tianocore

UEFI & EDK II Training

UEFI Driver Wizard Lab – Windows

See also Lab_Guide.md for Copy & Paste examples in labs

tianocore.org

LESSON OBJECTIVE

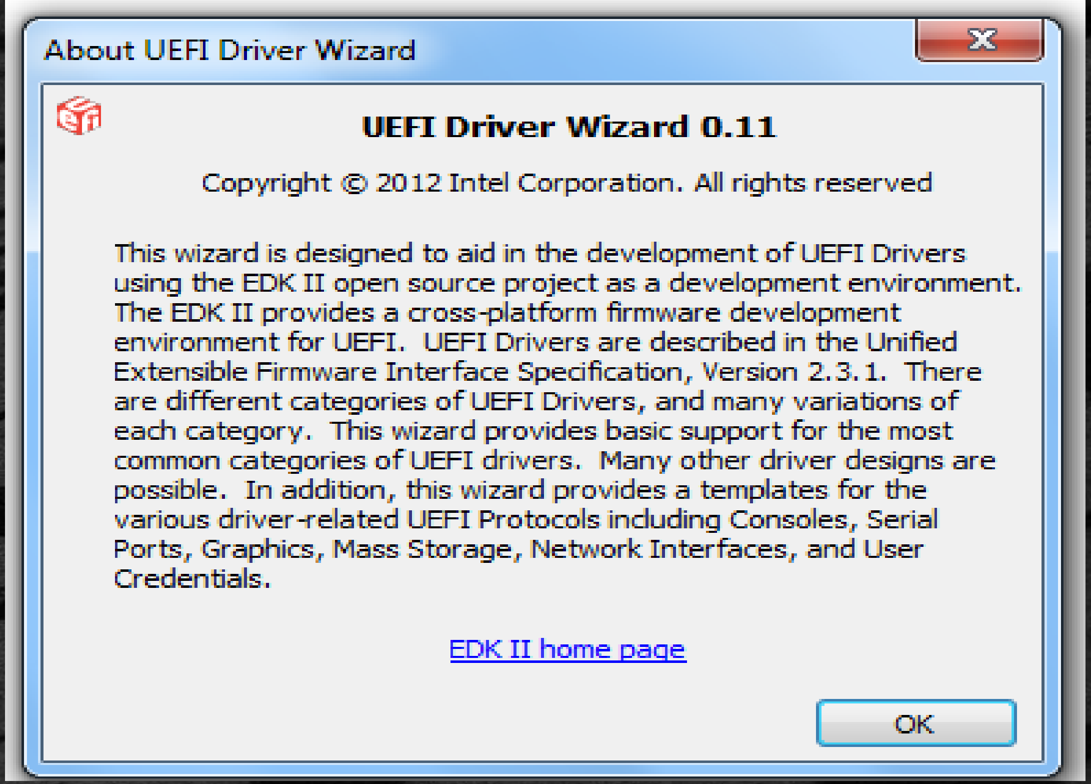
- Setup the UEFI Driver Wizard
- Create a UEFI Driver Template

UEFI DRIVER WIZARD

Creating a Template UEFI Driver with the UEFI Driver Wizard

UEFI Driver Wizard Overview

- ✓ Open source tool
- ✓ Based on *Driver Writer's Guide for UEFI 2.3.1* content
- ✓ Intel engineers contributed
- ✓ Located on www.TianoCore.org



UEFI Driver Wizard 0.11

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This wizard is designed to aid in the development of UEFI Drivers using the EDK II open source project as a development environment. The EDK II provides a cross-platform firmware development environment for UEFI. UEFI Drivers are described in the Unified Extensible Firmware Interface Specification, Version 2.3.1. There are different categories of UEFI Drivers, and many variations of each category. This wizard provides basic support for the most common categories of UEFI drivers. Many other driver designs are possible. In addition, this wizard provides a templates for the various driver-related UEFI Protocols including Consoles, Serial Ports, Graphics, Mass Storage, Network Interfaces, and User Credentials.

