

UEFI & EDK II Training

Changing PCDs w/ Windows Lab

tianocore.org

See also [LabGuide.md](#) for Copy & Paste examples in labs

Lesson Objective

 UEFI Application with PCDs

 Documentaton : [MdeModulePkg/Universal/PCD/Dxe/Pcd.inf](https://github.com/tianocore/edk2/blob/master/MdeModulePkg/Universal/PCD/Dxe/Pcd.inf)

Purpose

- Establishes platform common definitions
- Build-time/Run-time aspects
- Binary Editing Capabilities

Goals

- Simplify porting
- Easy to associate with a module or platform

PCDs can be located anywhere within the Workspace even though a different package will use those PCDs for a given project

.DEC

**Define
PCD**

Package

.INF

**Reference
PCD**

Module

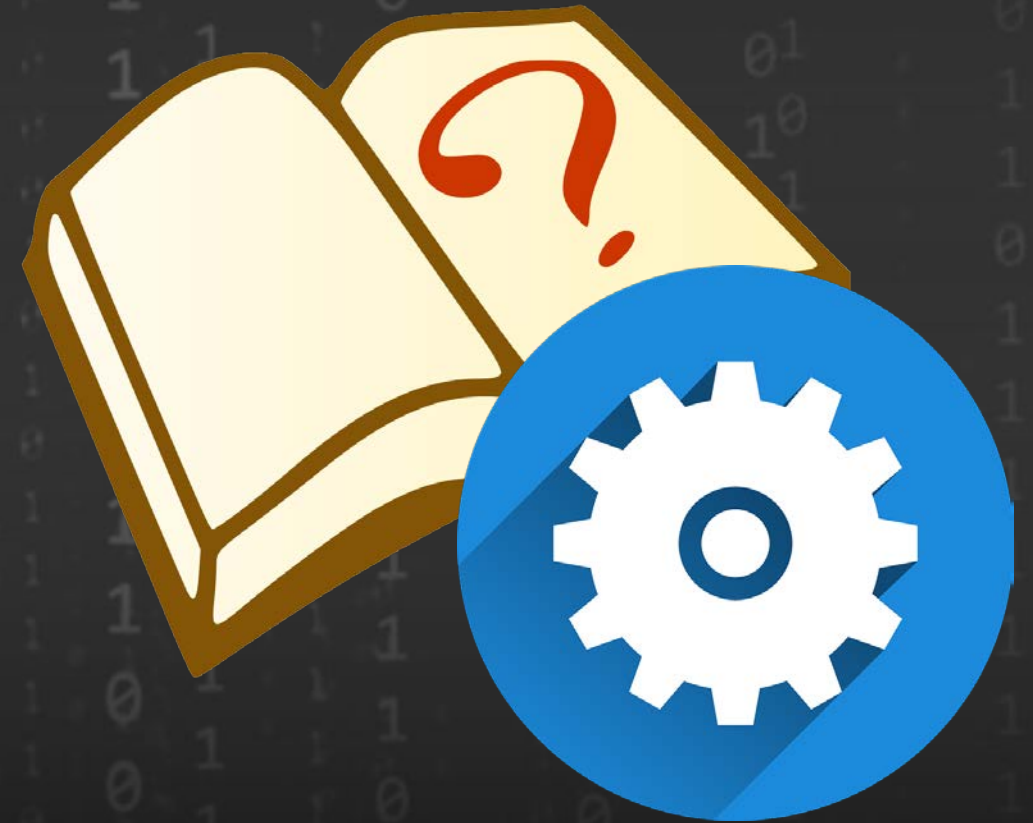
.DSC

**Modify
PCD**

Platform

Lab 1.1: Writing UEFI Applications with PCDs

In this lab, you'll learn how to write UEFI applications with PCDs.



