



# GAME INSTALLER CREATION

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Ali H. S. – Project II CITM

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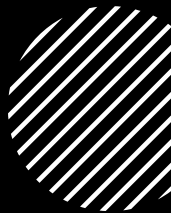
6. Digital Signing

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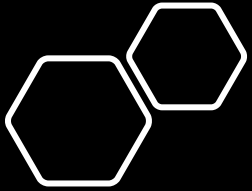


# 1. INSTALLATION



1.1 WHAT IS AN INSTALLATION?

1.2 TYPES OF INSTALLATIONS



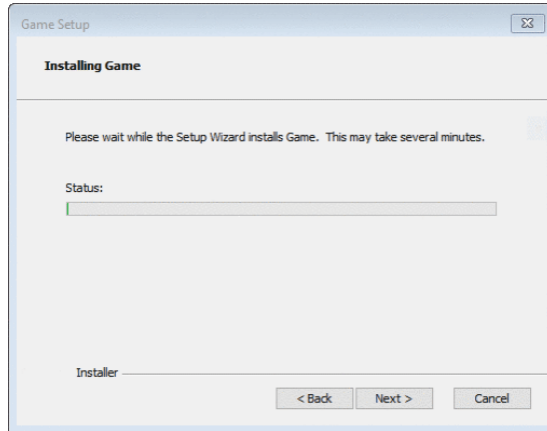
1.1

# What is an Installation?

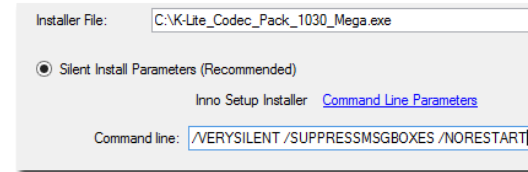
- The act of making the program ready for execution.
- The Process and the Management is very important for big manufacturing companies.
- Management strategy: **application packaging**.



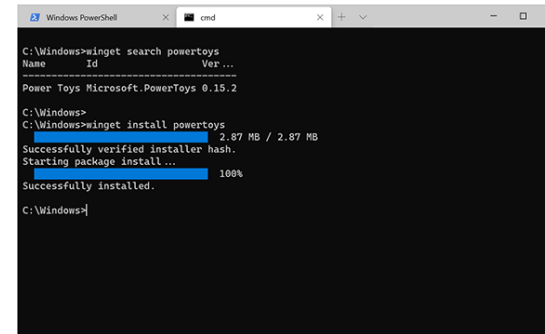
## Attended Installation



## 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



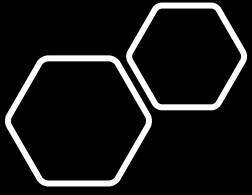
2.1 WHAT IS PACKAGING?

2.2 ADVANTAGES OF APPLICATION PACKAGING

3. MICROSOFT WINDOWS INSTALLER TECH

4. MAIN PACKAGING TOOLS





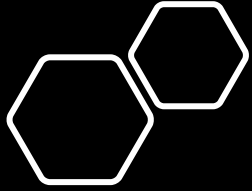
## 2.1

# What is Packaging?

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

## Packaging formats:

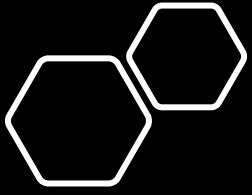
- Legacy executables: `Setup.exe`
- Microsoft Windows Installer: `Setup.msi`
- Windows store: `.appx`
- Batch/script files: `Install.vbs`, `Install.ps1`, `Install.bat`
- Loose Files / Raw Files.



