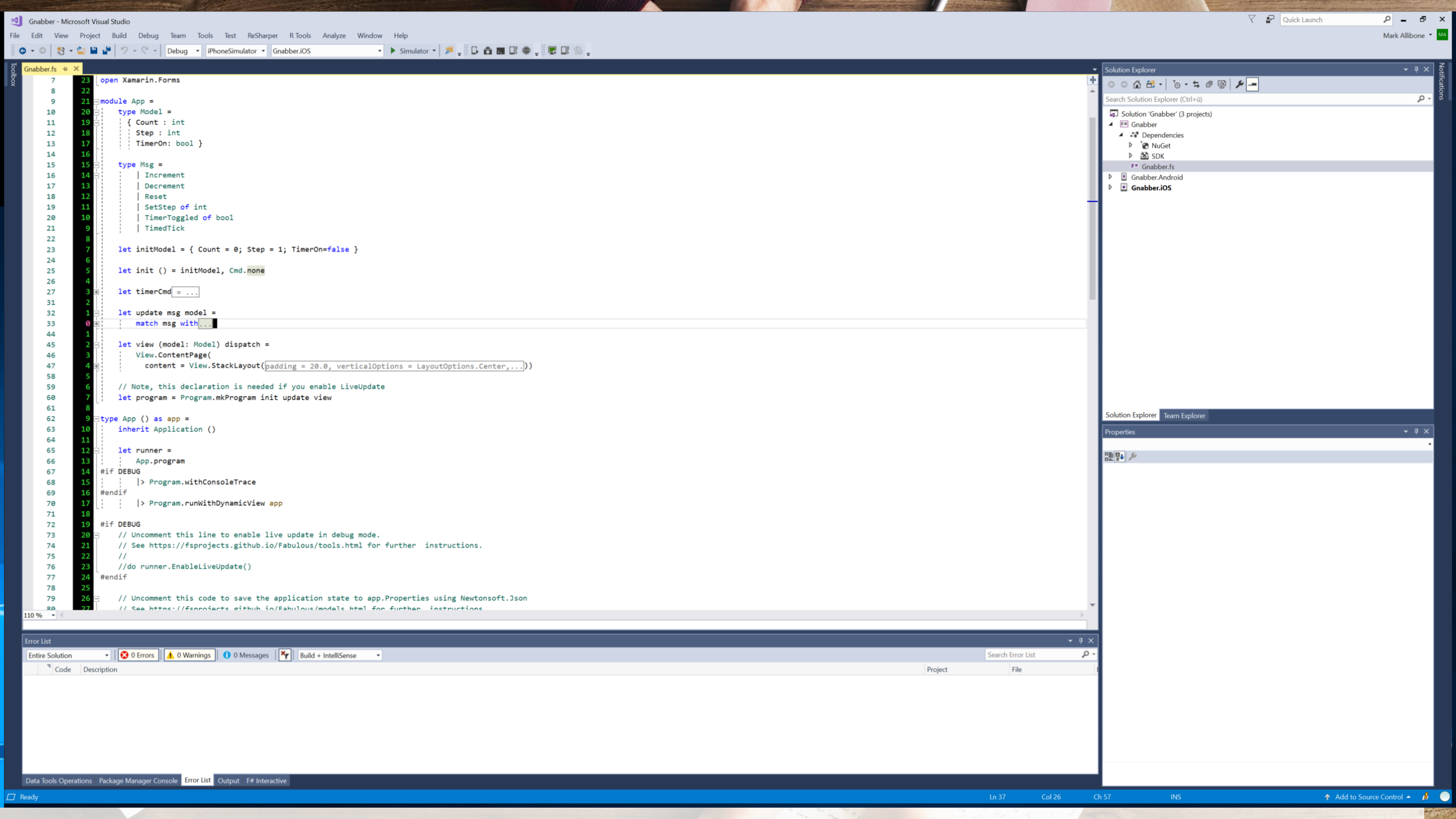
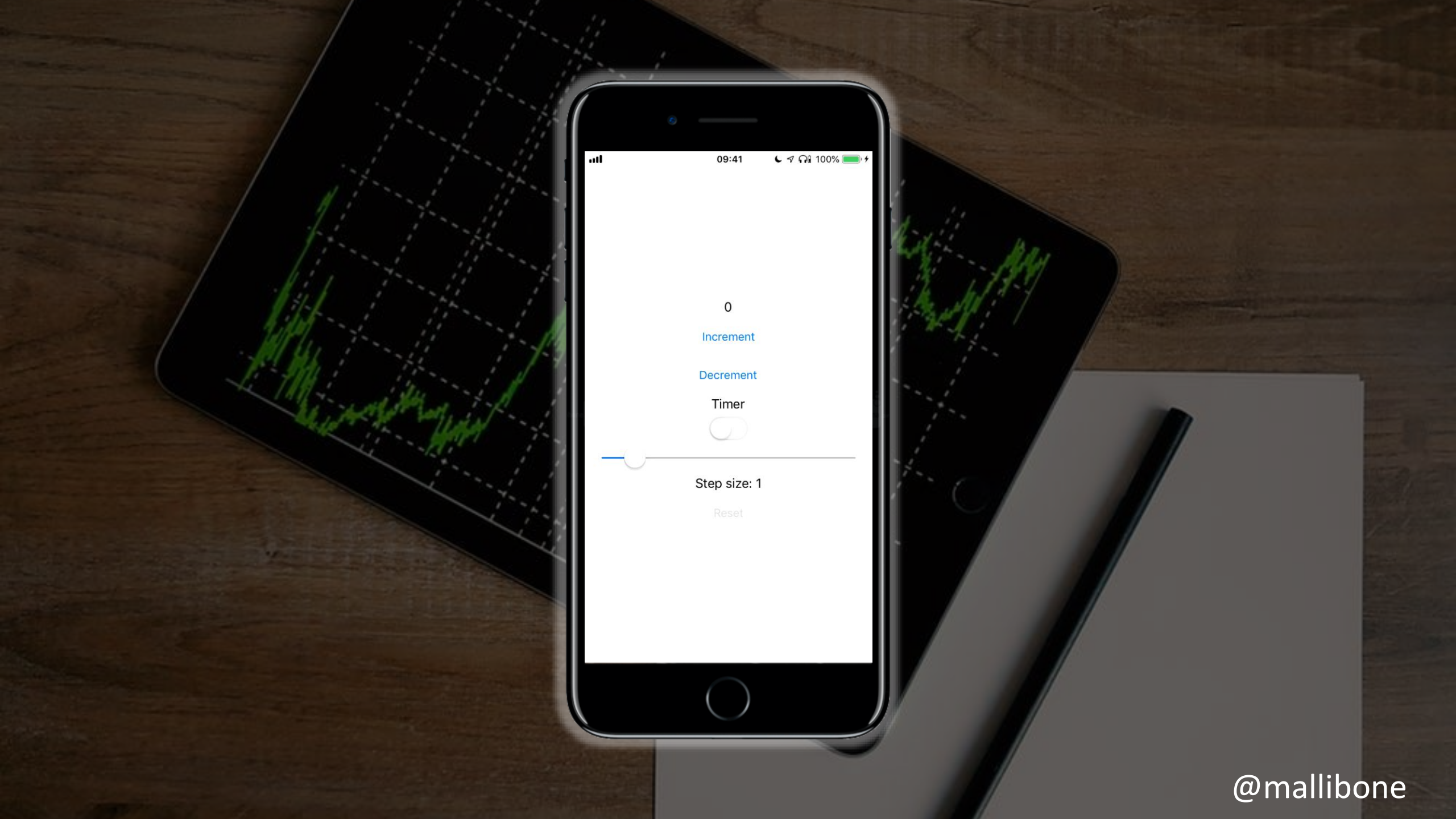

C:\Work\Playground ~ PowerShell 5.1.17134.407 64-bit (3752)
C:\Work\Playground> dotnet new fabulous-app -n Gnabber
The template "Fabulous App" was created successfully.
Processing post-creation actions...
Description: Opens NewApp.fs in the editor.
Manual instructions:
C:\Work\Playground>


Gnabber - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test ReSharper R Tools Analyze Window Help
Debug iPhoneSimulator Gnabber.iOS Simulator
Mark Allibone
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
// Uncomment this code to save the application state to app.Properties using Newtonsoft.Json
110 %
Solution Explorer
Search Solution Explorer (Ctrl+ü)
Solution 'Gnabber' (3 projects)
Gnabber
Dependencies
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
Ready Ln 37 Col 26 Ch 57 INS Add to Source Control