Solution: Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1

EDK II HelloWorld App Lab

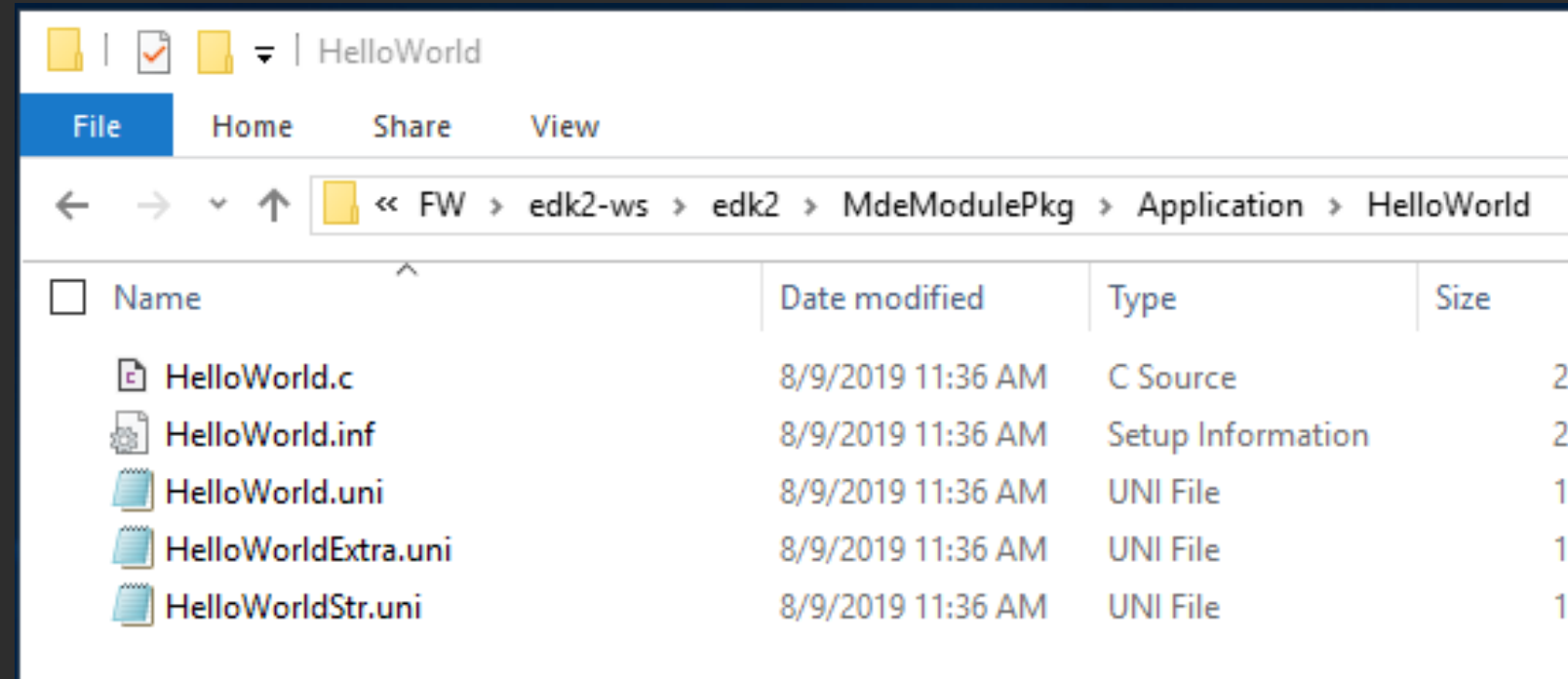
First Setup for Building EDK II for EmulatorPkg, See [Lab Setup](#)

Locate and Open edk2\MdeModulePkg\Application\HelloWorld\HelloWorld.c

Notice the PCD values

Build Emulation Package

Then Run HelloWorld



EDK II HelloWorld App Lab

Open a VS Command Prompt and type: `cd C:/FW/edk2-ws` then

```
$> Setenv.bat  
$> cd edk2  
$> edksetup
```

Build EmulatorPkg for Windows X64 (run WinHost.exe from Build/EmulatorX64/ . . ./X64)