## 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.

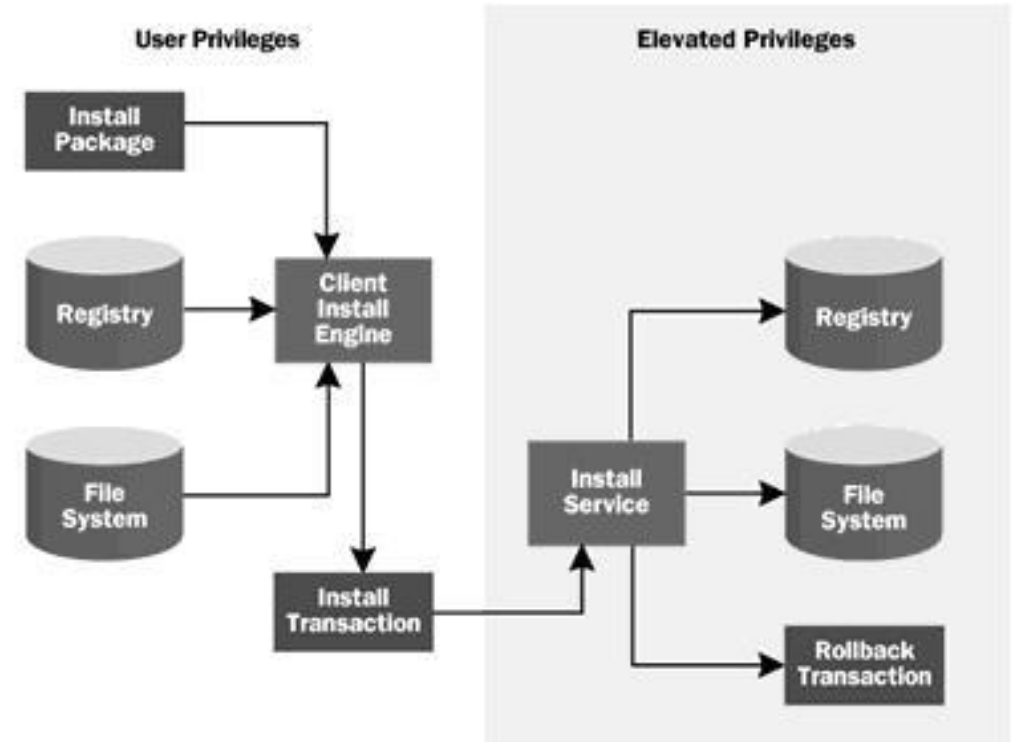


3.

# 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®**



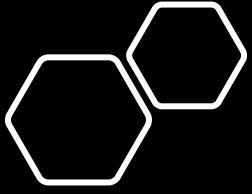
# 5. WiX Toolset

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?

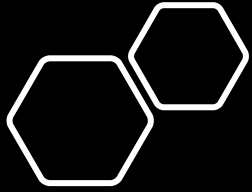
WiX, excels in:

- 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:

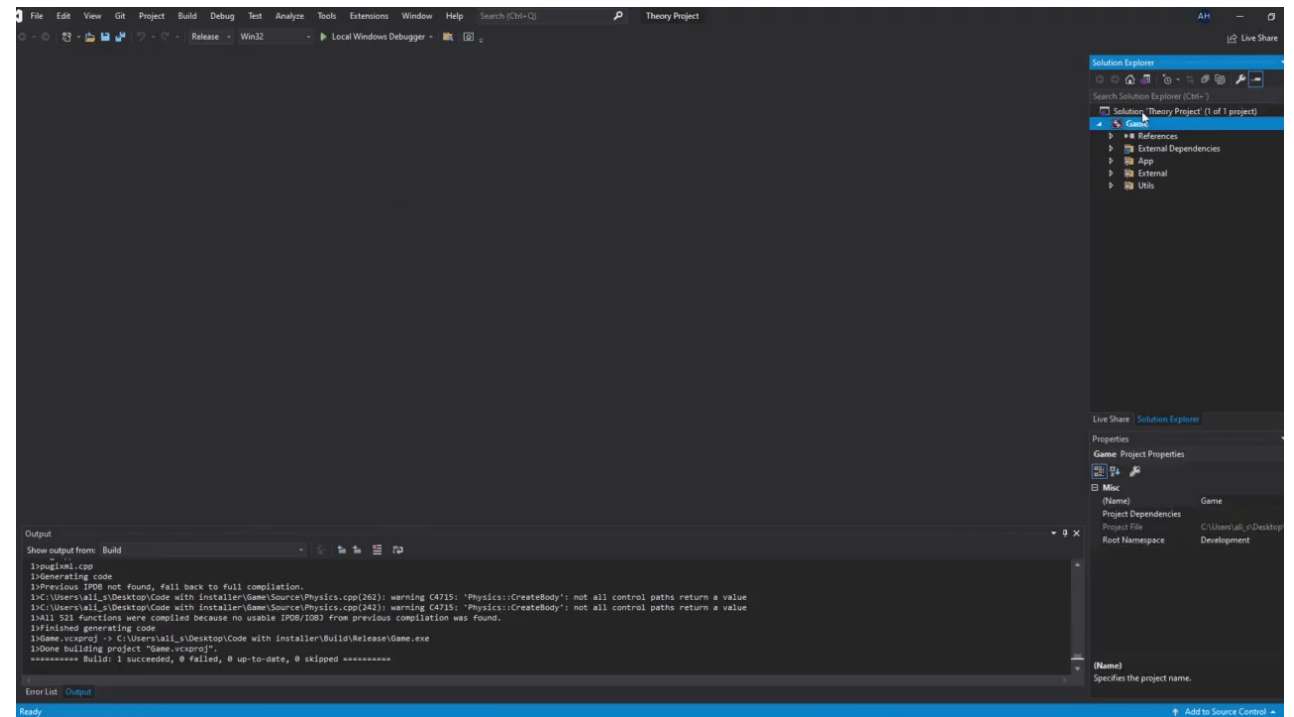
- **“WiX Toolset build tools”**
  - Everything you need to create installations on your development and build machines.
- **“WiX Toolset Visual Studio Extension”**
  - Provides integration into VS.

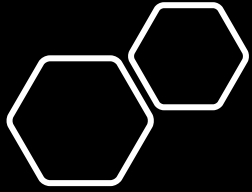


## 5.2.1

# 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.

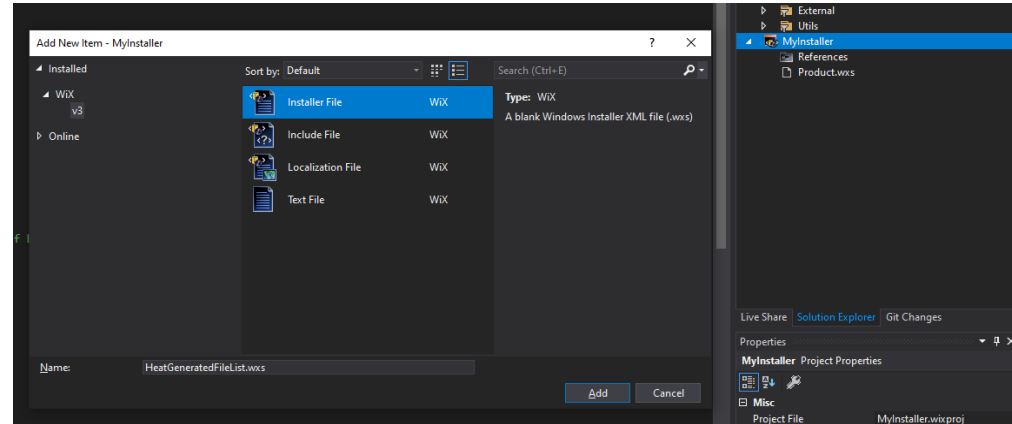




## 5.2.2 Setup and creation of the script.

Paste Into .wixproj

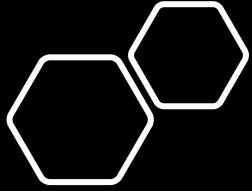
MyInstaller.wixproj	06/05/2021 23:13	Archivo WIXPROJ	2 KB
Product.wxs	06/05/2021 23:13	Archivo WXS	2 KB



