



GAME INSTALLER CREATION

Ali H. S. – Project II CITM

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1. INSTALLATION



1.1 WHAT IS AN INSTALLATION?

1.2 TYPES OF INSTALLATIONS



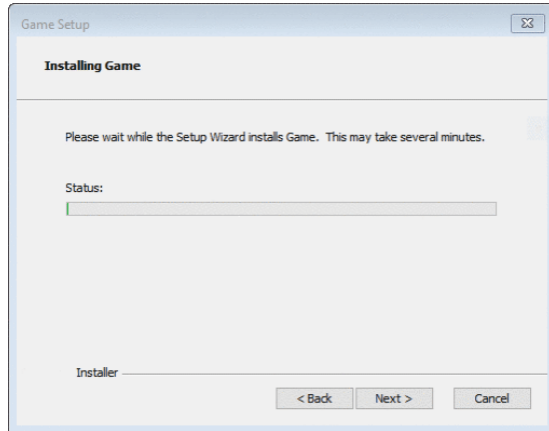
1.1

What is an Installation?

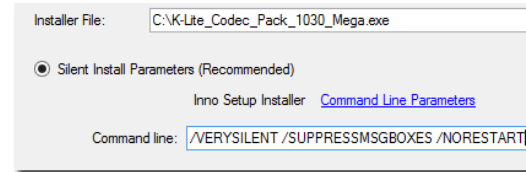
- The act of making the program ready for execution.
- The Process and the Management is very important for big manufacturing companies.
- Management strategy: **application packaging**.



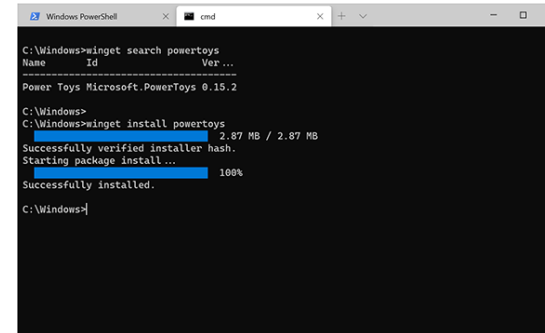
Attended Installation



Silent Installation



Unattended Installation



Network Installation



1.2 Types of installations

All silent installations are unattended, but not all unattended installations are silent.





2. PACKAGING

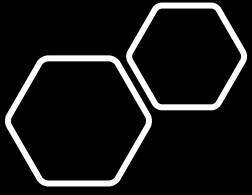


2.1 WHAT IS PACKAGING?

2.2 ADVANTAGES OF APPLICATION PACKAGING

3. MICROSOFT WINDOWS INSTALLER TECH

4. MAIN PACKAGING TOOLS



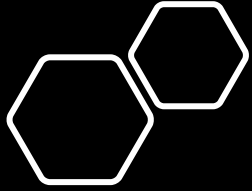
2.1

What is Packaging?

- The process of binding the relevant files and components to build a customized application.
- Distribution unit: many formats.

Packaging formats:

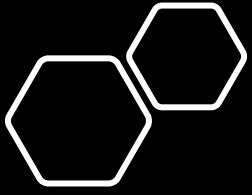
- Legacy executables: `Setup.exe`
- Microsoft Windows Installer: `Setup.msi`
- Windows store: `.appx`
- Batch/script files: `Install.vbs`, `Install.ps1`, `Install.bat`
- Loose Files / Raw Files.



2.2

Advantages of application packaging

- Simplify the **Installation** and **Un-installation** Procedures.
- Can be **advertised**. So that on **demos** and **trials** can take place.
- A solid package and its deployment can **prevent piracy**.
- A solid package signed with a **digital signature/certificate** ensure that the distribution unit **cannot be corrupted purposely** when on the retail or end-user.
- **Upgrading of the application** can be done with ease.
- **Customize Applications** to suit the user needs.