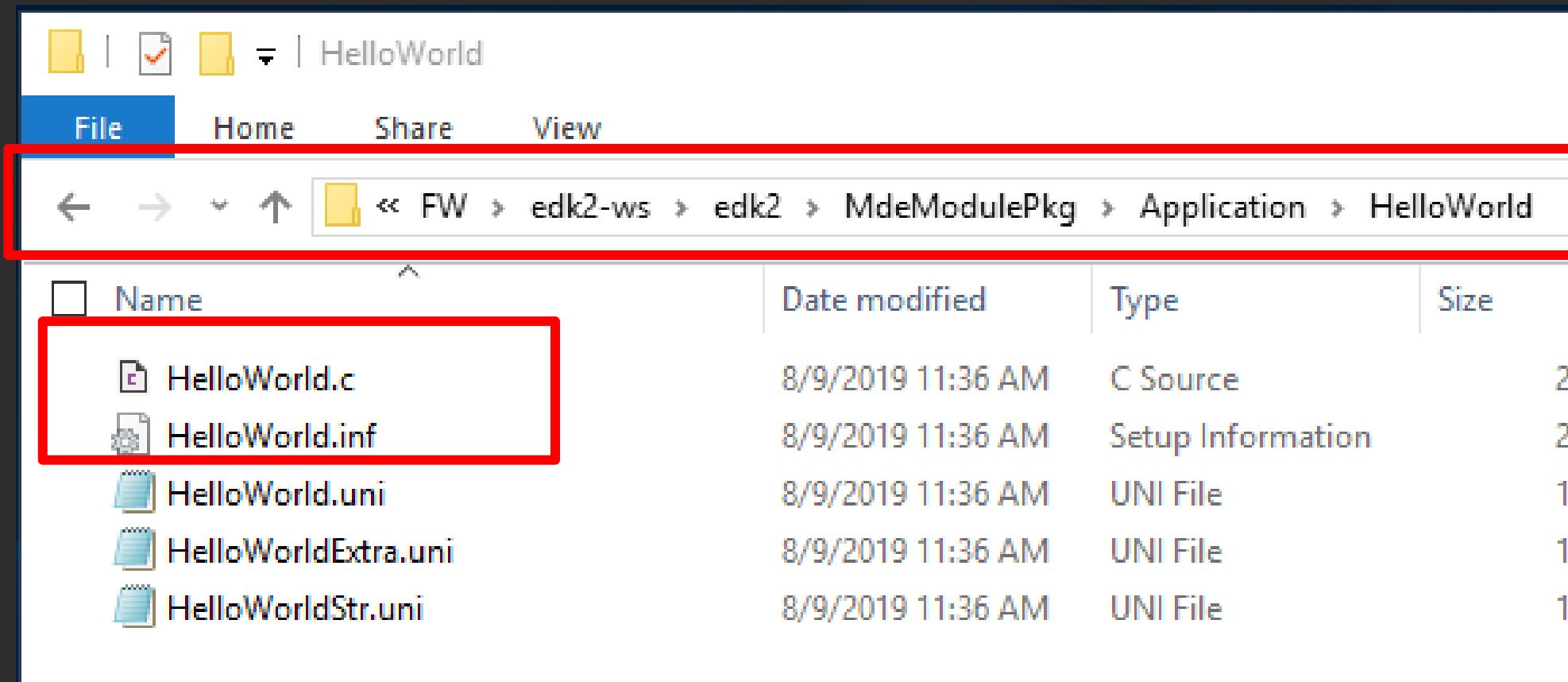
```
$> Build  
$> RunEmulator.bat
```

At the UEFI Shell prompt

```
Shell> HelloWorld  
UEFI Hello World!  
Shell>
```

How can we force the HelloWorld application to print out 3 times ?

Note: RunEmulator.bat will run WinHost.exe from Build/EmulatorX64/DEBUG_**TAG**/X64




```
EFI_STATUS
EFIAPI
UefiMain (
    IN EFI_HANDLE      ImageHandle,
    IN EFI_SYSTEM_TABLE *SystemTable
)
{
    UINT32 Index;
    Index = 0;
    // Three PCD type (FeatureFlag, UINT32
    // and String) are used as the sample.
    if (FeaturePcdGet (PcdHelloWorldPrintEnable)) {
        for (Index = 0; Index < PcdGet32 (PcdHelloWorldPrintTimes); Index++) {

            // Use UefiLib Print API to print
            // string to UEFI console

            Print ((CHAR16*)PcdGetPtr (PcdHelloWorldPrintString));


        }
    }

    return EFI_SUCCESS;
}
```

Notice the 3 PCDs

EDK II HelloWorld App Solution

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dsc
After the section [PcdsFixedAtBuild] (search for "PcdsFixedAtBuild" or "Hello")



```
EmulatorPkg.dsc-Notepad
File Edit Format View Help

[PcdsFixedAtBuild]
gEfiMdeModulePkgTokenSpaceGuid.PcdHelloWorldPrintTimes|3
```

2. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

EDK II HelloWorld App Solution

3. Run Emulation (run WinHost.exe from Build/EmulatorX64/ . . ./X64)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

4. At the Shell prompt

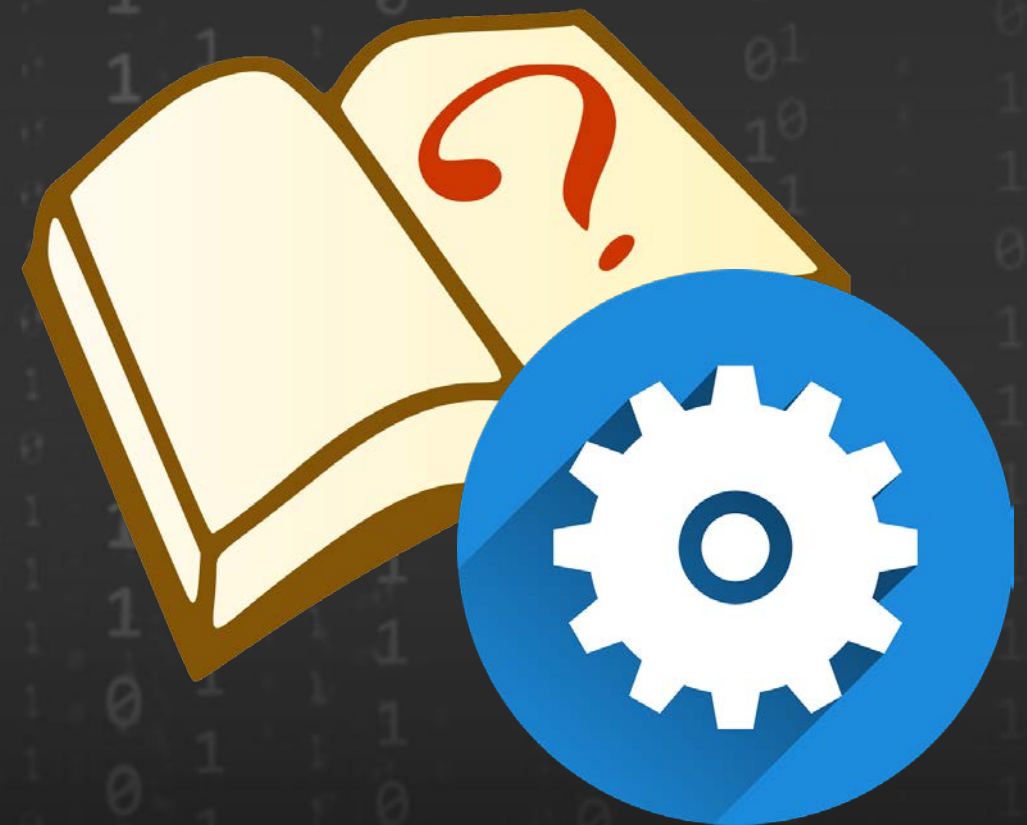
```
Shell> Helloworld
UEFI Hello World!
UEFI Hello World!
UEFI Hello World!
Shell>
```

5: Exit Emulation

```
Shell> Reset
```

Lab 1.2: Writing UEFI Applications with PCDs

In this lab, you'll learn how to change a PCD String in the HelloWorld UEFI applications.



Solution: `Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1_2`

EDK II HelloWorld App Change String

How can we change the string of the HelloWorld application?

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dsc
After the section [PcdsFixedAtBuild] add the PCD for the HelloWorld String
2. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

Hint: see ../edk2/MdeModulePkg/MdeModulePkg.Dec

EDK II HelloWorld App Solution

3. Run Emulation (run WinHost.exe from Build/EmulatorX64/ . . ./X64)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