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>
```

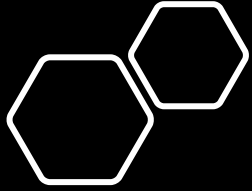




## 5.3

# 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.



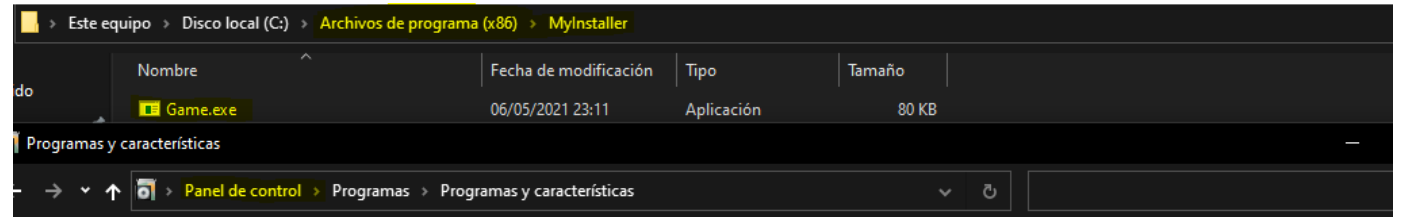
Code

## 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

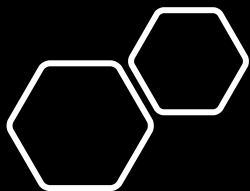
[Desinstalar o cambiar un programa](#)

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	



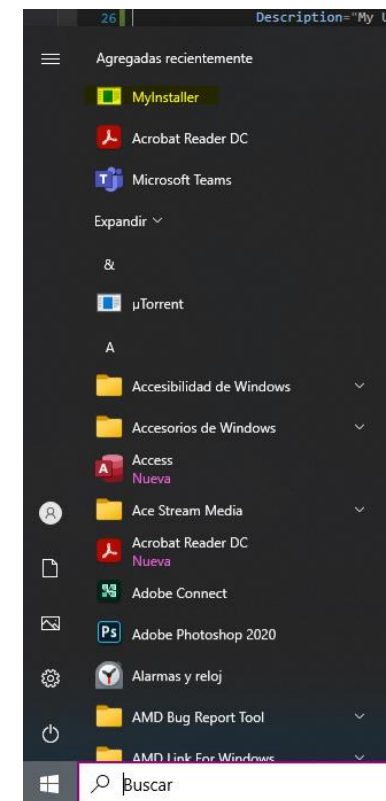
Code

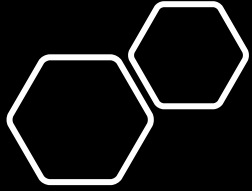
## STEP 2

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

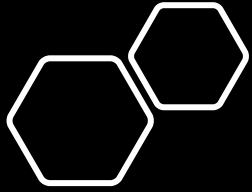
## STEP 3

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
```