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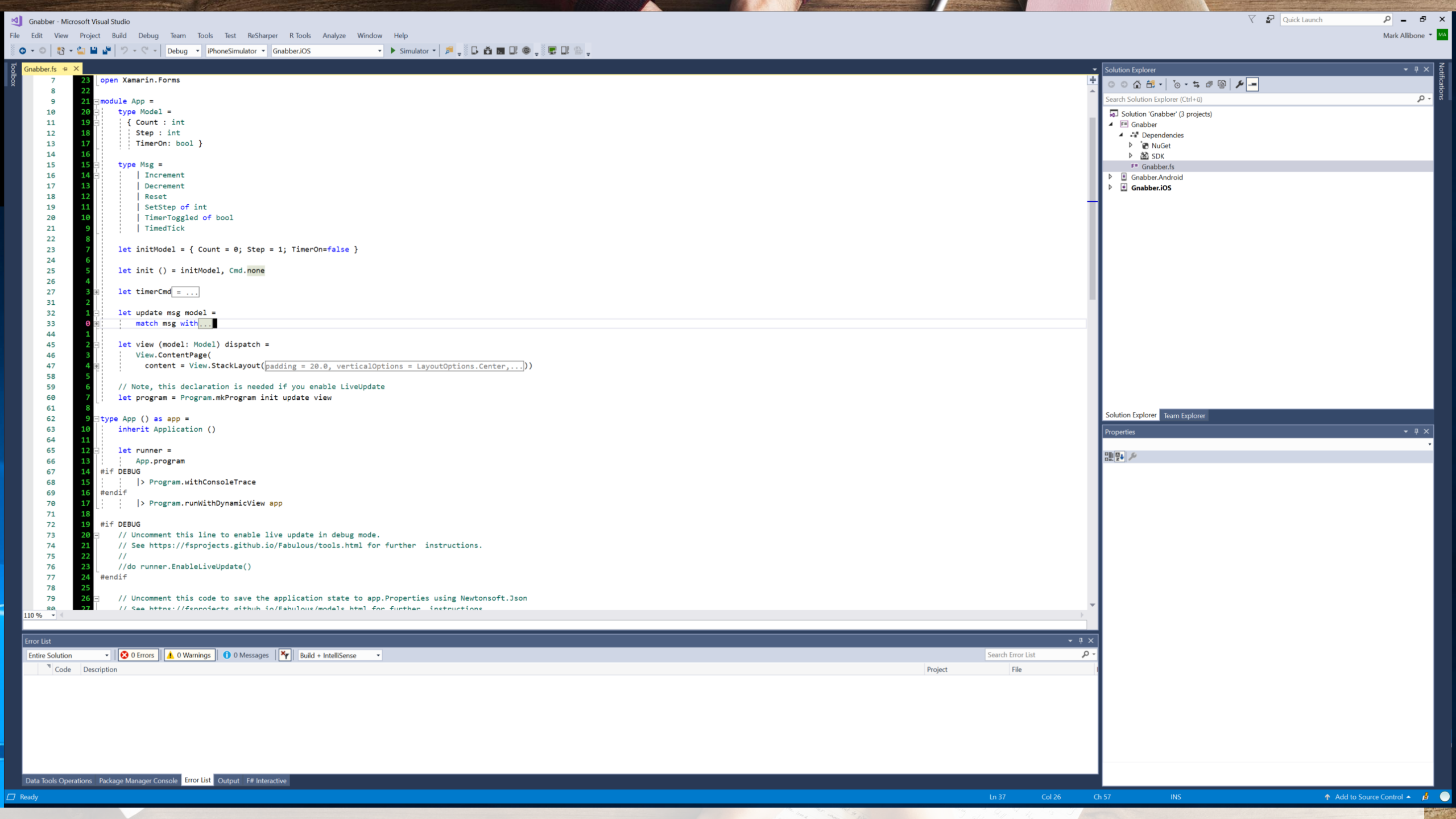
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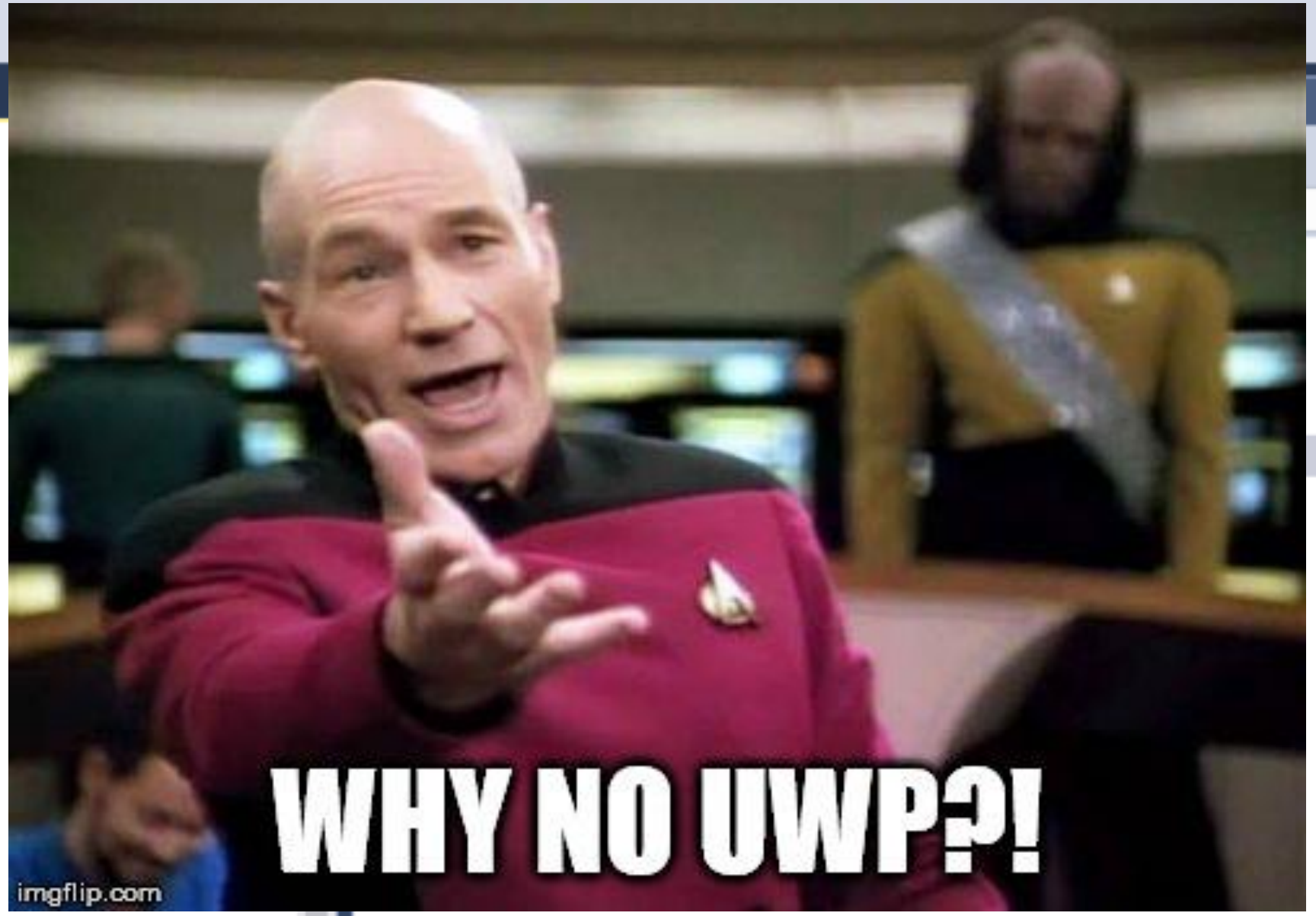
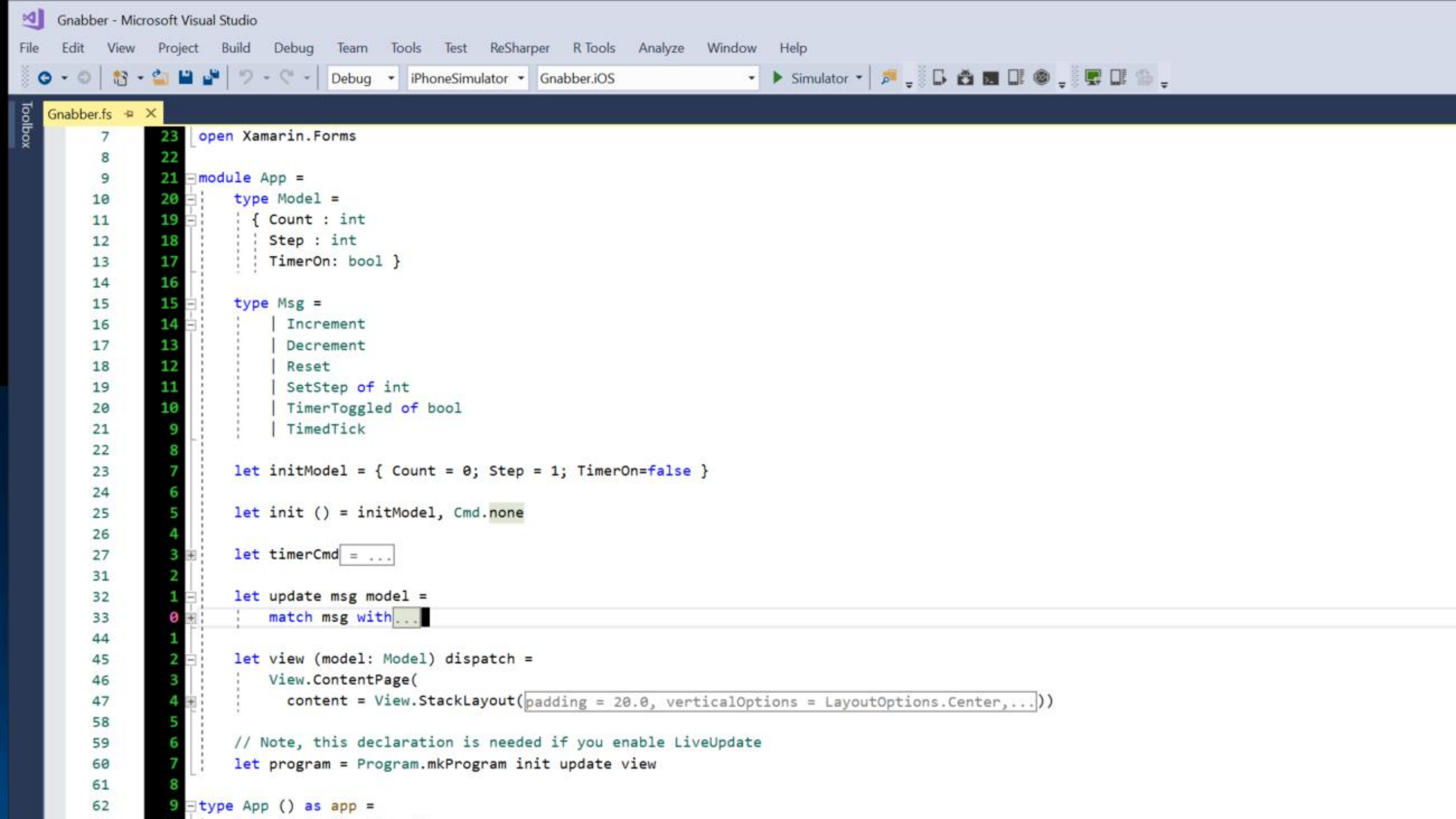