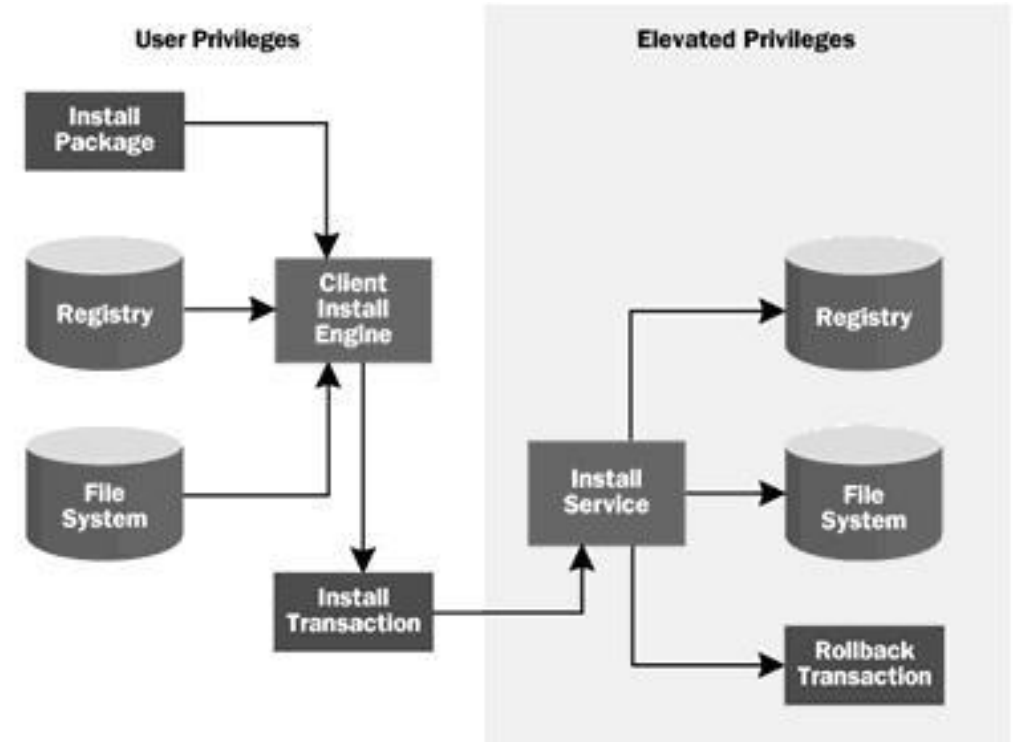


3.

Microsoft Windows Installer

(MSI) is database-driven service that resides on workstations and controls:

- The installing.
- The uninstalling.
- The patching.
- The repairing.



MSI Installation process

The MSI Packaged Installation usually takes place in two phases:

- **Acquisition:** will generate the installation and the un-installation scripts.
- **Execution:** executes the Installation script and kicks off the installation of components

4. Main Packaging tools

In the industry there are many packaging tools. The top ones are the following:



Advanced
INSTALLER



FLEXERA SOFTWARE™

InstallShield®



5. WiX Toolset

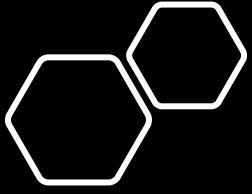


5.1 WHY WIX & PREREQUISITES

5.2 SETUP AND CREATION OF THE SCRIPT

5.3 CUSTOMIZATION AND MAPPING OF THE SCRIPT

- **STEP 1:** ADD THE .EXE COMPONENT
- **STEP 2:** ADD THE START MENU SHORTCUT
- **STEP 3:** ADD THE DESKTOP SHORTCUT
- **STEP 4:** CUSTOMIZE ICON OF THE SHORTCUTS
- **STEP 5:** CUSTOMIZE THE WIZARD & ADD LICENSE AGREEMENT
- **STEP 6:** LINK ALL ASSETS & ALL DLL



5.1

Why WiX?

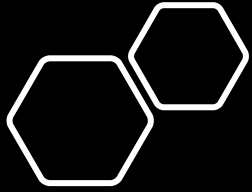
WiX, excels in:

- Flexibility.
- Extensibility.
- Stability.
- XML text source.
- Free license.

Every developer can view and compile the source and changes are easily tracked, reverted, or approved.

Prerequisites:

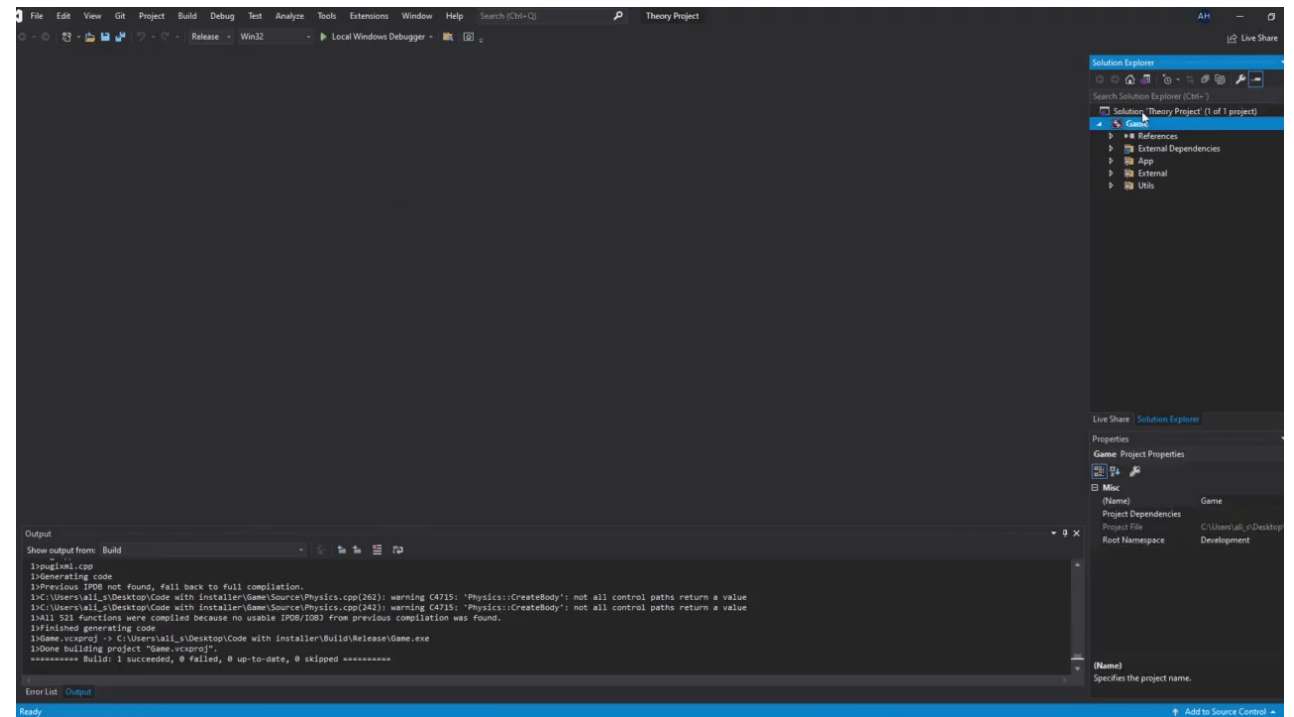
- **“WiX Toolset build tools”**
 - Everything you need to create installations on your development and build machines.
- **“WiX Toolset Visual Studio Extension”**
 - Provides integration into VS.