EDK II home page

Installing UEFI Driver Wizard

Requirements and Options

- Workspace must contain BaseTools, MdePkg & MdeModulePkg Packages from tianocore.org edk2 for Driver development on Tianocore.org
- Uses previous lab’s setup w/ Windows `C:\FW\edk2-ws\`
- Python* scripts from Github Link then use instructions from README for Python and wxPython versions to install then run

```
bash$ python launch.py
```

Requirements for Your Driver

Using UEFI Driver Wizard

- UEFI Device Driver
- UEFI Version 2.7 (0x00020046)

```
#define EFI_2_70_SYSTEM_TABLE_REVISION ((2<<16) | (70DEC))
```

- Unloadable driver
- Support IA32 & x64 CPUs
- Returns component name information
- Byte stream device (i.e.UART / Serial I/O)
- Option to produce HII strings & forms for setup

Template File Contents

Proper UEFI driver entry point

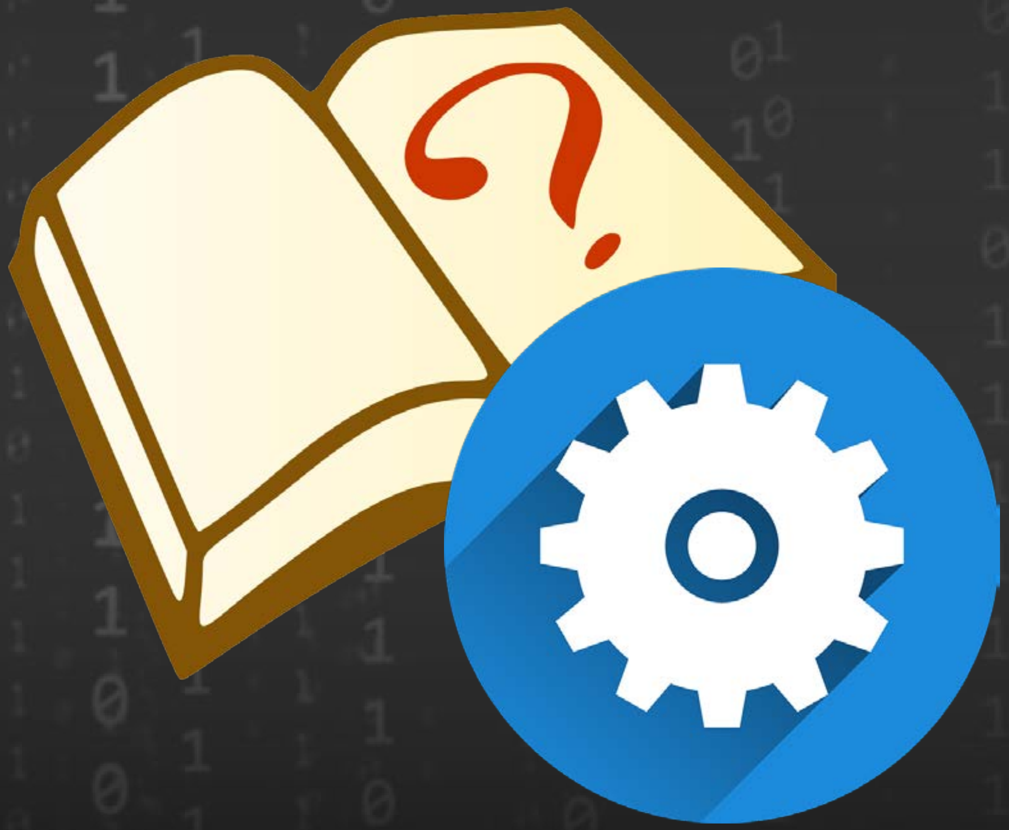
Basic driver libraries/headers

Skeletons for common driver functions

Error values until ported
EFI_UNSUPPORTED, EFI_DEVICE_ERROR

Lab 1: Create a UEFI Driver with the UEFI Driver Wizard

- In this lab, you'll create a new UEFI driver using the UEFI Driver Wizard.
- This will create a set of "c" code files to be used as a template UEFI Driver used in the subsequent driver labs