WHY NO UWP?!
imgflip.com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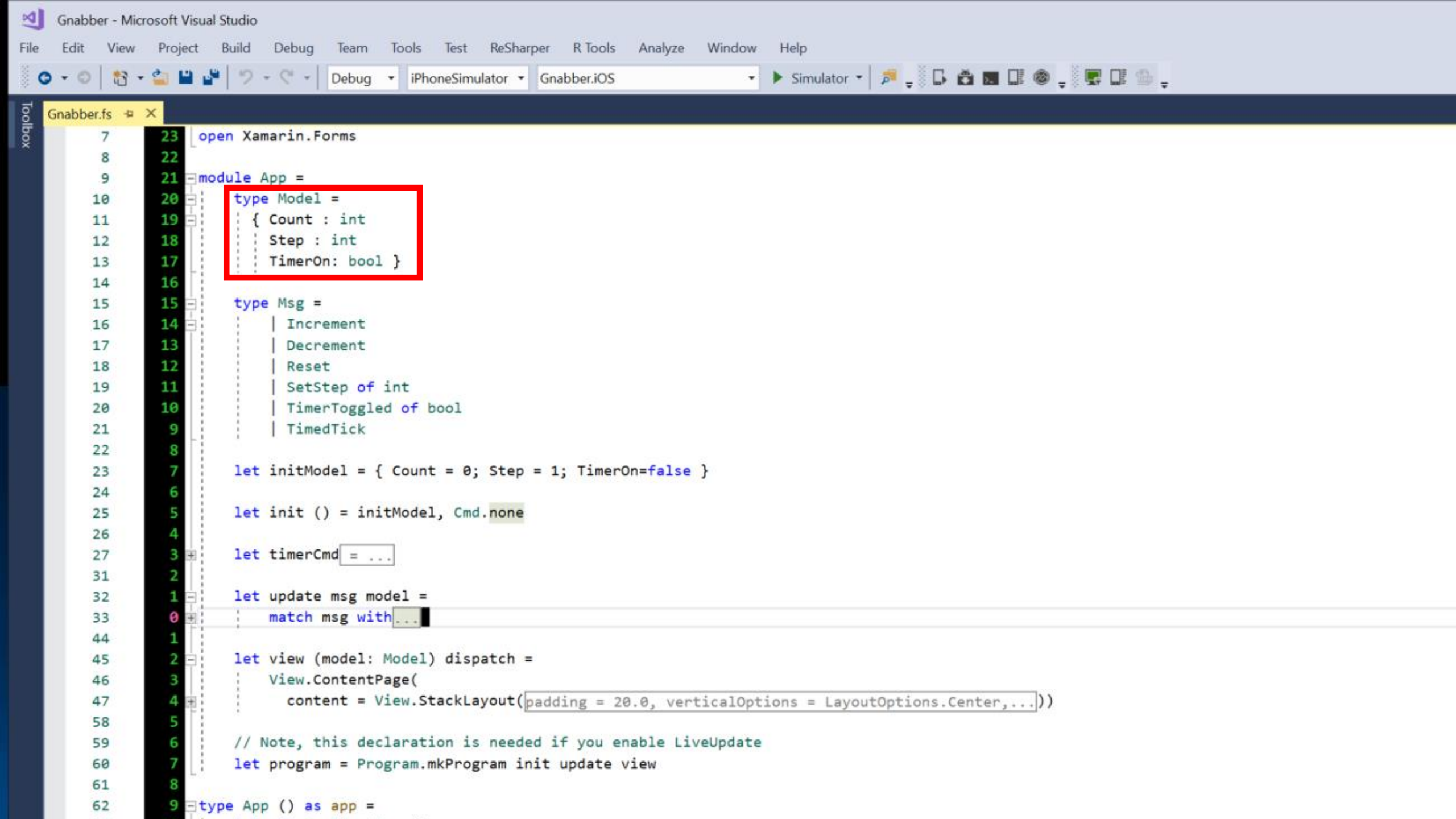
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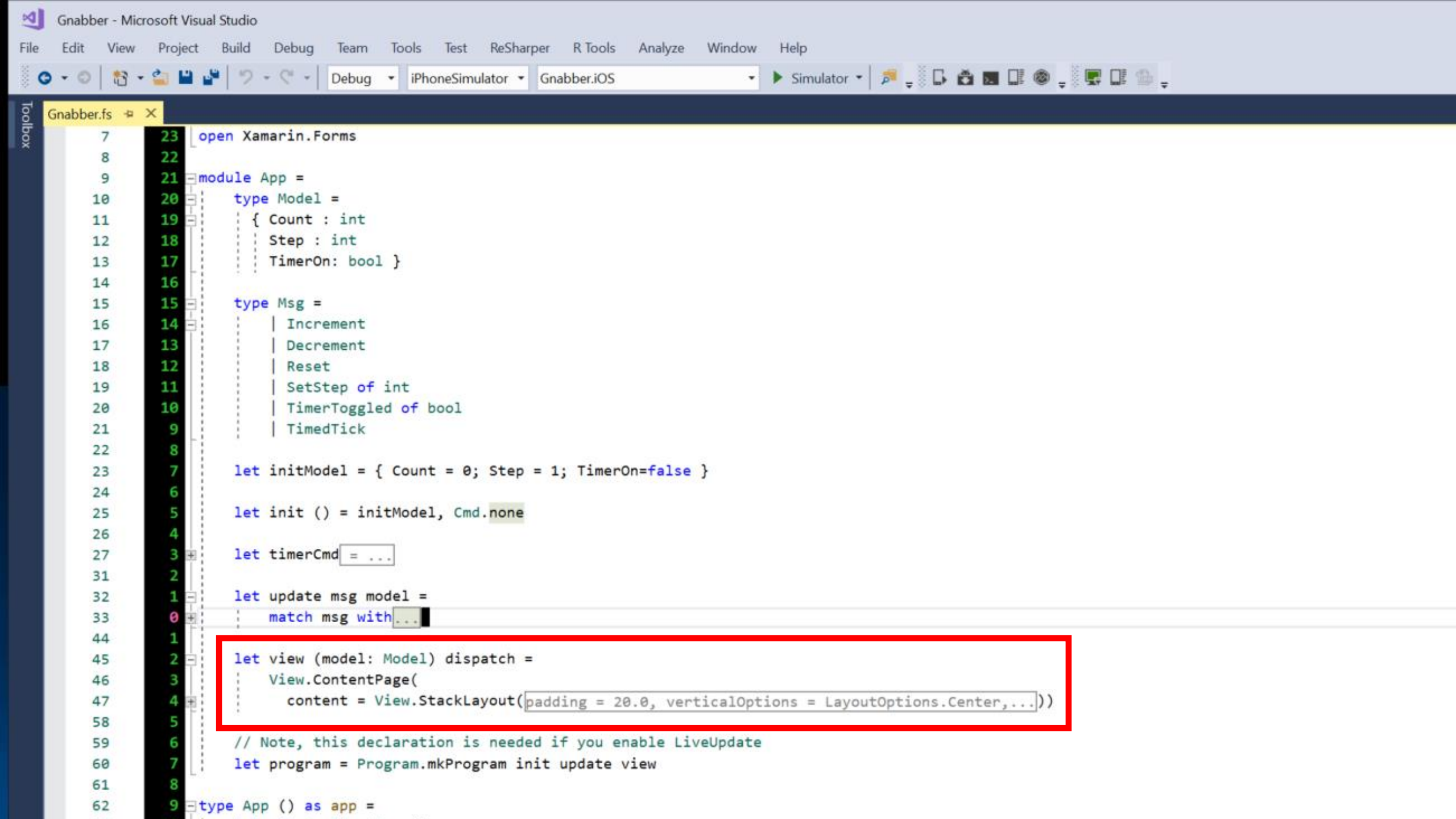
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Debug iPhoneSimulator Gnabber.iOS Simulator
Toolbox
Gnabber.fs
open Xamarin.Forms
module App =
type Model =
{ Count : int
Step : int
TimerOn: bool }
type Msg =
| Increment
| Decrement
| Reset
| SetStep of int
| TimerToggled of bool
| TimedTick
let 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