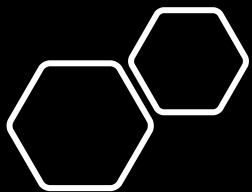


5.2.1

Setup and creation of the script.

1. Add new project: “Setup Project for WiX v3” (**.Wixproj**).
2. Will create a generic script file, **product.wxs**: container of the components of our installer
3. **.Wixproj**, this last one contains properties for the creation of the installer.

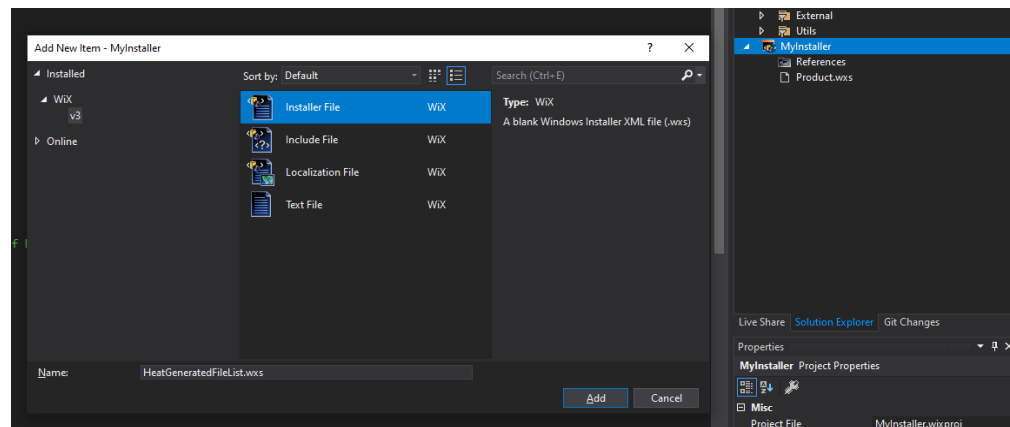




5.2.2 Setup and creation of the script.

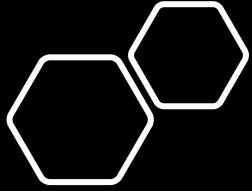
Paste Into .wixproj

MyInstaller.wixproj	06/05/2021 23:13	Archivo WIXPROJ	2 KB
Product.wxs	06/05/2021 23:13	Archivo WXS	2 KB



HeatGeneratedFileList.wxs	09/05/2021 22:22	Archivo WXS	1 KB
MyInstaller.wixproj	06/05/2021 23:13	Archivo WIXPROJ	2 KB
Product.wxs	06/05/2021 23:13	Archivo WXS	2 KB

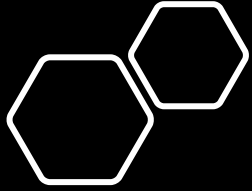
```
<Target Name="BeforeBuild">
<HeatDirectory Directory="..\Output"
PreprocessorVariable="var.HarvestPath"
OutputFile="HeatGeneratedFileList.wxs"
ComponentGroupName="HeatGenerated"
DirectoryRefId="INSTALLFOLDER"
AutogenerateGuids="true"
ToolPath="$ (WixToolPath) "
SuppressFragments="true"
SuppressRegistry="true"
SuppressRootDirectory="true" /> </Target>
```

5.3

CUSTOMIZATION AND MAPPING OF THE SCRIPT

- Link **components** (.exe, assets, dll) and **directories** (program folder, desktop shortcut, start menu shortcut) inside the **product.wxs**
- The **script** is **divided** by **fragments**, we use references to tell the framework other components and directories that **exist in other fragments**
- **GUID** to avoid duplications in updates o reparations.
- The step 0 is to change the Manufacturer name to the name of your studio, otherwise it won't build.