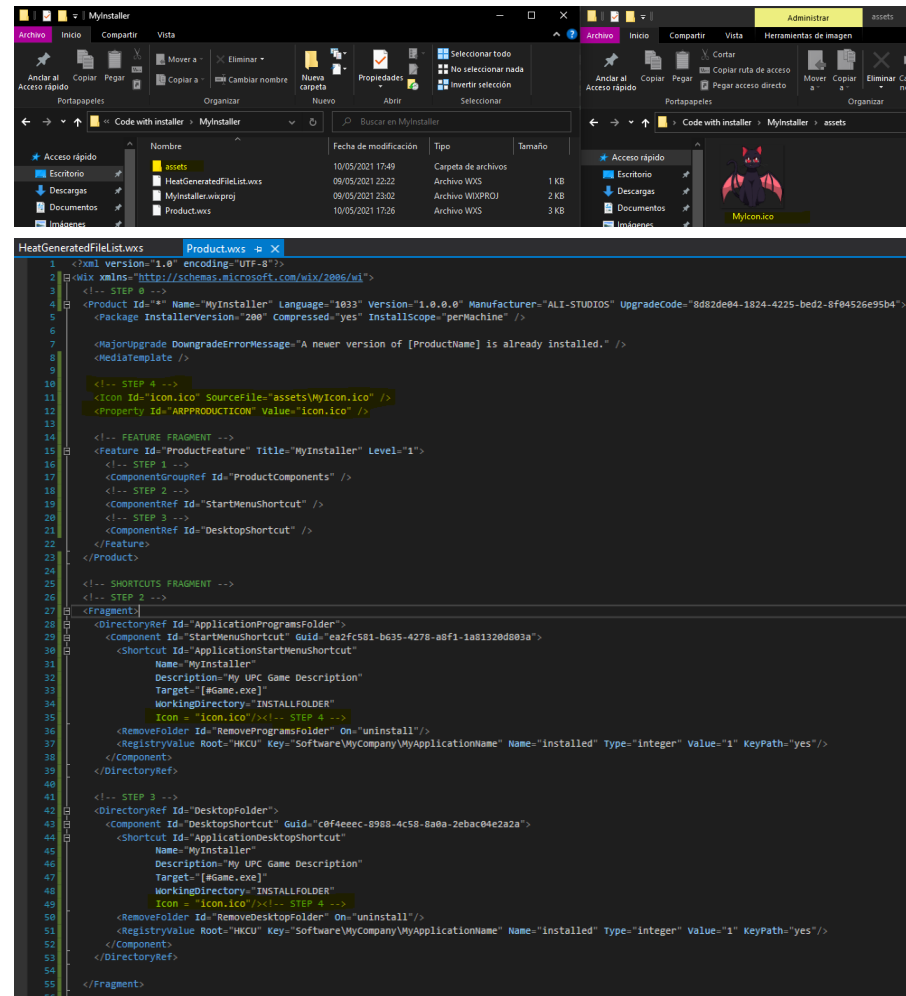


STEP 4

Customize icon  
of the shortcuts

Directory

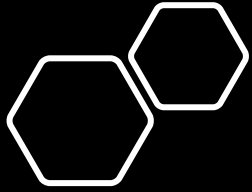
Code



Expected Outcome

WIX ICON	SIZES
icon.ico	16x16
icon.ico	32 * 32
icon.ico	48 * 48
icon.ico	256 * 256