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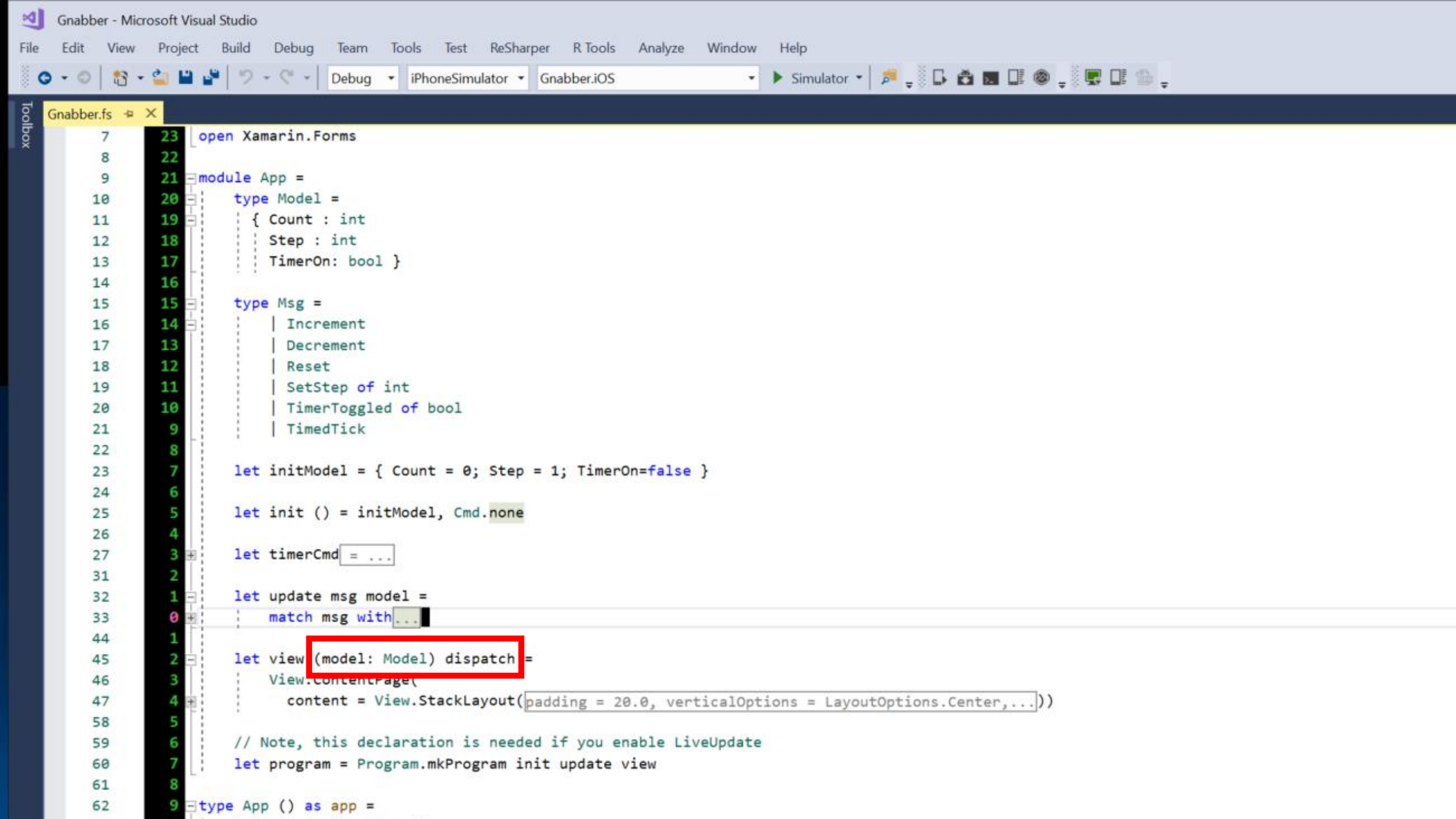
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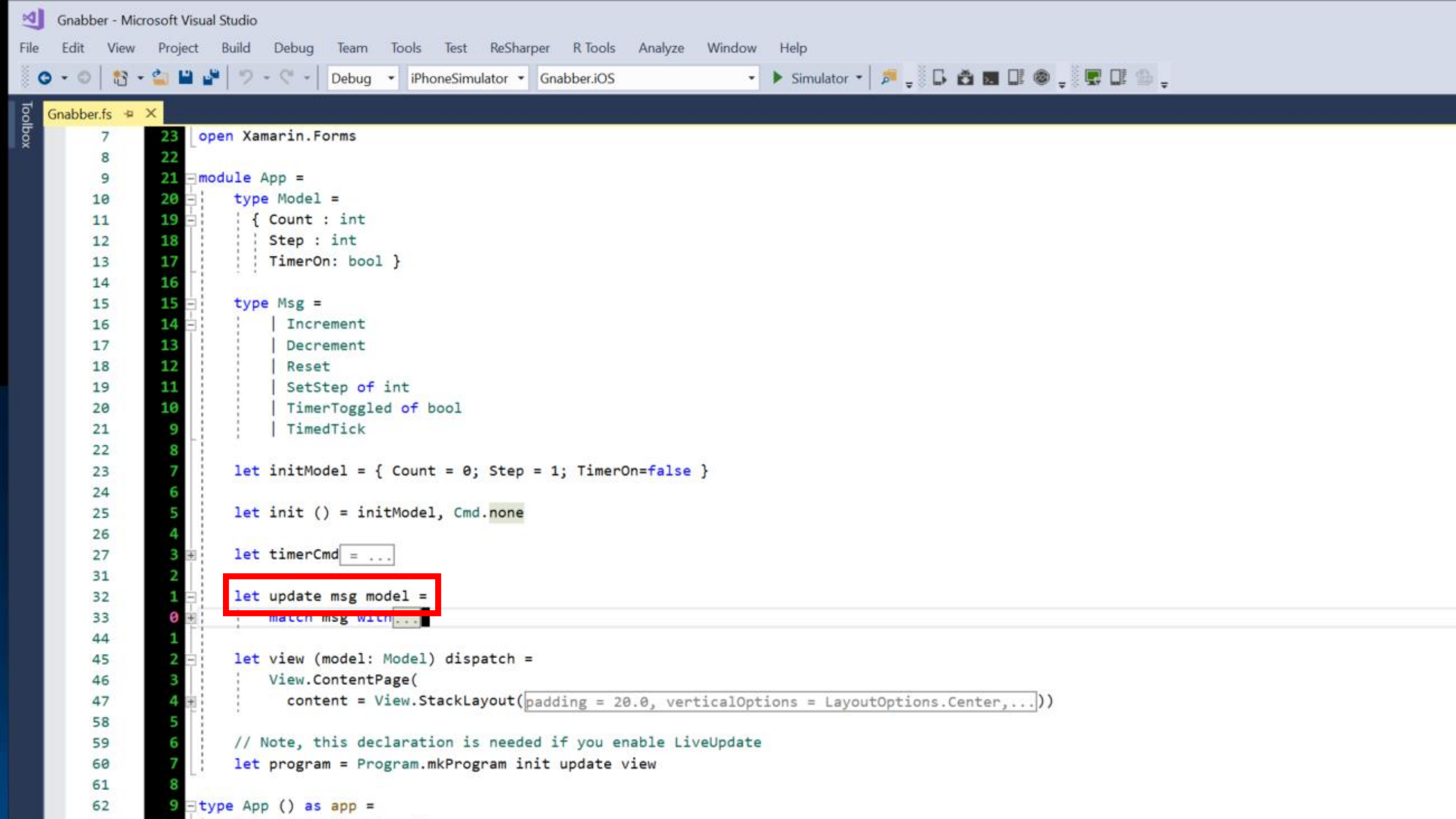
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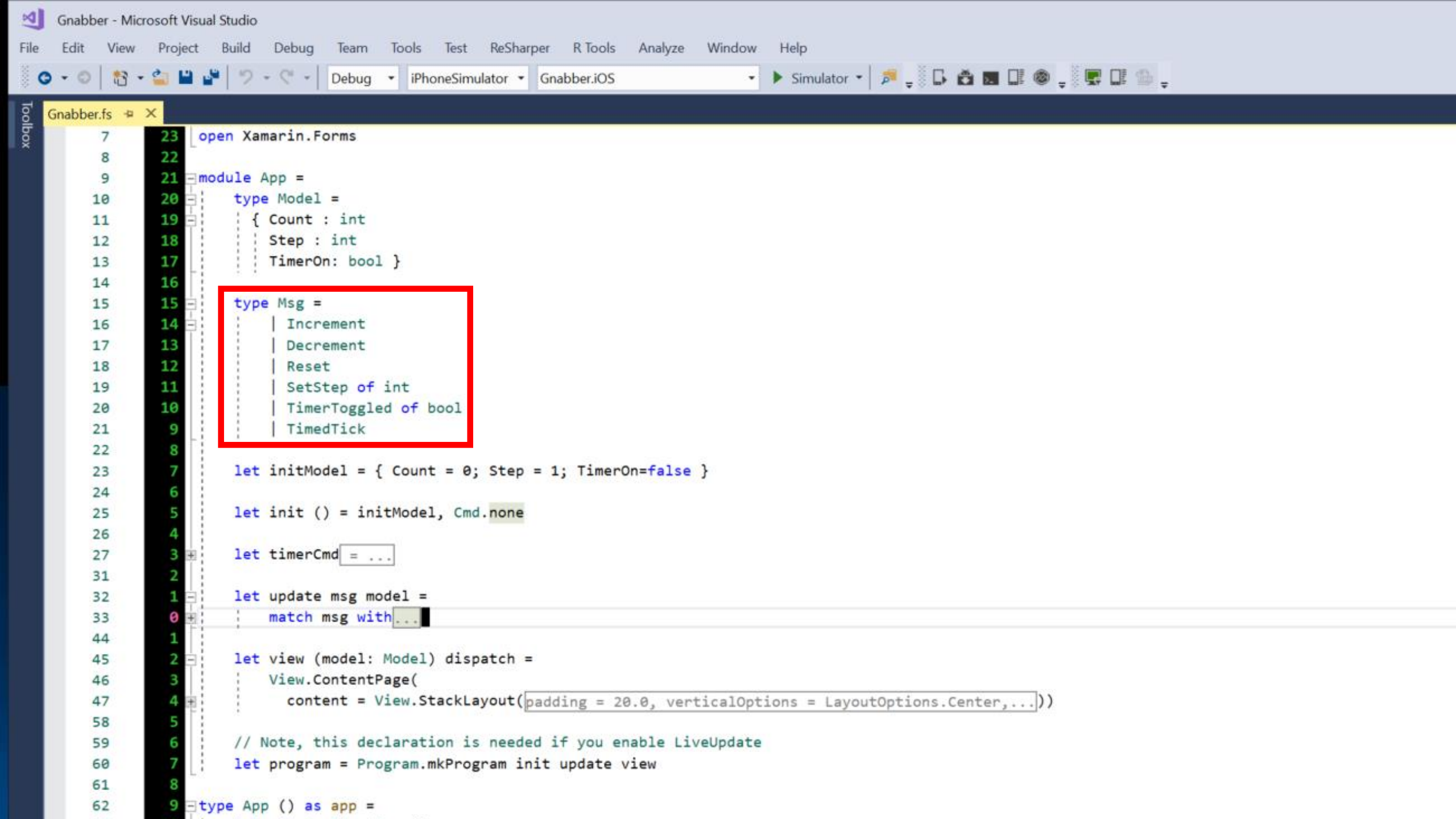
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BUSINESS
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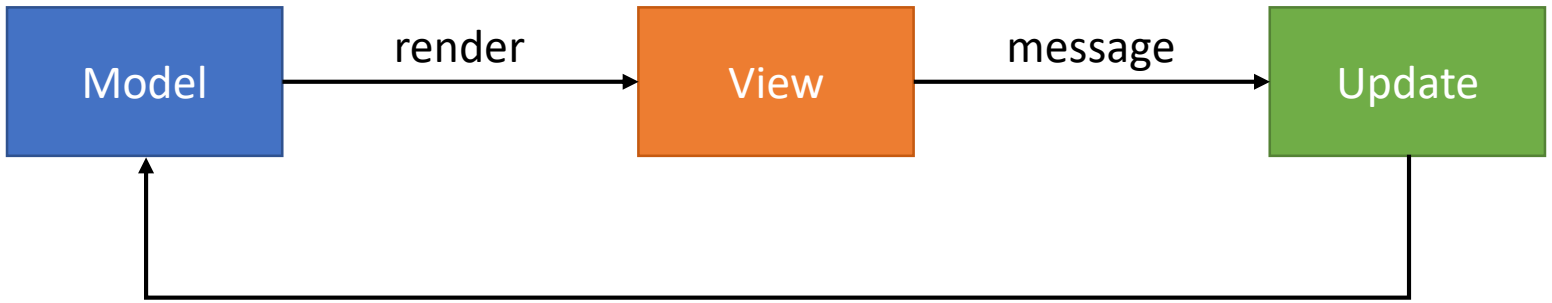
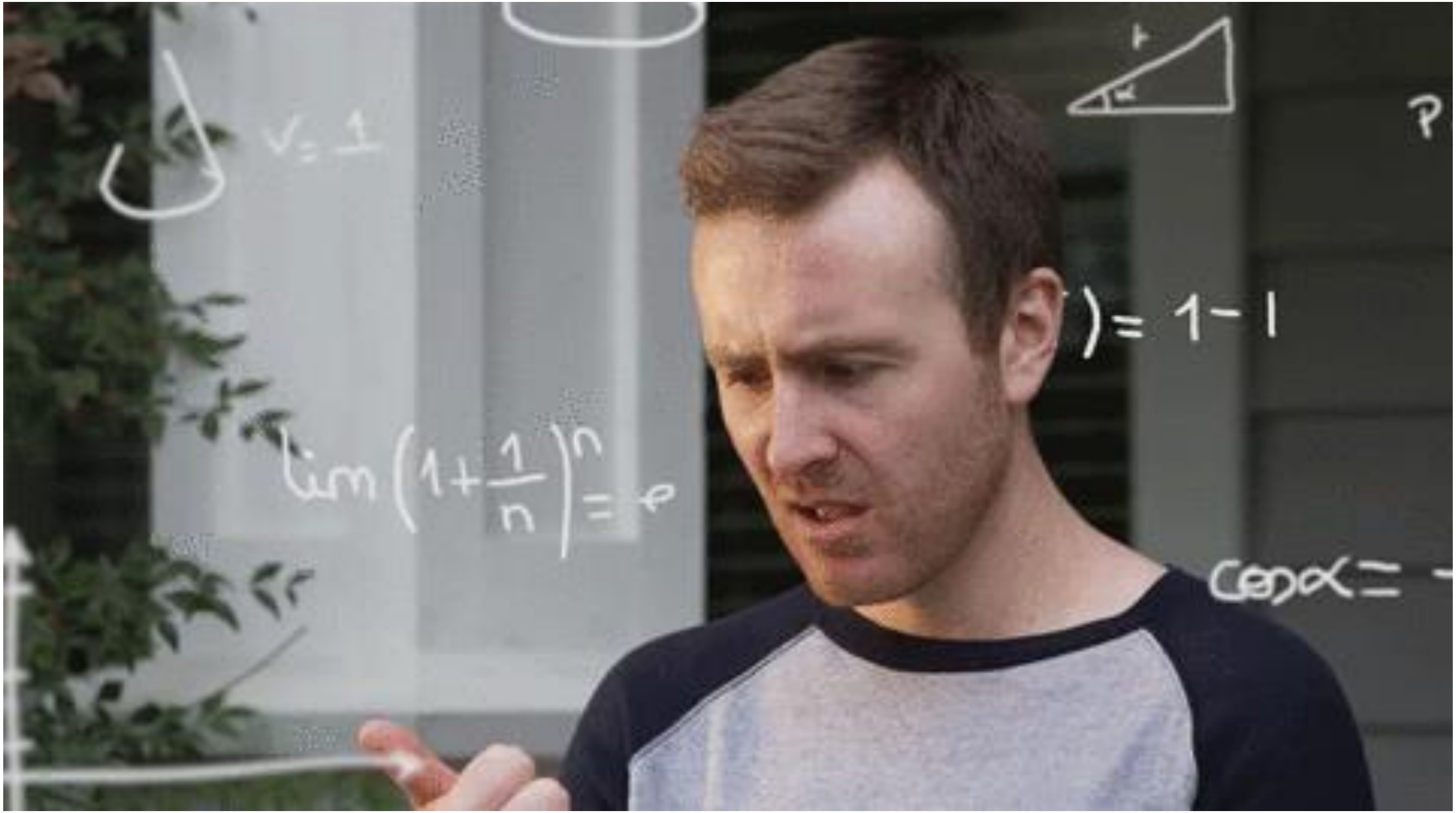
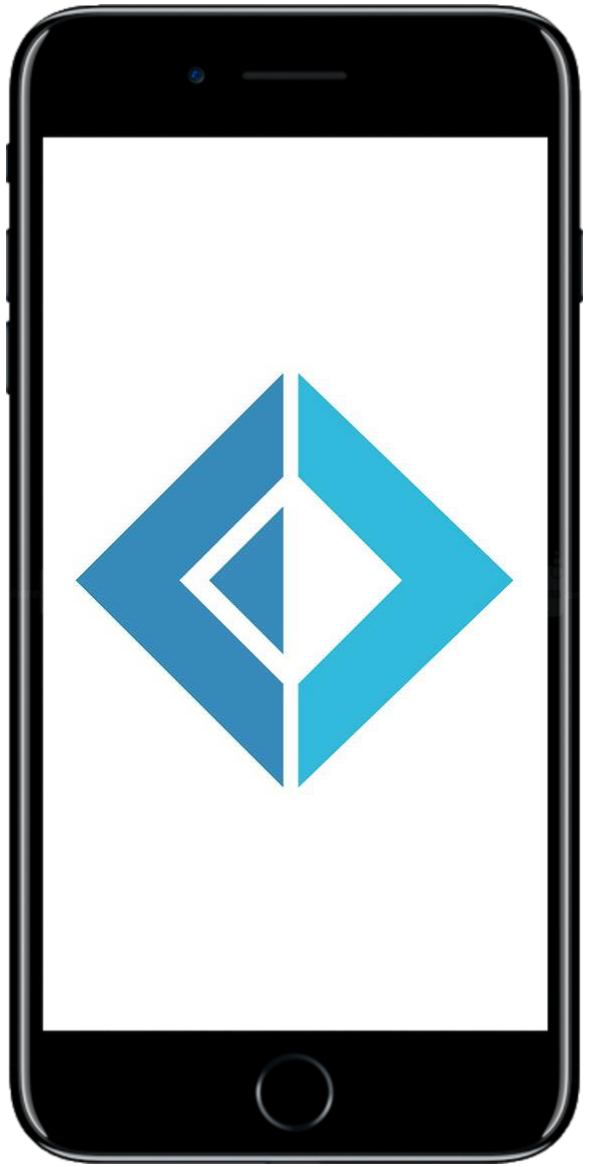
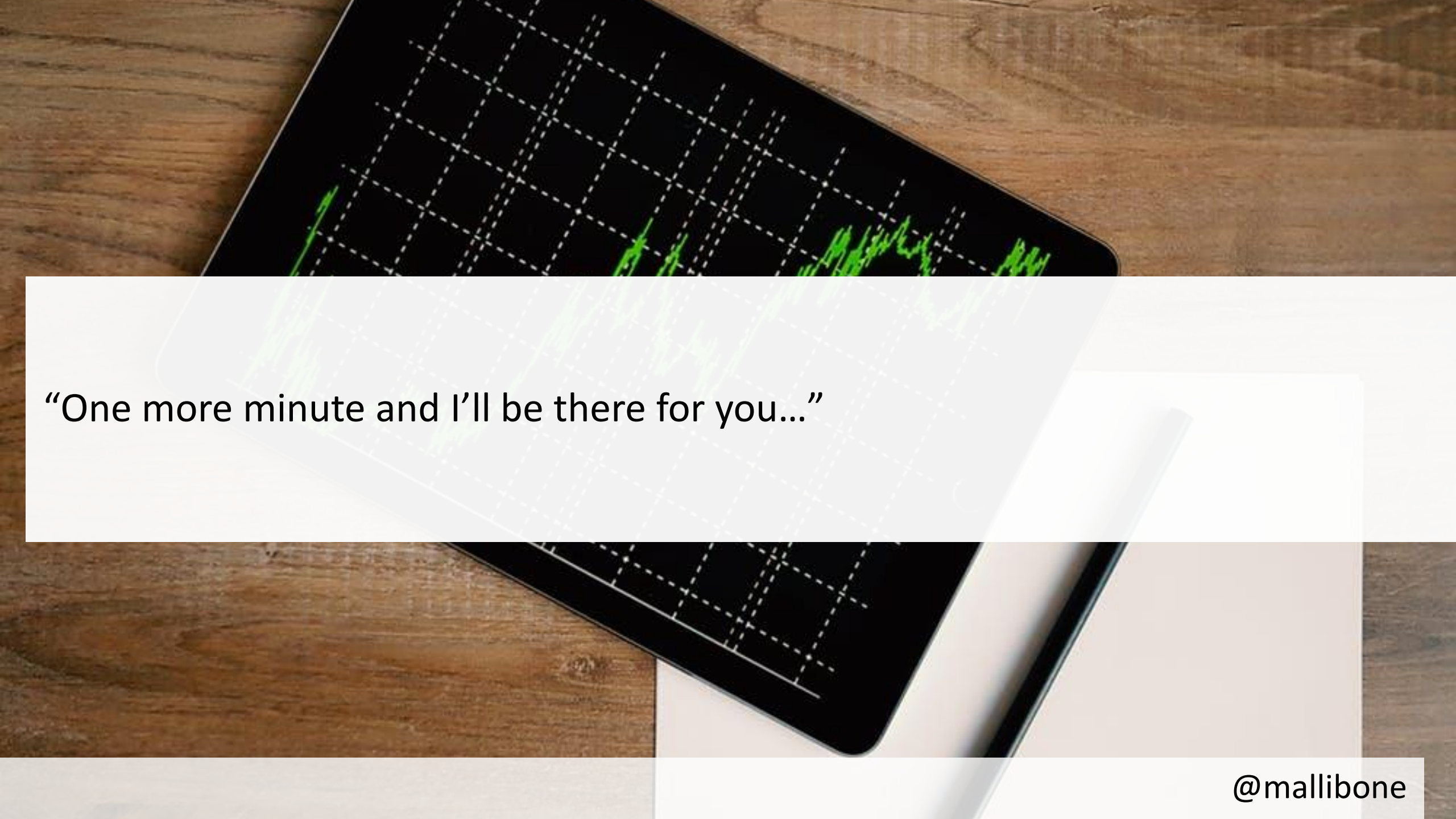
Model View Update