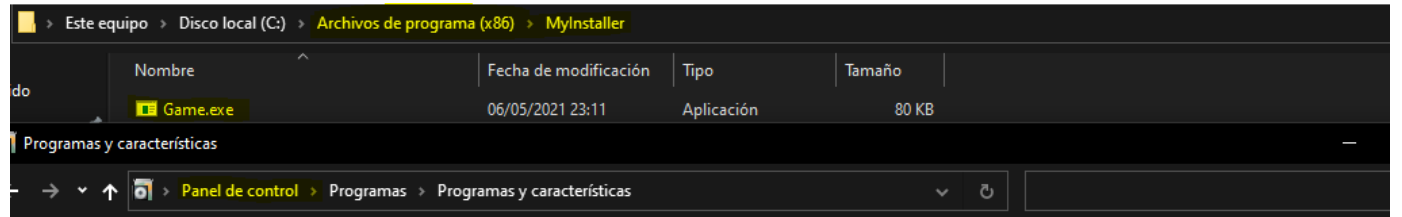
Code

STEP 1

Add the .exe component

Expected Outcome

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
3   <!-- STEP 0 -->
4   <Product Id="*" Name="MyInstaller" Language="1033" Version="1.0.0.0" Manufacturer="ALI-STUDIOS" UpgradeCode="8d82de04-1824-4225-bed2-8f04526e95b4">
5     <Package InstallerVersion="200" Compressed="yes" InstallScope="perMachine" />
6
7     <MajorUpgrade DowngradeErrorMessage="A newer version of [ProductName] is already installed." />
8     <MediaTemplate />
9
10    <Feature Id="ProductFeature" Title="MyInstaller" Level="1">
11      <!-- STEP 1 -->
12      <ComponentGroupRef Id="ProductComponents" />
13    </Feature>
14  </Product>
15
16  <Fragment>
17    <Directory Id="TARGETDIR" Name="SourceDir">
18      <Directory Id="ProgramFilesFolder">
19        <Directory Id="INSTALLFOLDER" Name="MyInstaller" />
20      </Directory>
21    </Directory>
22  </Fragment>
23
24  <Fragment>
25    <ComponentGroup Id="ProductComponents" Directory="INSTALLFOLDER">
26      <!-- STEP 1 -->
27      <Component Id="Game.exe" Guid="4b886816-febd-4e5c-a87f-923960027d5c">
28        <File Id="Game.exe" Source="..\Build\Release\Game.exe" KeyPath="yes" Checksum="yes" />
29      </Component>
30    </ComponentGroup>
31  </Fragment>
32 </Wix>
33
```



Ventana principal del Panel de control

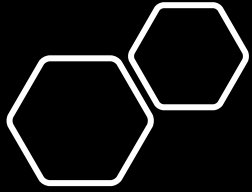
[Desinstalar o cambiar un programa](#)

Ver actualizaciones instaladas

Para desinstalar un programa, selecciónelo en la lista y después haga clic en Desinstalar, Cambiar o Reparar.

Activar o desactivar las características de Windows

Organizar ▾ Desinstalar Cambiar Reparar					
Nombre	Editor	Se instaló el	Tamaño	Versión	
MyInstaller	ALI-STUDIOS	10/05/2021	64,0 KB	1.0.0.0	
WebView2 Runtime de Microsoft Edge	Microsoft Corporation	07/05/2021		90.0.818.56	
Microsoft Edge	Microsoft Corporation	07/05/2021		90.0.818.56	
Microsoft System CLR Types para SQL Server 2010 CT	Microsoft Corporation	06/05/2021	1 07 MB	15.0.1200.24	



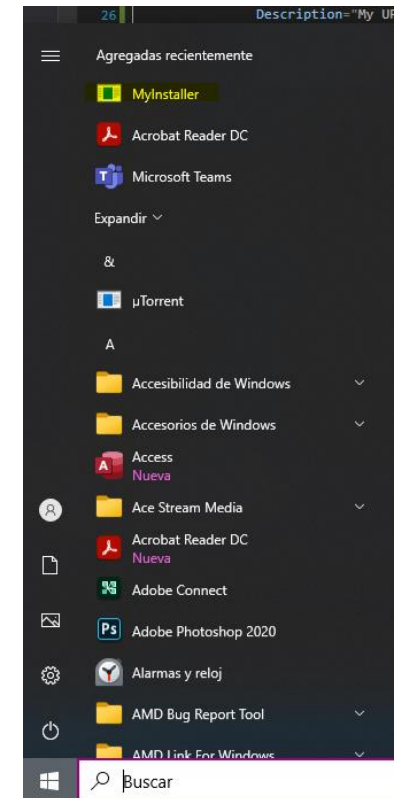
Code

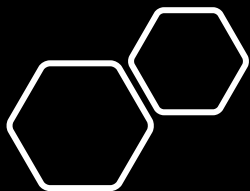
STEP 2

Add the start
menu shortcut

```
HeatGeneratedFileList.wxs Product.wxs
1 <?xml version="1.0" encoding="UTF-8"?>
2 <Wix xmlns="http://schemas.microsoft.com/wix/2006/wi">
3 <!-- STEP 0 -->
4 <Product Id="*" Name="MyInstaller" Language="1033" Version="1.0.0.0" Manufacturer="ALI-STUDIOS" UpgradeCode="8d82de04-1824-4225-bed2-8f04526e95b4">
5 <Package InstallerVersion="200" Compressed="yes" InstallScope="perMachine" />
6
7 <MajorUpgrade DowngradeErrorMessage="A newer version of [ProductName] is already installed." />
8 <MediaTemplate />
9
10 <!-- FEATURE FRAGMENT -->
11 <Feature Id="ProductFeature" Title="MyInstaller" Level="1">
12 <!-- STEP 1 -->
13 <ComponentGroupRef Id="ProductComponents" />
14 <!-- STEP 2 -->
15 <ComponentRef Id="StartMenuShortcut" />
16 </Feature>
17 </Product>
18
19 <!-- SHORTCUTS FRAGMENT -->
20 <!-- STEP 2 -->
21 <Fragment>
22 <DirectoryRef Id="ApplicationProgramsFolder">
23 <Component Id="StartMenuShortcut" Guid="ea2fc581-b635-4278-a8f1-1a81320d803a">
24 <Shortcut Id="ApplicationStartMenuShortcut"
25 Name="MyInstaller"
26 Description="My UPC Game Description"
27 Target="[#Game.exe]"
28 WorkingDirectory="INSTALLFOLDER"/>
29 <RemoveFolder Id="RemoveProgramsFolder" On="uninstall"/>
30 <RegistryValue Root="HKCU" Key="Software\MyCompany\MyApplicationName" Name="installed" Type="integer" Value="1" KeyPath="yes"/>
31 </Component>
32 </DirectoryRef>
33 </Fragment>
34
35 <!-- DIRECTORIES FRAGMENT -->
36 <Fragment>
37 <Directory Id="TARGETDIR" Name="SourceDir">
38
39 <Directory Id="ProgramFilesFolder">
40 <Directory Id="INSTALLFOLDER" Name="MyInstaller" />
41 </Directory>
42
43 <!-- STEP 2 -->
44 <Directory Id="ProgramMenuFolder">
45 <Directory Id="ApplicationProgramsFolder" Name="MyInstaller"/>
46 </Directory>
47
48 </Directory>
49 </Fragment>
50
51 <!-- COMPONENTS FRAGMENT -->
52 <Fragment>
53 <ComponentGroup Id="ProductComponents" Directory="INSTALLFOLDER">
54 <!-- STEP 1 -->
55 <Component Id="Game.exe" Guid="4b886816-febd-4e5c-a87f-923960027d5c">
56 <File Id="Game.exe" Source="..\Build\Release\Game.exe" KeyPath="yes" Checksum="yes" />
57 </Component>
58 </ComponentGroup>
59 </Fragment>
```

Expected Outcome





Code

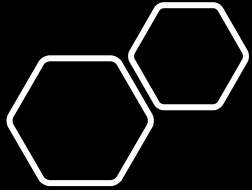
STEP 3

Add the desktop shortcut

Expected Outcome