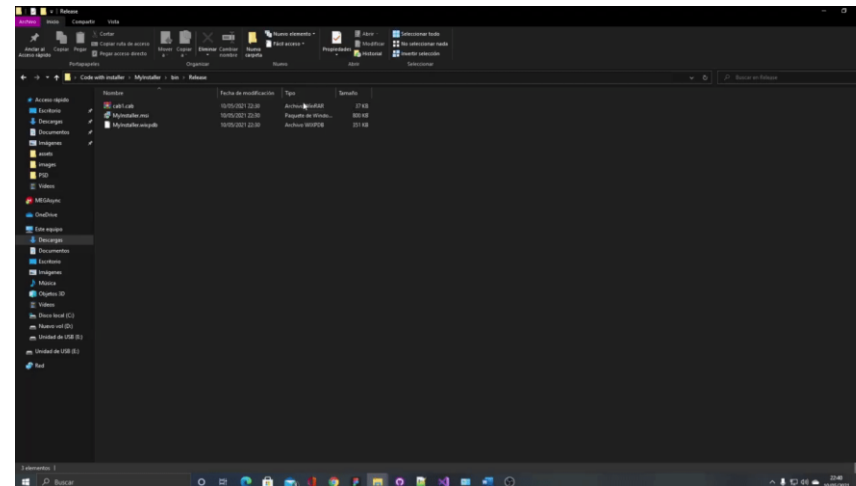
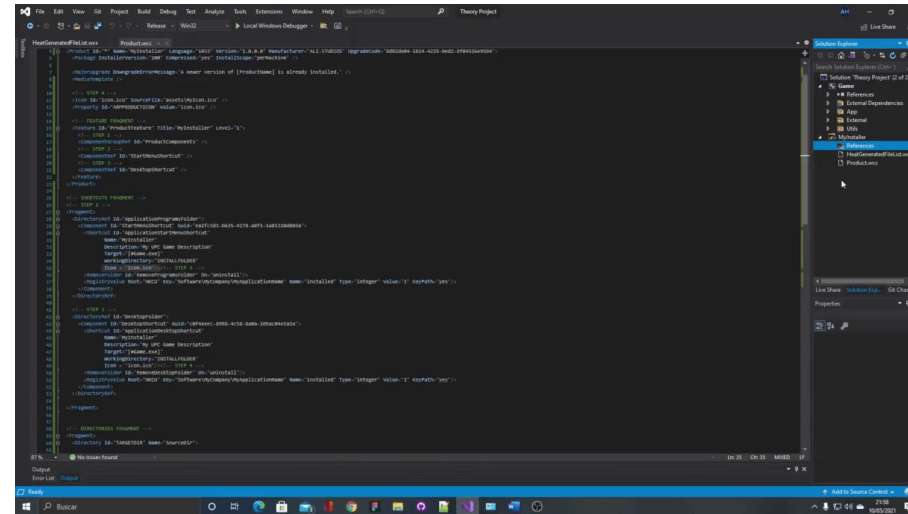
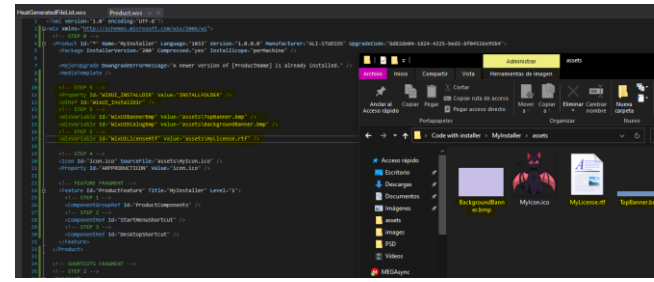
STEP 5