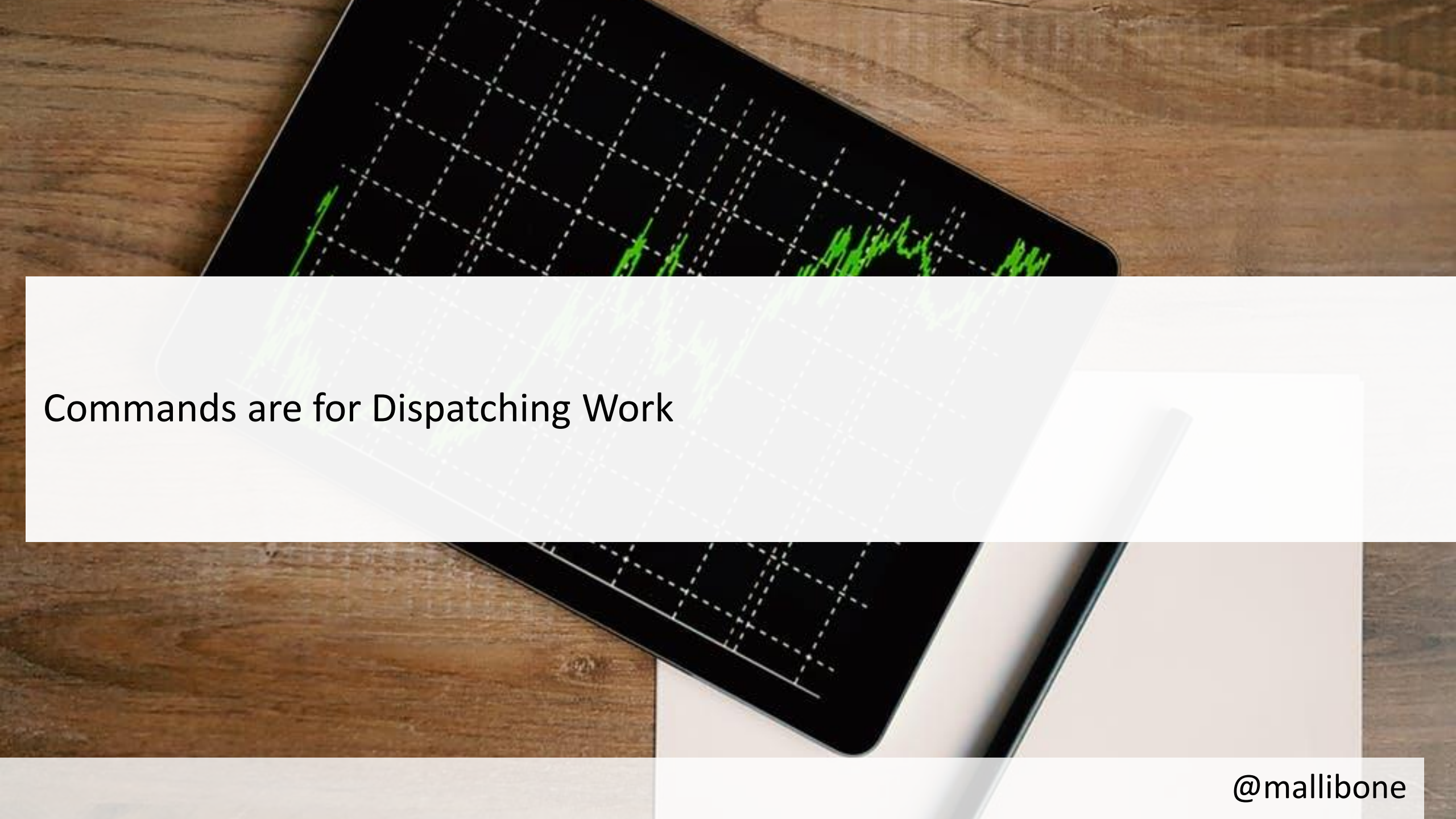

$\lim\left(1+\frac{1}{n}\right)^n = e$

- Driven from the model not the view
- States changes are defined with messages
- Single place for change in the update method
- Based on Xamarin Forms





“One more minute and I’ll be there for you…”



Commands are for Dispatching Work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Doing it with style