```
HeatGeneratedFileList.wxs Product.wxs -d X
9
10 <!-- FEATURE FRAGMENT -->
11 <Feature Id="ProductFeature" Title="MyInstaller" Level="1">
12 <!-- STEP 1 -->
13 <ComponentGroupRef Id="ProductComponents" />
14 <!-- STEP 2 -->
15 <ComponentRef Id="StartMenuShortcut" />
16 <!-- STEP 3 -->
17 <ComponentRef Id="DesktopShortcut" />
18 </Feature>
19 </Product>
20
21 <!-- SHORTCUTS FRAGMENT -->
22 <!-- STEP 2 -->
23 <Fragment>
24 <DirectoryRef Id="ApplicationProgramsFolder">
25 <Component Id="StartMenuShortcut" Guid="{ea2fc581-b635-4278-a8f1-1a81320d803a}">
26 <Shortcut Id="ApplicationStartMenuShortcut"
27 Name="MyInstaller"
28 Description="My UPC Game Description"
29 Target="[#Game.exe]"
30 WorkingDirectory="INSTALLFOLDER"/>
31 <RemoveFolder Id="RemoveProgramsFolder" On="uninstall"/>
32 <RegistryValue Root="HKCU" Key="Software\MyCompany\MyApplicationName" Name="installed" Type="integer" Value="1" KeyPath="yes"/>
33 </Component>
34 </DirectoryRef>