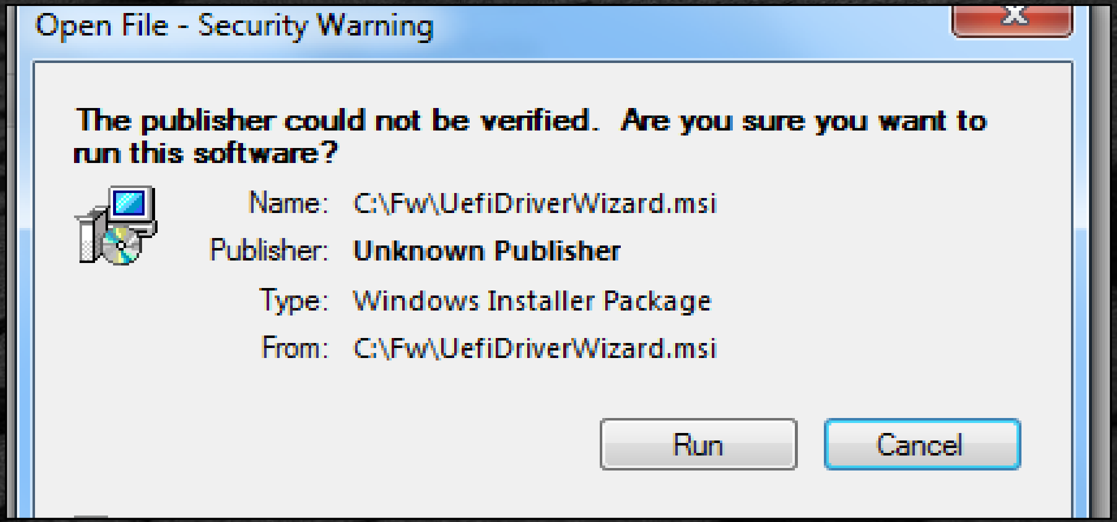


Lab 1: Install UEFI Driver Wizard

First setup for Building EDK II for Emulator, See Lab Setup

Install UEFI Driver Wizard

1. **Open** and **Run** /FW/DriverWizard/UefiDriverWizard.msi
2. **Click** through “Next” until install finishes



Open File - Security Warning

The publisher could not be verified. Are you sure you want to run this software?