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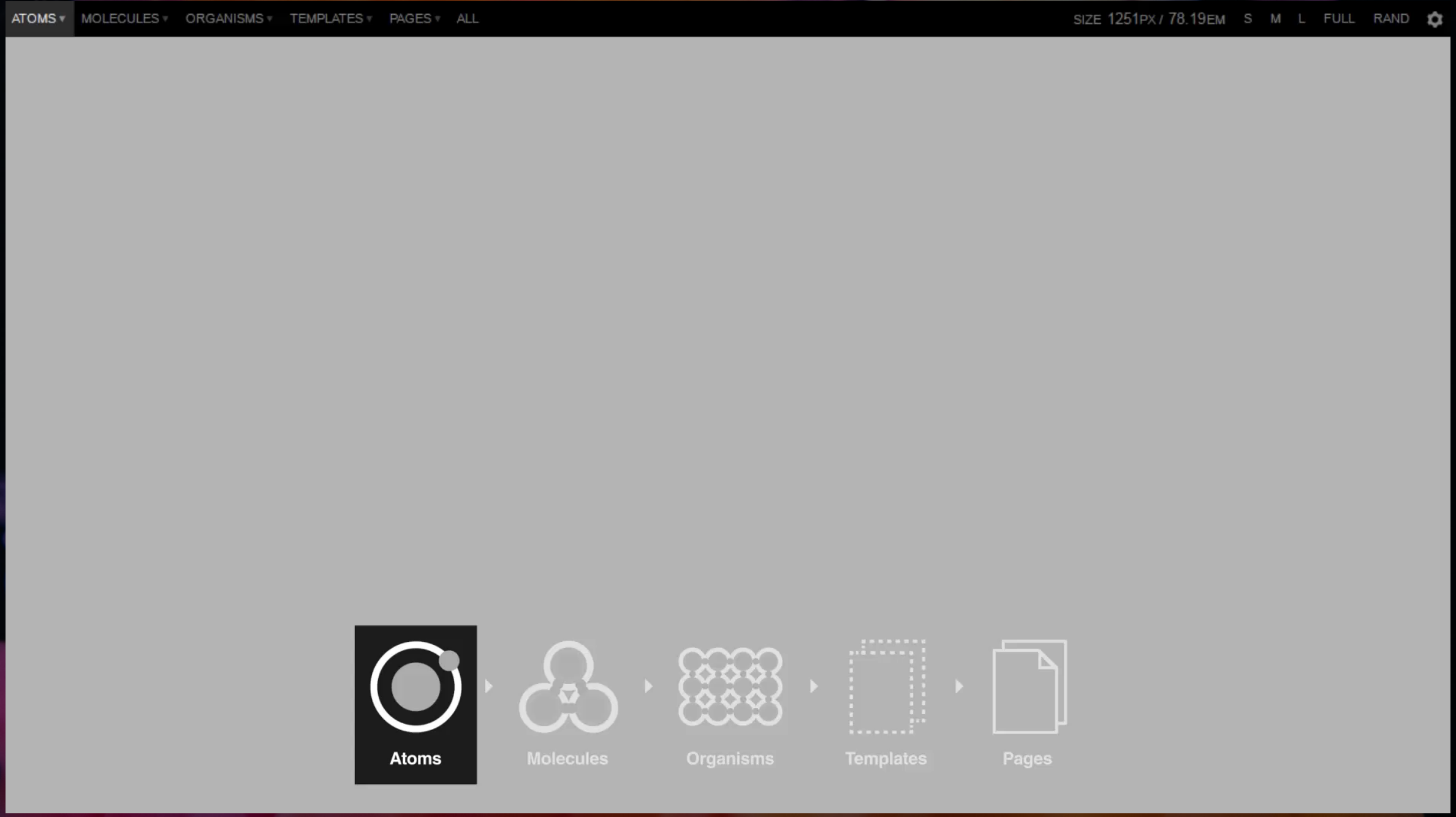

https://patternlab.io/

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

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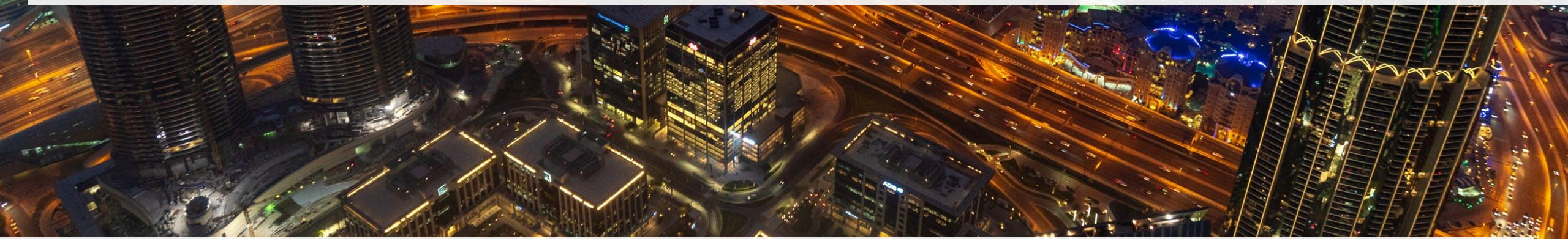
What about Shell? Visual Material? Or your other favorite Xamarin feature?



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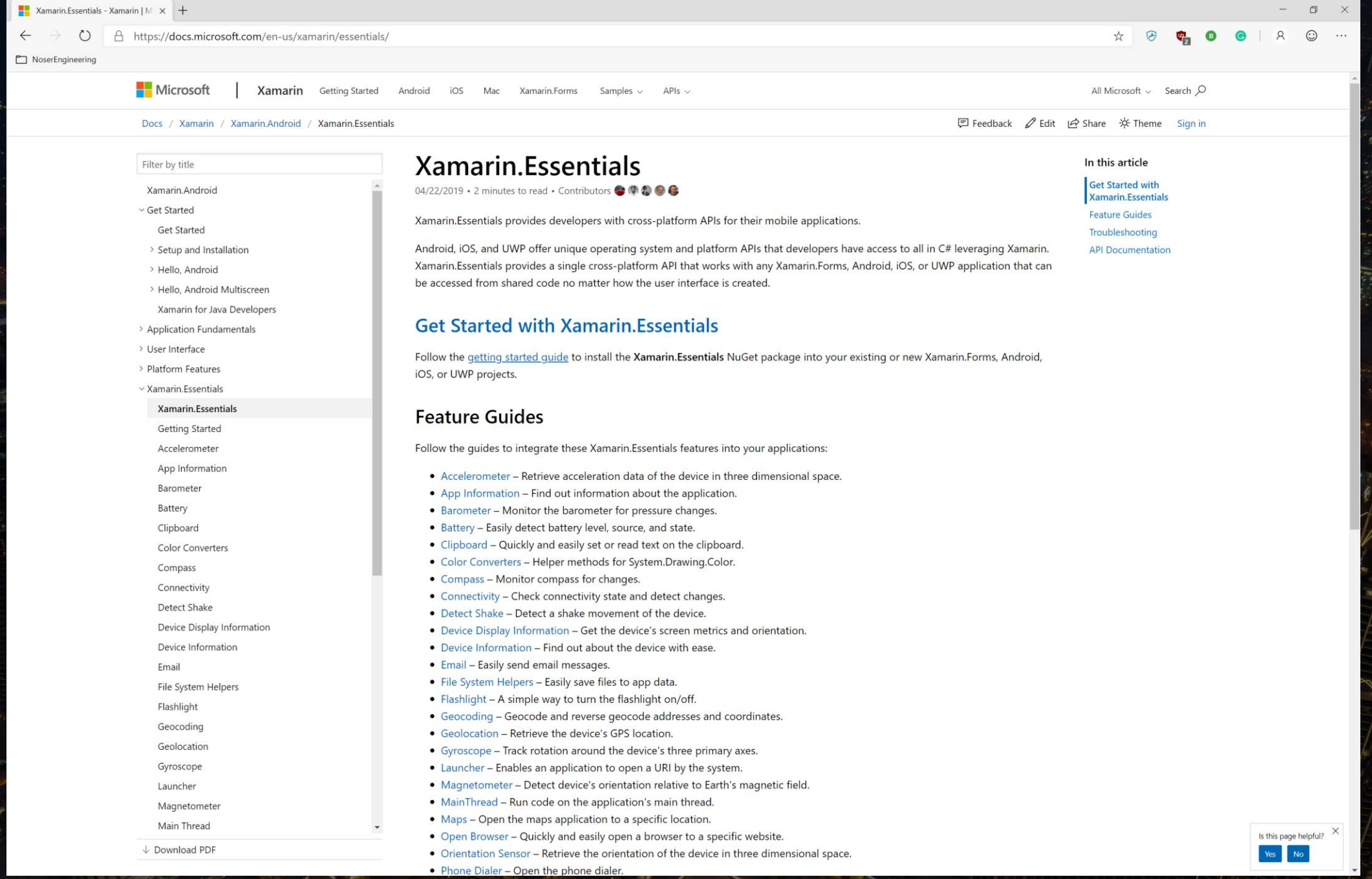
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Get Started with Xamarin.Essentials
Follow the getting started guide to install the Xamarin.Essentials NuGet package into your existing or new Xamarin.Forms, Android, iOS, or UWP projects.
Feature Guides
Follow the guides to integrate these Xamarin.Essentials features into your applications:
Accelerometer – Retrieve acceleration data of the device in three dimensional space.
App Information – Find out information about 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.
Detect Shake – Detect a shake movement of the device.
Device Display Information – Get the device's screen metrics and orientation.
Device Information – Find out about the device with ease.
Email – Easily send email messages.
File System Helpers – Easily save files to app data.
Flashlight – A simple way to turn the flashlight on/off.
Geocoding – Geocode and reverse geocode addresses and coordinates.
Geolocation – Retrieve the device's GPS location.
Gyroscope – Track rotation around the device's three primary axes.
Launcher – Enables an application to open a URI by the system.
Magnetometer – Detect device's orientation relative to Earth's magnetic field.
MainThread – Run code on the application's main thread.
Maps – Open the maps application to a specific location.
Open Browser – Quickly and easily open a browser to a specific website.
Orientation Sensor – Retrieve the orientation of the device in three dimensional space.
Phone Dialer – Open the phone dialer.
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No