Customize the  
wizard & add  
license  
agreement

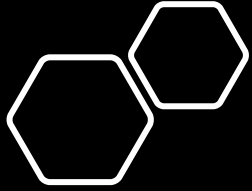
Code & Directory

Inclusion

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

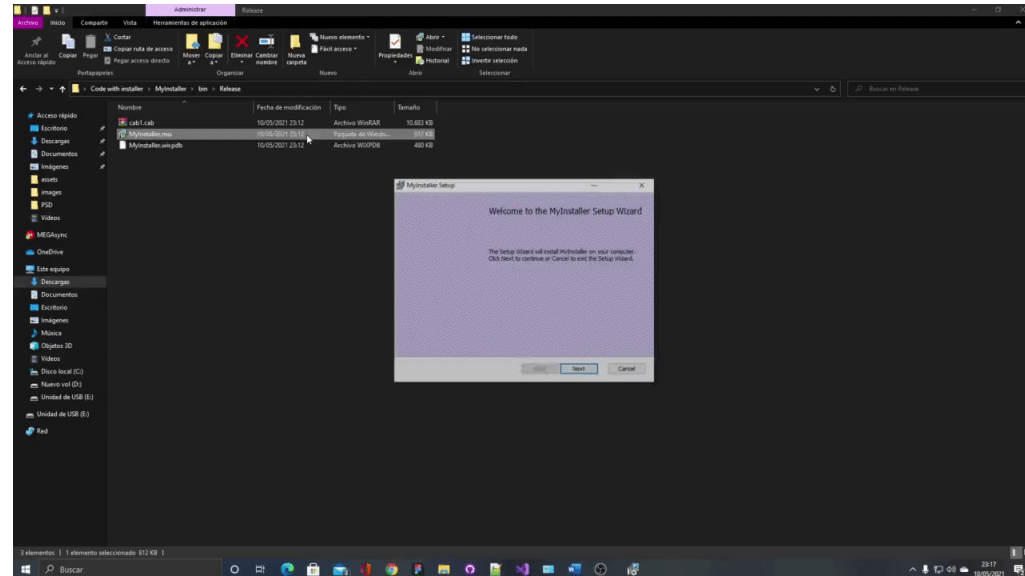
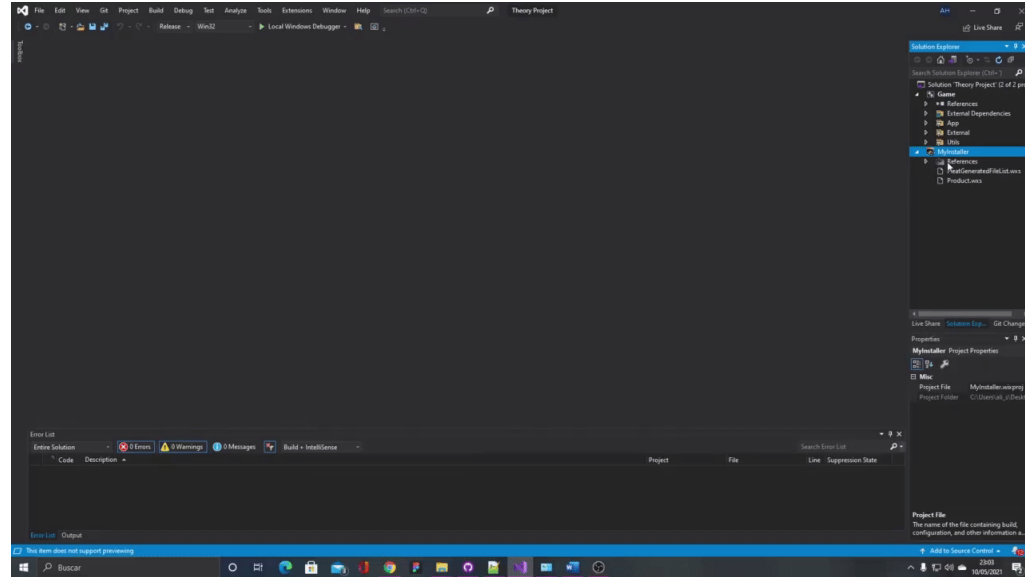
Code