35
36 <!-- STEP 3 -->
37 <DirectoryRef Id="DesktopFolder">
38 <Component Id="DesktopShortcut" Guid="{c0f4eeec-8988-4c58-8a0a-2ebac04e2a2a}">
39 <Shortcut Id="ApplicationDesktopShortcut"
40 Name="MyInstaller"
41 Description="My UPC Game Description"
42 Target="[#Game.exe]"
43 WorkingDirectory="INSTALLFOLDER"/>
44 <RemoveFolder Id="RemoveDesktopFolder" On="uninstall"/>
45 <RegistryValue Root="HKCU" Key="Software\MyCompany\MyApplicationName" Name="installed" Type="integer" Value="1" KeyPath="yes"/>
46 </Component>
47 </DirectoryRef>
48 </Fragment>
49
50 <!-- DIRECTORIES FRAGMENT -->
51 <Fragment>
52 <Directory Id="TARGETDIR" Name="SourceDir">
53 <Directory Id="ProgramFilesFolder">
54 <Directory Id="INSTALLFOLDER" Name="MyInstaller" />
55 </Directory>
56 <!-- STEP 2 -->
57 <Directory Id="ProgramMenuFolder">
58 <Directory Id="ApplicationProgramsFolder" Name="MyInstaller"/>
59 </Directory>
60 <!-- STEP 3 -->