4. At the Shell prompt

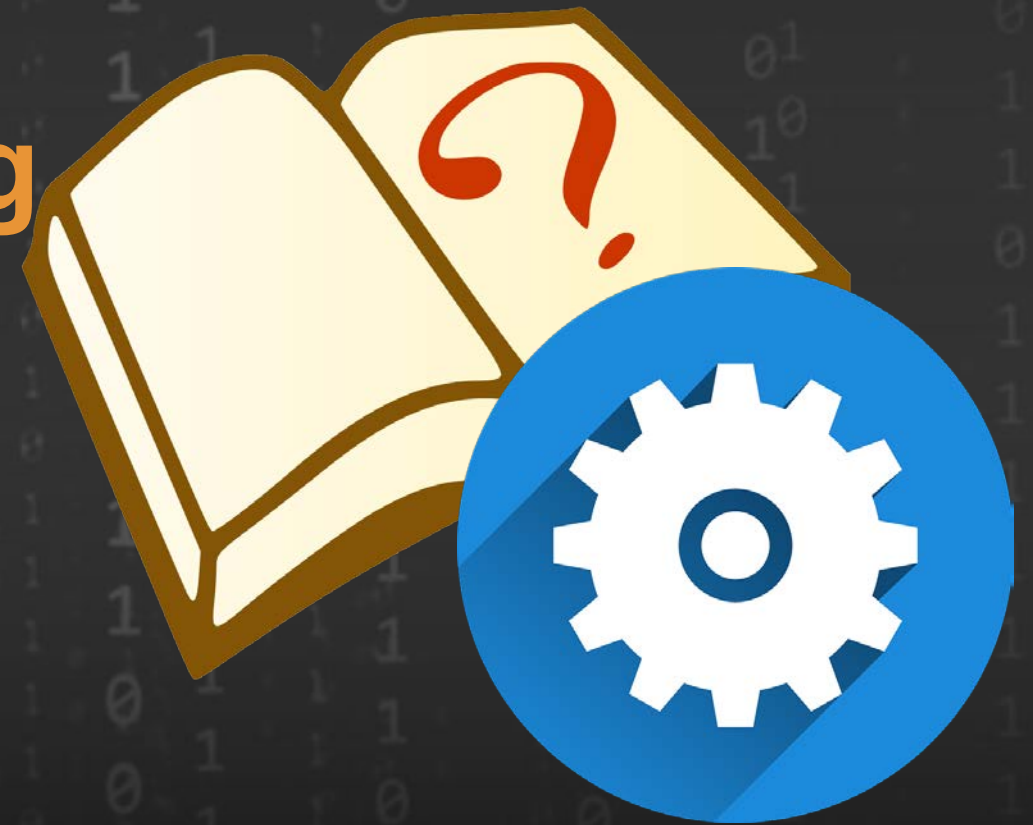
```
Shell> Helloworld
My New String!
My New String!
My New String!
Shell>
```

5: Exit Emulation

```
Shell> Reset
```

Lab 1.3 – Adding PCD String

In this lab, you'll add a PCD String to the previous lab's SampleApp UEFI Shell application



Solution: Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1_3

Lab 1.3: Catch up from previous lab

Skip to next slide if Lab Writing UEFI App Lab completed ([Lab Guide](#))

- Perform Lab Setup from previous Labs ([Lab Guide](#))
- Create a Directory under the workspace C:/FW/edk2-ws/edk2 “SampleApp”
- Copy contents of C:../FW/LabSampleCode/SampleAppPCD to C:/FW/edk2-ws/edk2/SampleApp
- Open C:/FW/edk2/EmulatorPkg/EmulatorPkg.dsc
- Add the following to the [Components] section:

```
# Add new modules here
SampleApp/SampleApp.inf
```

- Save and close the file EmulatorPkg.dsc

Sample App Add PCD String

How can we add a string to the SampleApp application?

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dec. After the section [PcdsFixedAtBuild] add the PCD for the SampleApp called: PcdSampleAppString
2. Edit the file C:/FW/edk2-ws/edk2/SampleApp.inf and add the new PCD in the PCD section. Also add the package EmulatorPkg.dec in the Package section
3. Edit the file C:/FW/edk2-ws/edk2/SampleApp.c and add the correct Library include and also add:

```
Print((CHAR16 *)PcdGetPtr(PcdSampleAppString));
```

4. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

EDK II SampleApp Test

5. Run Emulation (run WinHost.exe from Build/EmulatorX64/ . . ./X64)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

6. At the Shell prompt

```
Shell> SampleApp  
SampleApp String
```

```
Shell>
```

7: Exit Emulation

```
Shell> Reset
```

Summary

UEFI Application with PCDs

Questions?



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ACKNOWLEDGEMENTS

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