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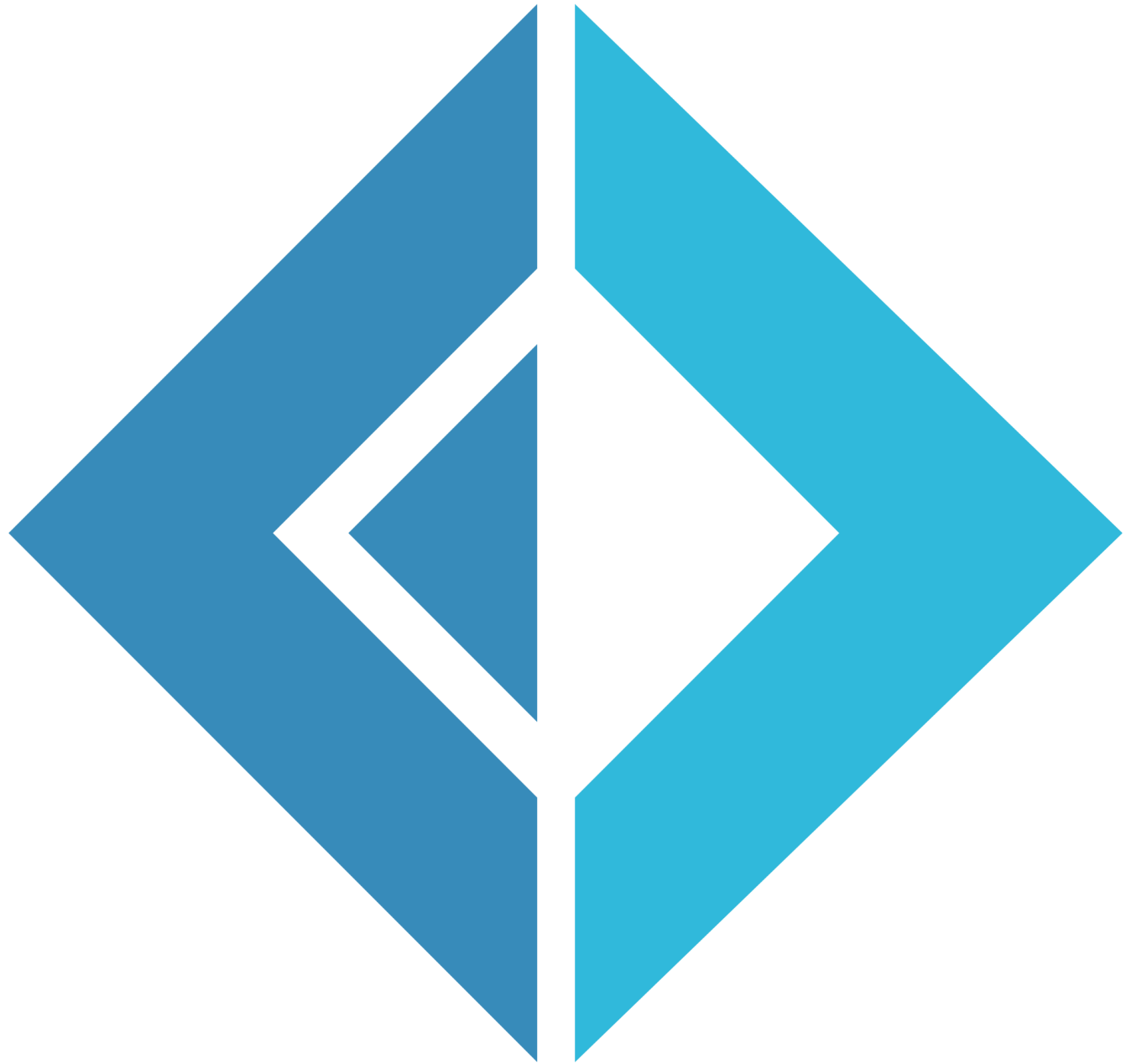
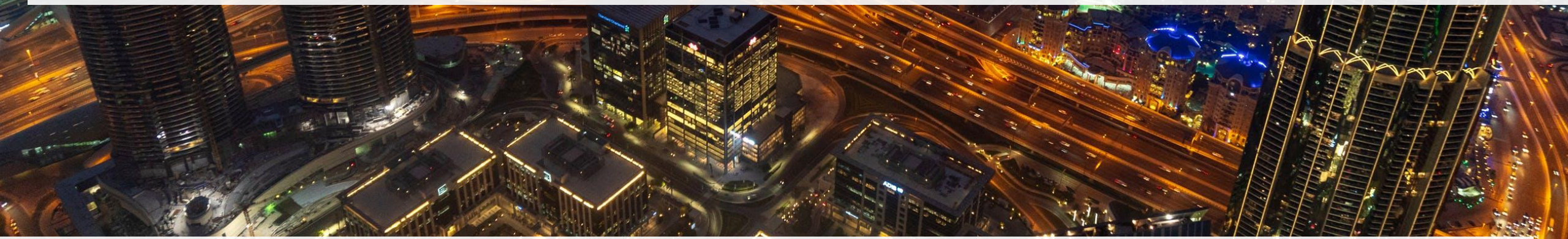
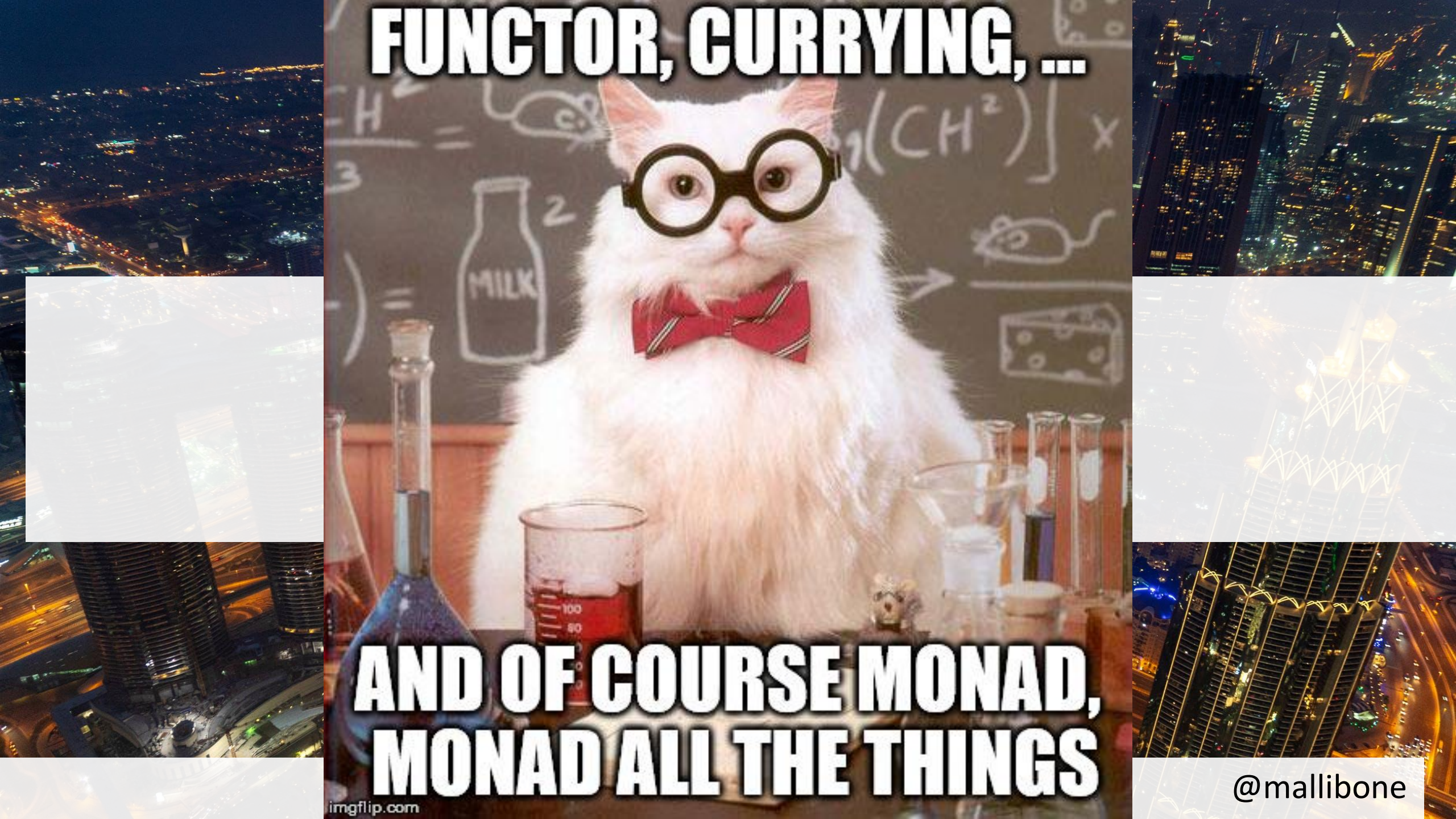


How to get started with F#?




FUNCTOR, CURRYING, ...
MILK
AND OF COURSE MONAD,
MONAD ALL THE THINGS
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"HOLY FORKING SHIRT!"
#THEGOODPLACE
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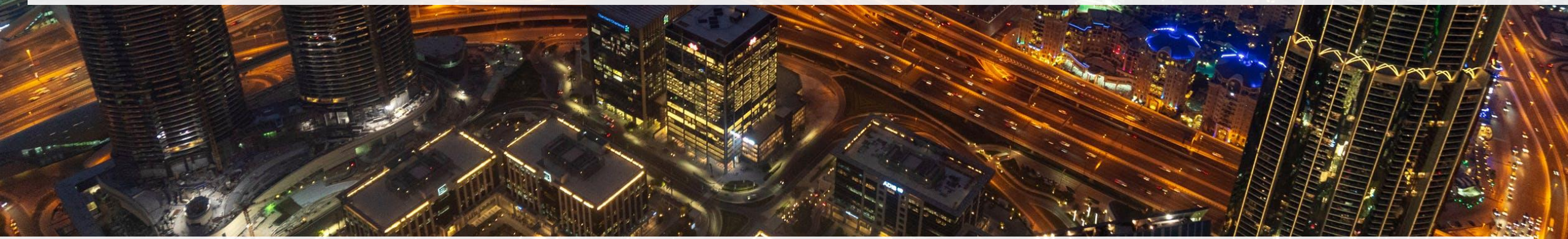
Learn Design patterns after learning the language