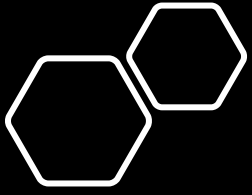
Preprocessor var

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 -->
```

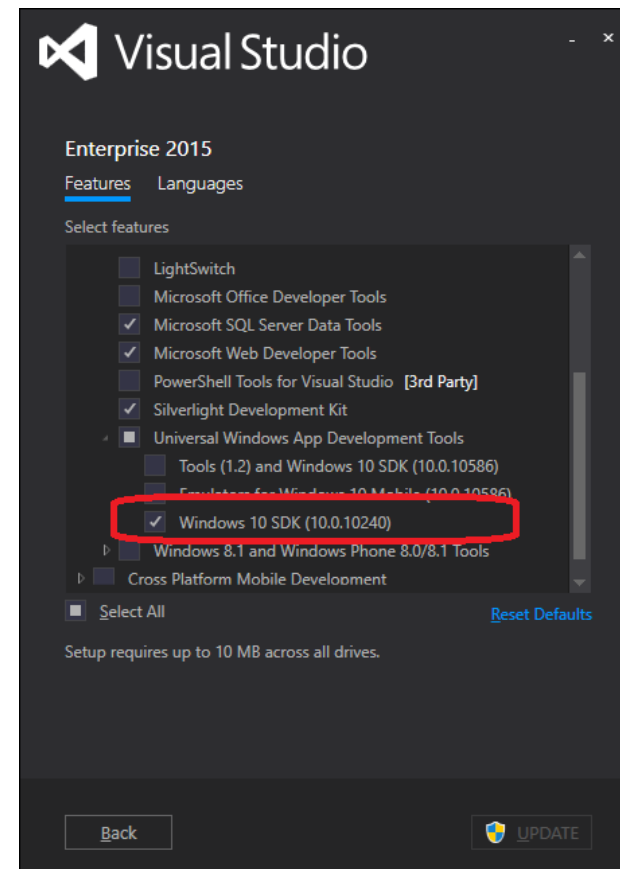




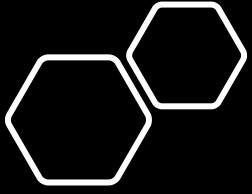
## 6. Digital Signature

- 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:`



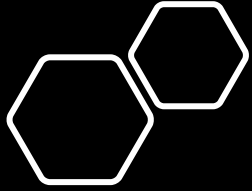




## 7. Testing on Virtual Machines

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

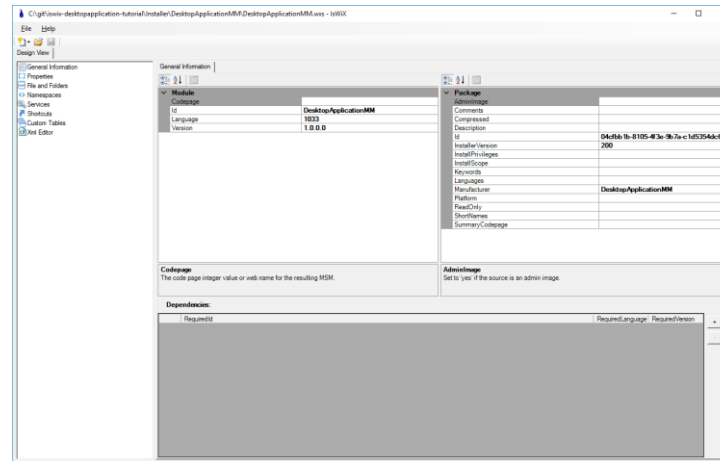
1. The process is simple, once the VirtualBox and its drivers are installed:
2. Click NEW to create a new virtual machine and follow the process of disk space and ram allocation.
3. After that, the wizard will ask you to choose a .iso file to boot the operating system of our choice.
4. Finally, before 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.



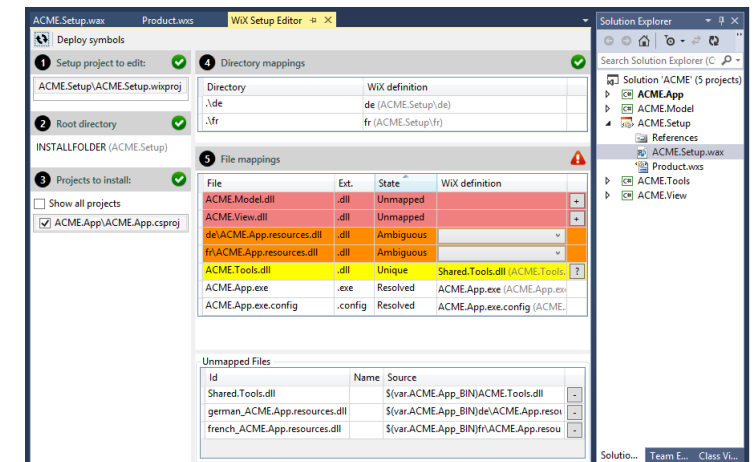
# 8. Possible Improvements/ Innovations


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!

