Embeddinator

From Xamarin libraries to Java & Objective-C libraries

About me

From Xamarin libraries to Java & Objective-C libraries

Why on earth...?

Embeddinator 4000

> .NET Embedding allows your existing .NET Code (C#, F#, and others) to be consumed from other programming languages and in various different environments.

Suported language consumers

- Objective-C
- Java
- C

Contributors

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Sample: MonkeysSDK 🛠️🐒

Setup

- ✅ CrossPlatform library
- ✅ Add Embeddinator NuGet Package
- ✅ Download ndk r15c

Android

After build command

```
mono ../packages/Embeddinator-4000.0.4.0/tools/Embeddinator-4000.exe
    '${TargetPath}' '${TargetDir}/MonkeysSDK.dll' --gen=Java
    --platform=Android --outdir='${SolutionDir}/androidoutput' -c
```

Android Studio

- ✅ Import .JAR/.AAR Package
- ✅ Add module as dependency
- ✅ Enable D8
- ✅ minSDKVersion 24
- ✅ `multiDexEnabled true`
- ✅ `aaptOptions { noCompress 'dll' }`
- ✅ Inherit from Java.Lang.Obj -> [Register] / [Export]

iOS

After build command

```
../packages/Embeddinator-4000.0.4.0/tools/objcgen ${TargetPath}
    --target=framework --platform=iOS
    --outdir=${SolutionDir}/iosoutput/ -c --nativeexception
```

XCode

✅Disable BITCODE

✅Add Framework

✅Add Framework path to *Library Search Paths*

Collections

Android

Neither `Monkey[]` nor `List<Monkey>` will work. Workaround: iterator

iOS

`Monkey[]` is converted to `NSArray<MonkeysSDK_Monkey *> *)`

Exceptions 💥

Android

Any unhandled exception on .NET code **will crash the app**

iOS

You **can catch the exceptions** if you use `--nativeexception` option on the after build command

Async 🧵

Tasks are not recognized by Embeddinator so any async method will be ignored. Instead you could give a synchronous alternative.

ℹ️ to avoid locking the UI thread on Android consider using `AsyncTask`
⚠️ you need to inherit your objects from Java.Lang.Obj, otherwise your app will crash!
ℹ️ to avoid locking the UI thread on iOS consider using `dispatch_async`

```
class Something extends AsyncTask<Void, Void, String>{

        @Override
        protected void onPreExecute() {
            ...
        }

        @Override
        protected Void doInBackground(Void... voids) {
            return new MonkeysSDK().getRandomMonkey();
        }

        @Override
        protected void onPostExecute(String randomMonkey) {
            ...
        }
    }
```

```
dispatch_queue_t queue = dispatch_get_global_queueDISPATCH_QUEUE_PRIORITY_DEFAULT, 0);
    dispatch_async(queue, ^{

        MonkeysSDK* sdk = [[MonkeysSDK alloc] init];
        NSString* monkey = [sdk getRandomMonkey]

        dispatch_async(dispatch_get_main_queue(), ^{
            ...
        });
    });
```

Callbacks

Android

You can have callbacks. but it is tricky

> Calling to Java from C# is somewhat a risky business

iOS

NOT possible

iOS - Awful useful hack

CFBundleSupportedPlatforms

```
sed -i '.bak' 's/&lt;string&gt;iPhoneSimulator&lt;\\/string&gt;//g'
    ${SolutionDir}/iosoutput/FastAuthSDK.iOS.Library.framework/Info.plist
```

Be aware (part 1) ⚠️

- Slow build times 🐢
- 1st step: Unit test everything on .NET
- Big binaries, mostly on iOS 🏋️
- Any complex type might be a problem to migrate 😩
- Noy every dependency is easily migrated 😓
- Although the forum is very active, you won't always find a solution 😵
- No bitcode support
- ctor: `public MonkeyIterator(Monkey[] monkeys)` fails on iOS 😔

Be aware (part 2) ⚠️

We are problem solvers!

The end! 

Aknowledgements

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Contact info

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References

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- https://github.com/java-decompiler/jd-gui
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