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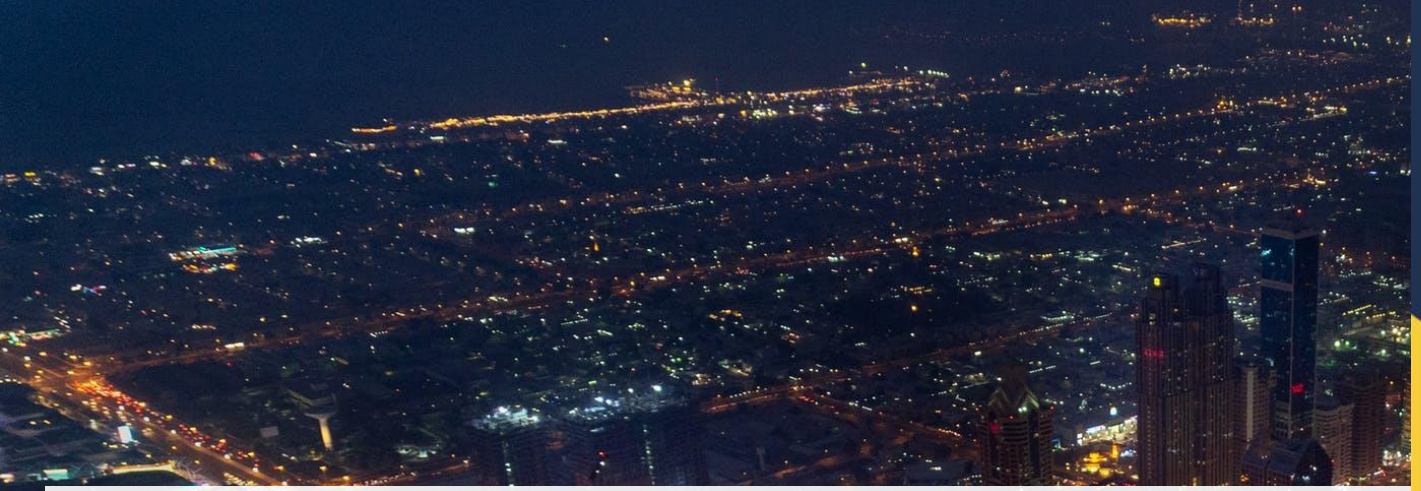
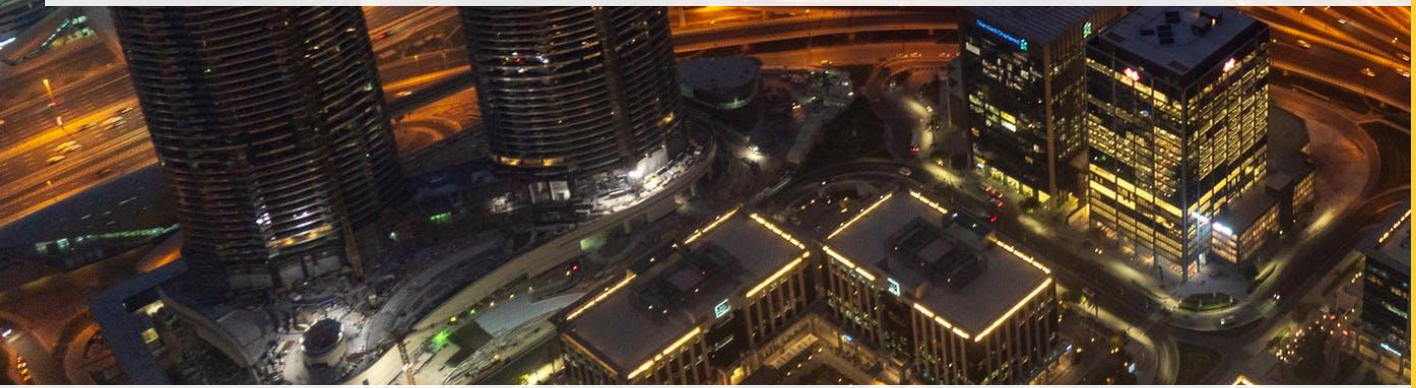
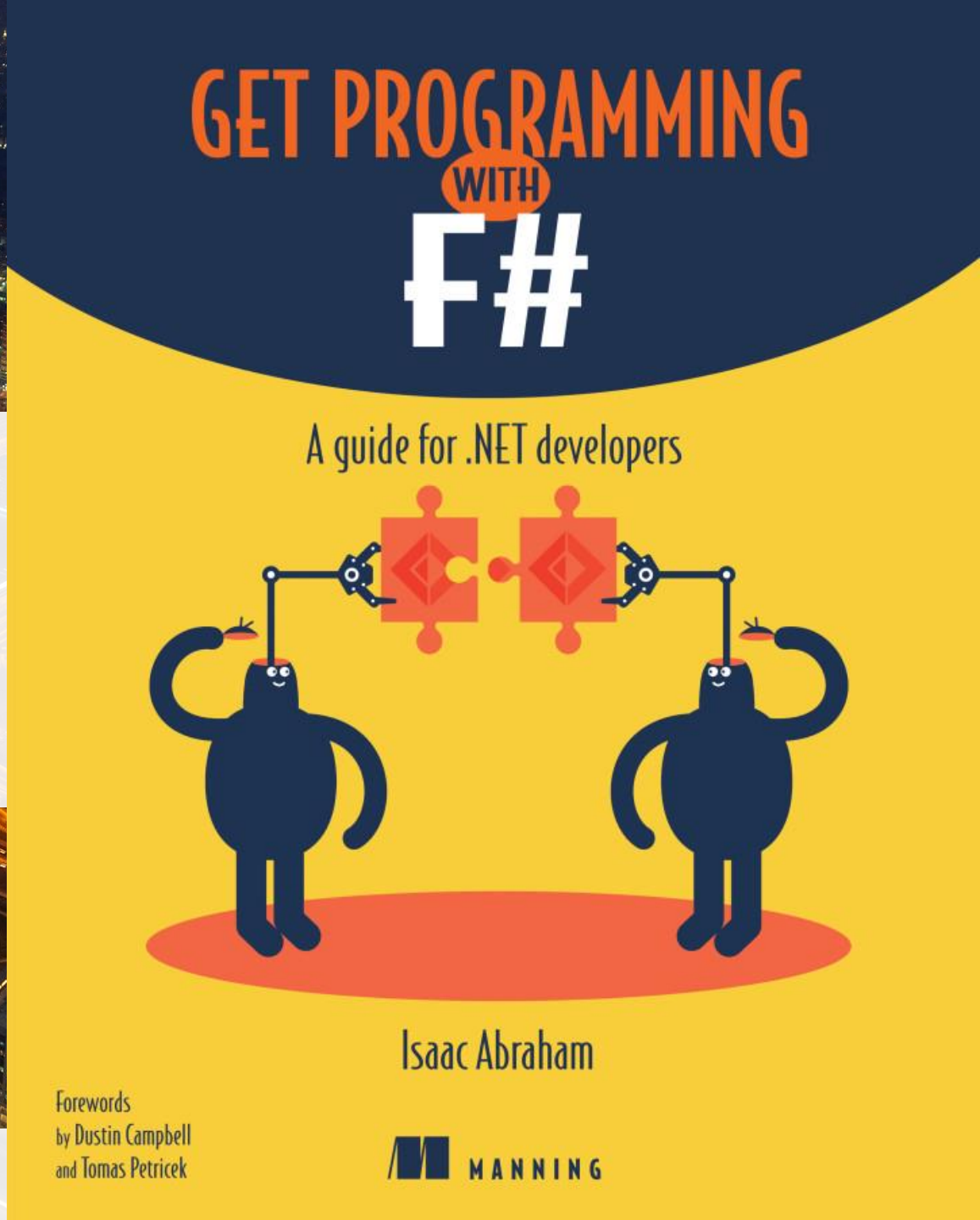
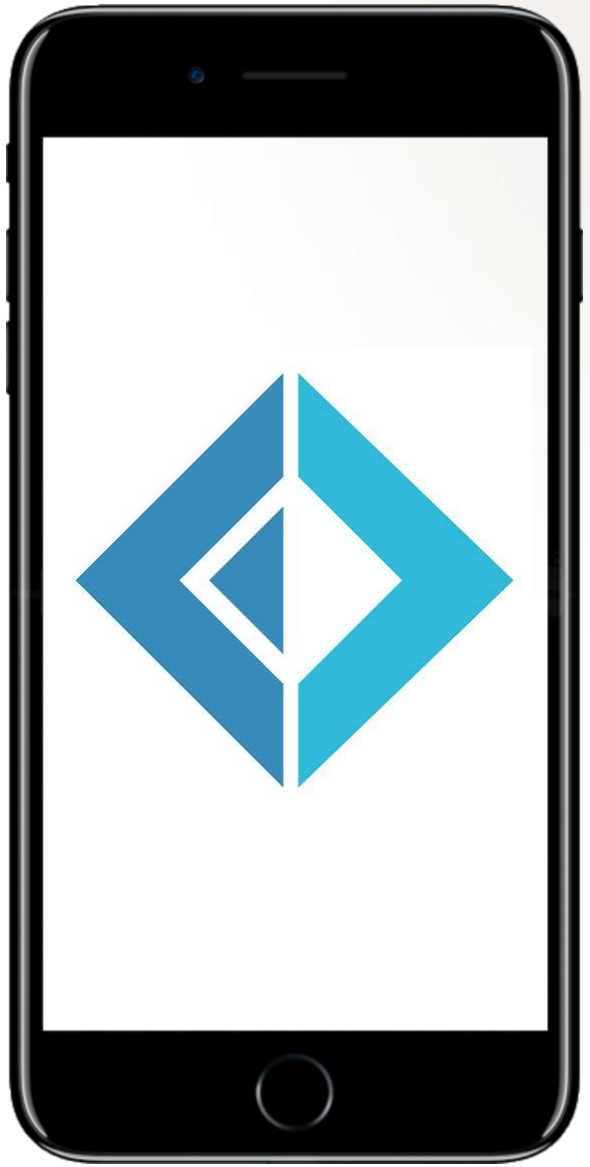


How to get started with F#?



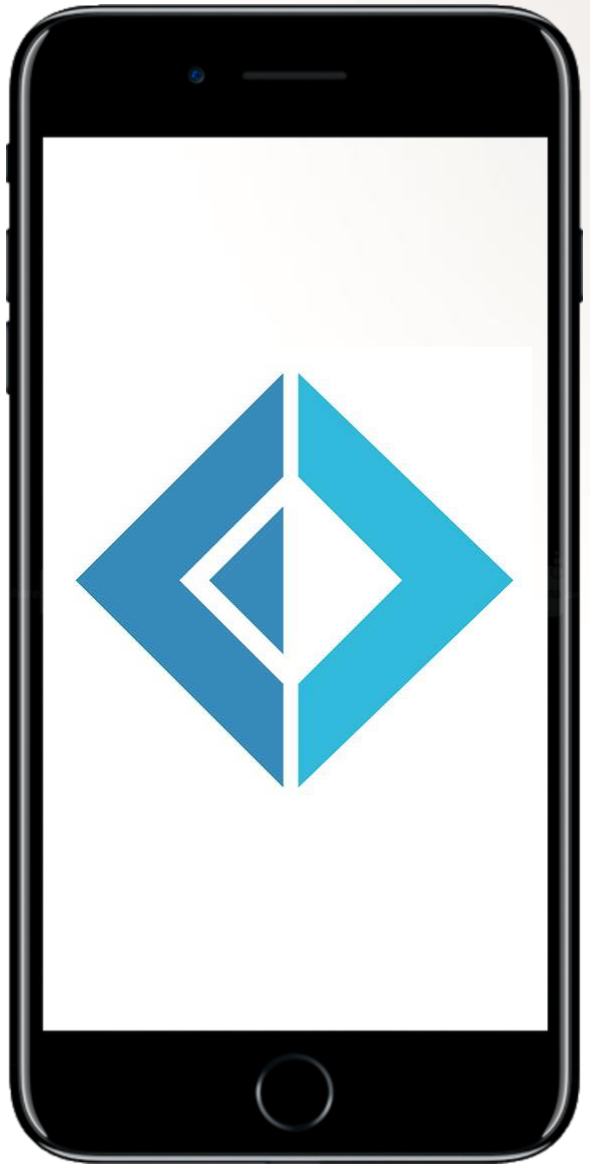


Takeaways



Takeaways

- F# is not scary it’s just yet another .Net language
- Model View Update simplifies state handling in UI
- Fabulous is everywhere
- Have a Fabulous Day!



Thank you for your time!

Mark Allibone @mallibone

Head of Mobile, Noser Engineering AG

https://fsprojects.github.io/Fabulous

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