61 <Directory Id="DesktopFolder" Name="My UPC App" />
62 </Directory>
63 </Fragment>
64
65 </Product>
66
67
```



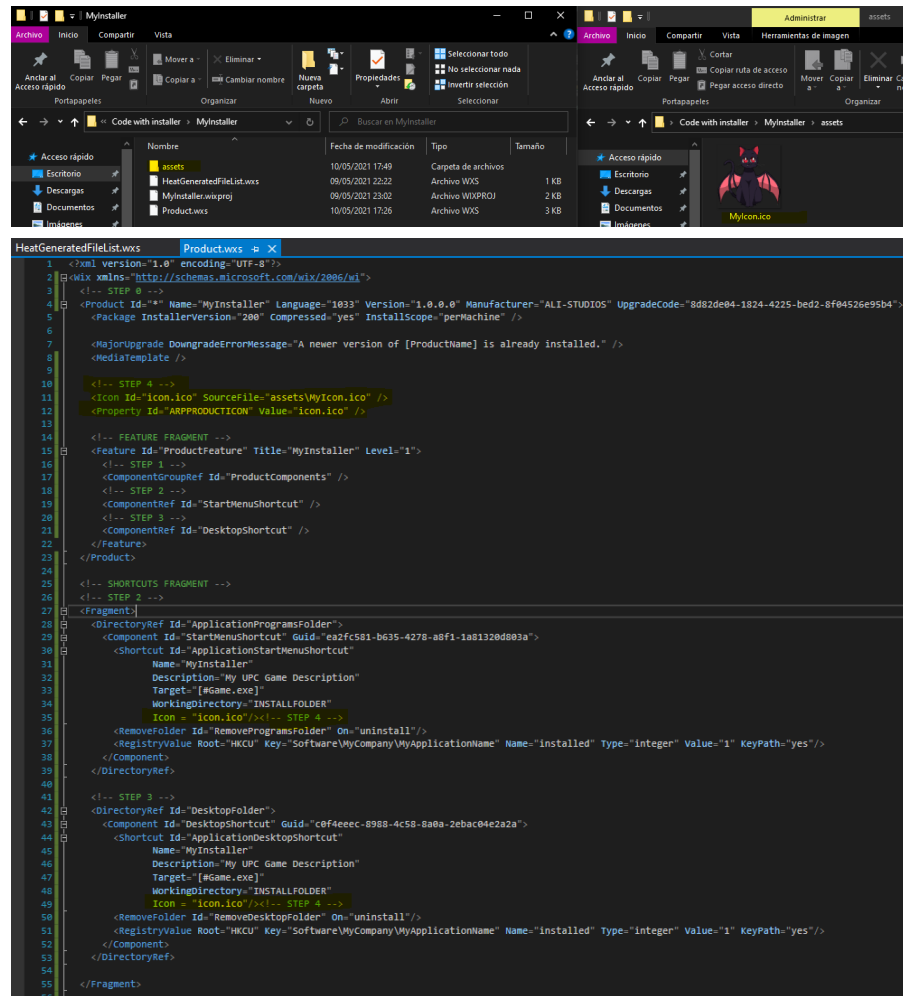


STEP 4

Customize icon
of the shortcuts

Directory

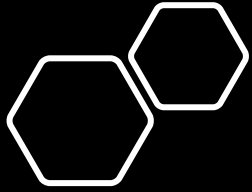
Code



Expected Outcome

WIX ICON	SIZES
icon.ico	16×16
icon.ico	32 * 32
icon.ico	48 * 48
icon.ico	256 * 256





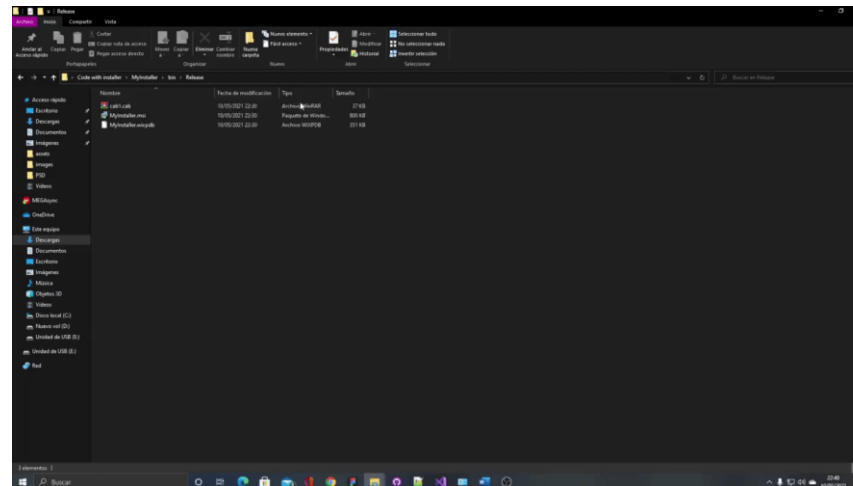
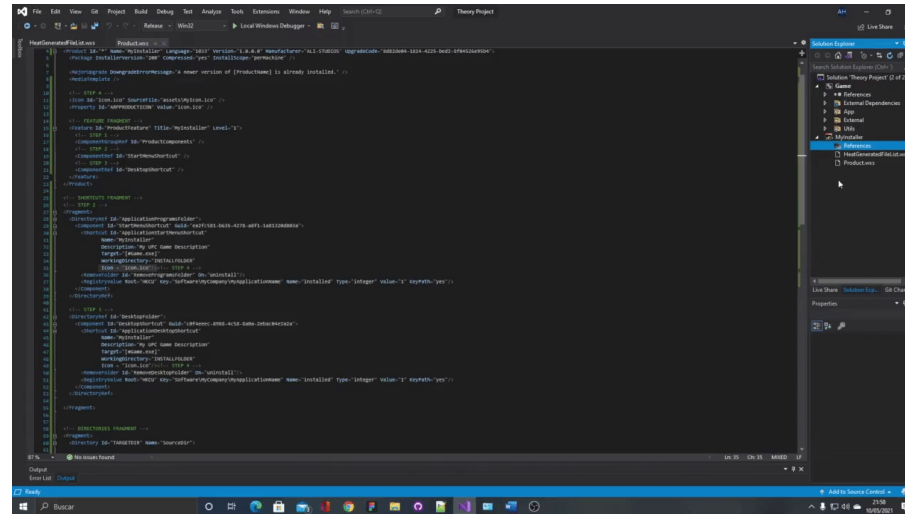
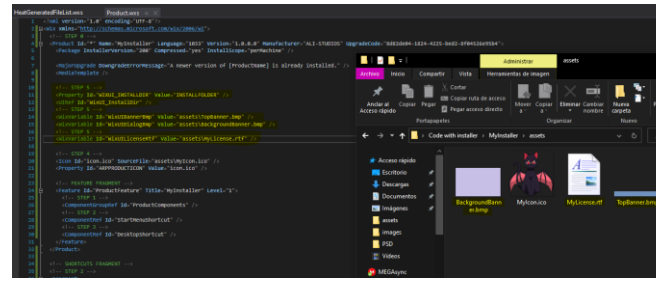
Code & Directory

STEP 5

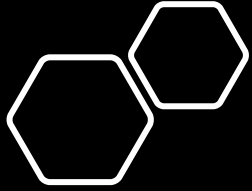
Inclusion

Customize the wizard & add license agreement

Expected Outcome



Wix	BMP	SIZES
WixUIBannerBmp	Top banner	493 × 58
WixUIDialogBmp	Background bitmap used on the welcome and completion dialogs	493 × 312



STEP 6

Link all assets &
all DLLs

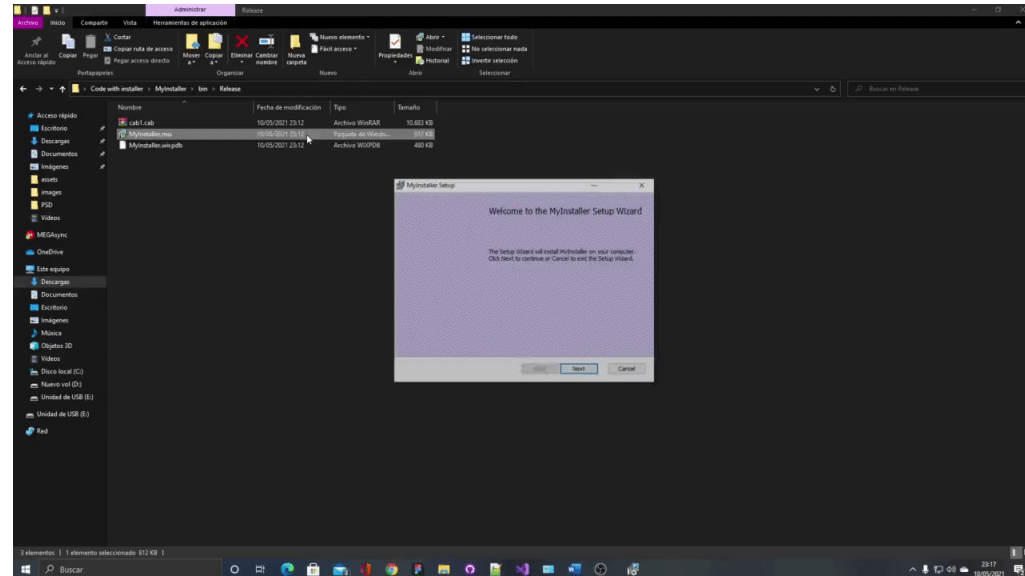
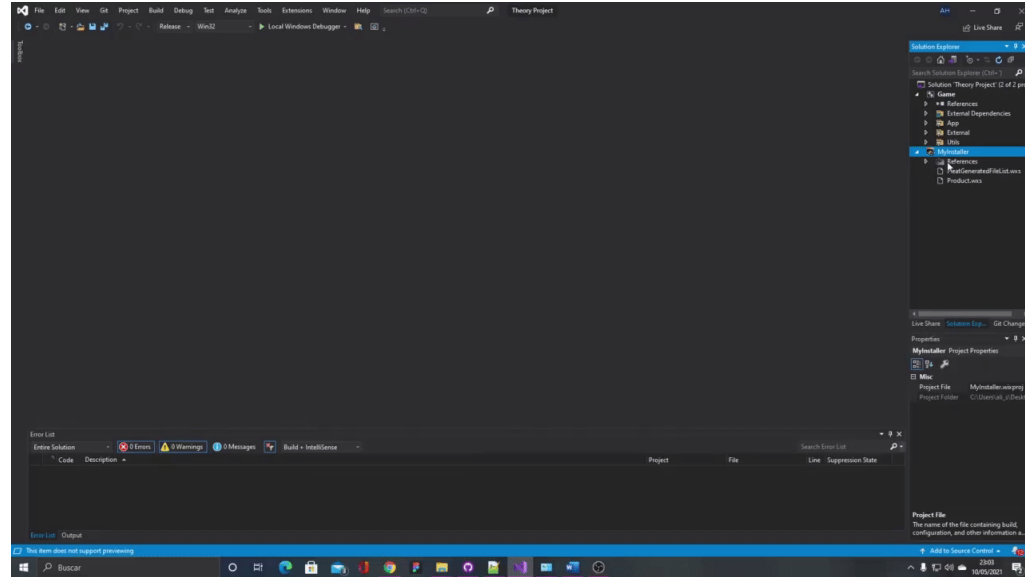
Code

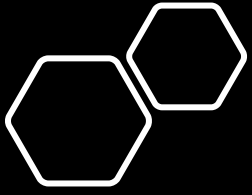
Preprocessor var

Expected Outcome

```
<!-- FEATURE FRAGMENT -->
<Feature Id="ProductFeature" Title="MyInstaller" Level="1">
  <!-- STEP 1 -->
  <ComponentGroupRef Id="ProductComponents" />
  <!-- STEP 2 -->
  <ComponentRef Id="StartMenuShortcut" />
  <!-- STEP 3 -->
  <ComponentRef Id="DesktopShortcut" />
  <!-- STEP 6 -->
  <ComponentGroupRef Id="HeatGenerated" />
</Feature>
</Product>

<!-- SHORTCUTS FRAGMENT -->
```

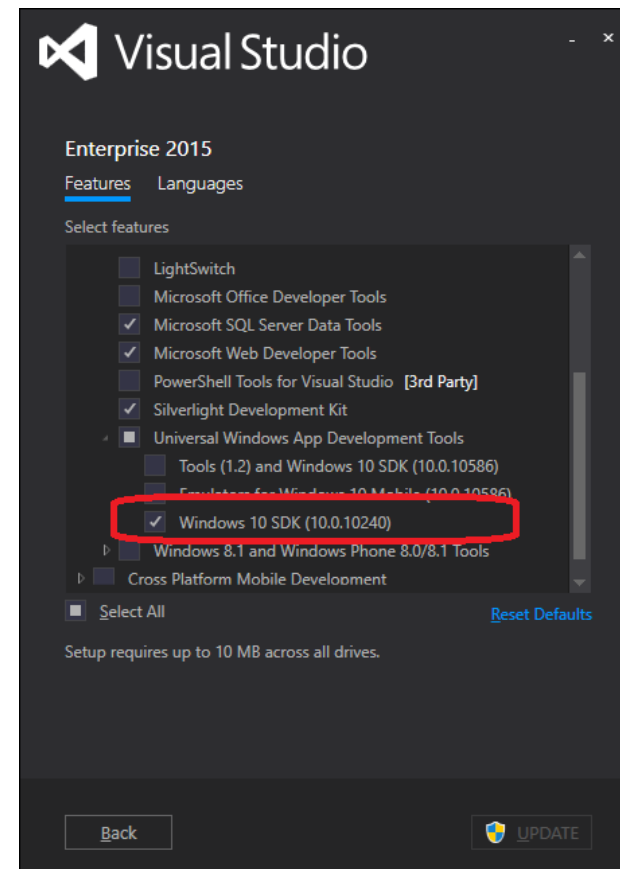


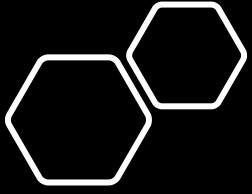


6. Digital Signature

- To assure recipients that it does indeed come from us.
- Key pair:
 - The private -> owner
 - The public key -> available to anyone.
- SignTool is a command line tool that is used to sign an application package or a batch of applications with a certificate.

1. On the development computer, install the certificate that you want to sign the file with.
2. Open a Visual Studio command prompt through visual studio tools.
3. Change to the directory that contains the .msi file.
4. Sign the .msi file by using the following command:
`signtool sign /sha1 CertificateHash SetupNameFile.msi:`

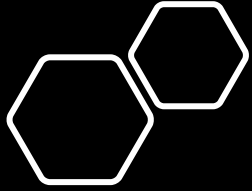




7. Testing on Virtual Machines

- Easiest ways of testing software on simulated
- Is a free and open-source hosted hypervisor for x86 virtualization.

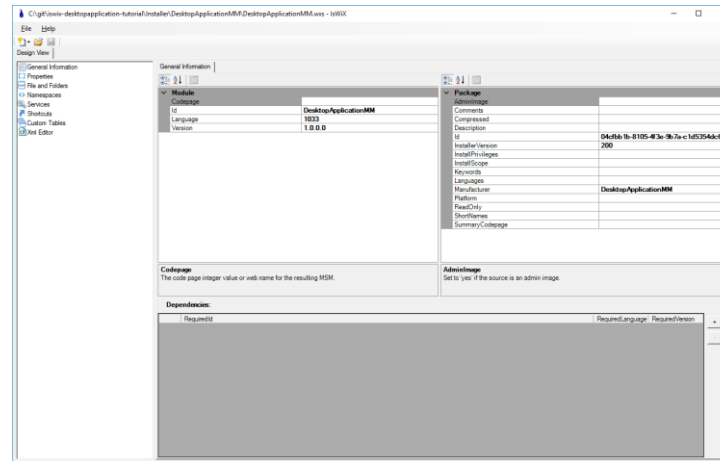
1. The process is simple, once the VirtualBox and its drivers are installed:
2. Click NEW to create a new virtual machine and follow the process of disk space and ram allocation.
3. After that, the wizard will ask you to choose a .iso file to boot the operating system of our choice.
4. Finally, before anything else take a “snapshot” through the machine option, it will work like a backup. And to import files from our PC to the simulated operating system just change drag and drop feature to bidirectional through the devices option in the top bar.



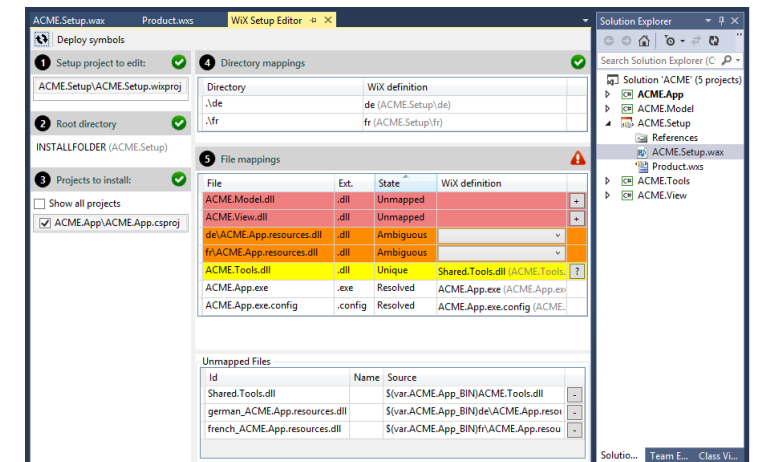
8. Possible Improvements/ Innovations


The lack of and GUI is noticed a lot, specially for newcomers into this tool.

- There are third party visual studio extensions like “IsWix”



- Or “Wax” that supply this lack of user interface.





That is all. Thank
you for
attending!