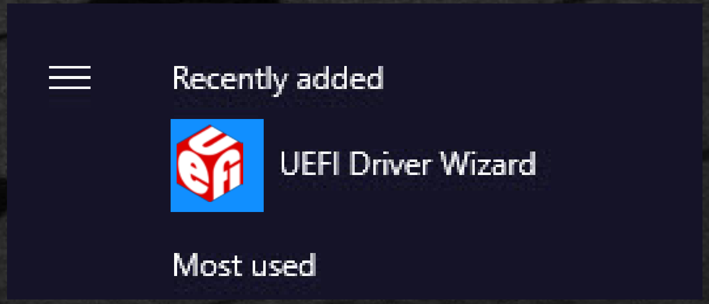
Name: C:\Fw\UefiDriverWizard.msi

Publisher: **Unknown Publisher**

Type: Windows Installer Package

From: C:\Fw\UefiDriverWizard.msi

Open the UEFI Driver Wizard

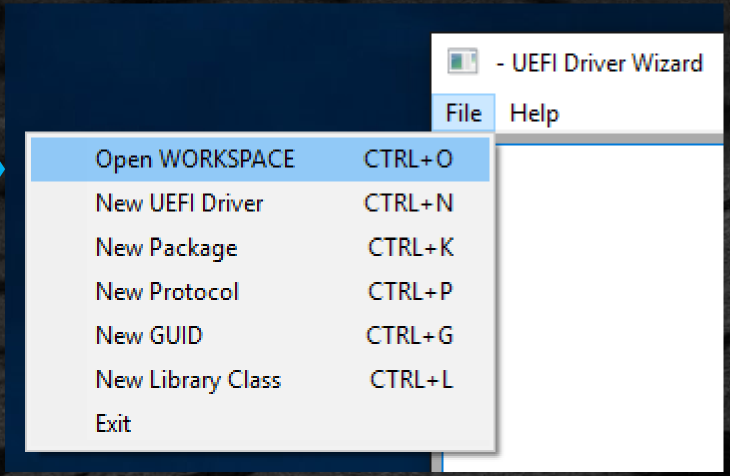


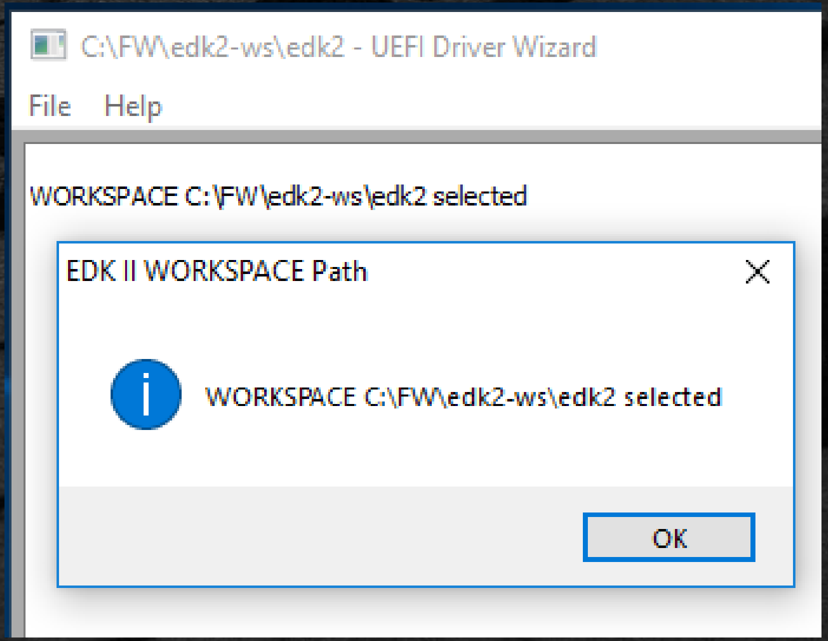
Lab 1: UefiDriverWizard -Select Work Space

Click on File and Select
“Open WORKSPACE”
Or
Control+O

Browse to C:/FW/edk2-ws/edk2
Select “OK”
Should say
“WORKSPACE C:\FW\edk2-ws\edk2 selected”

Note: the environment for EDK II must be setup with edksetup.bat



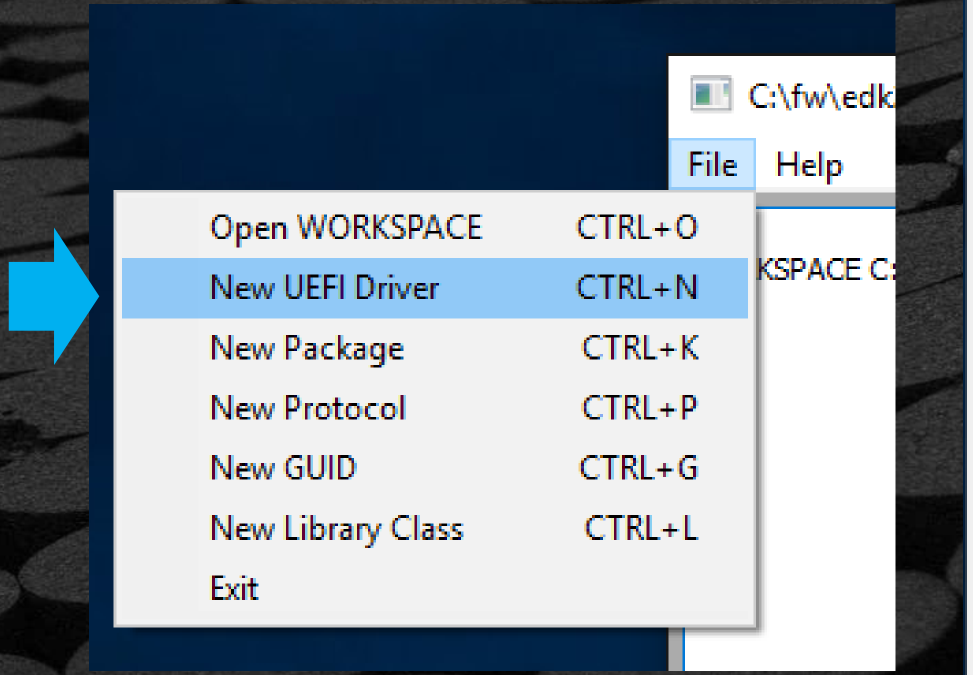


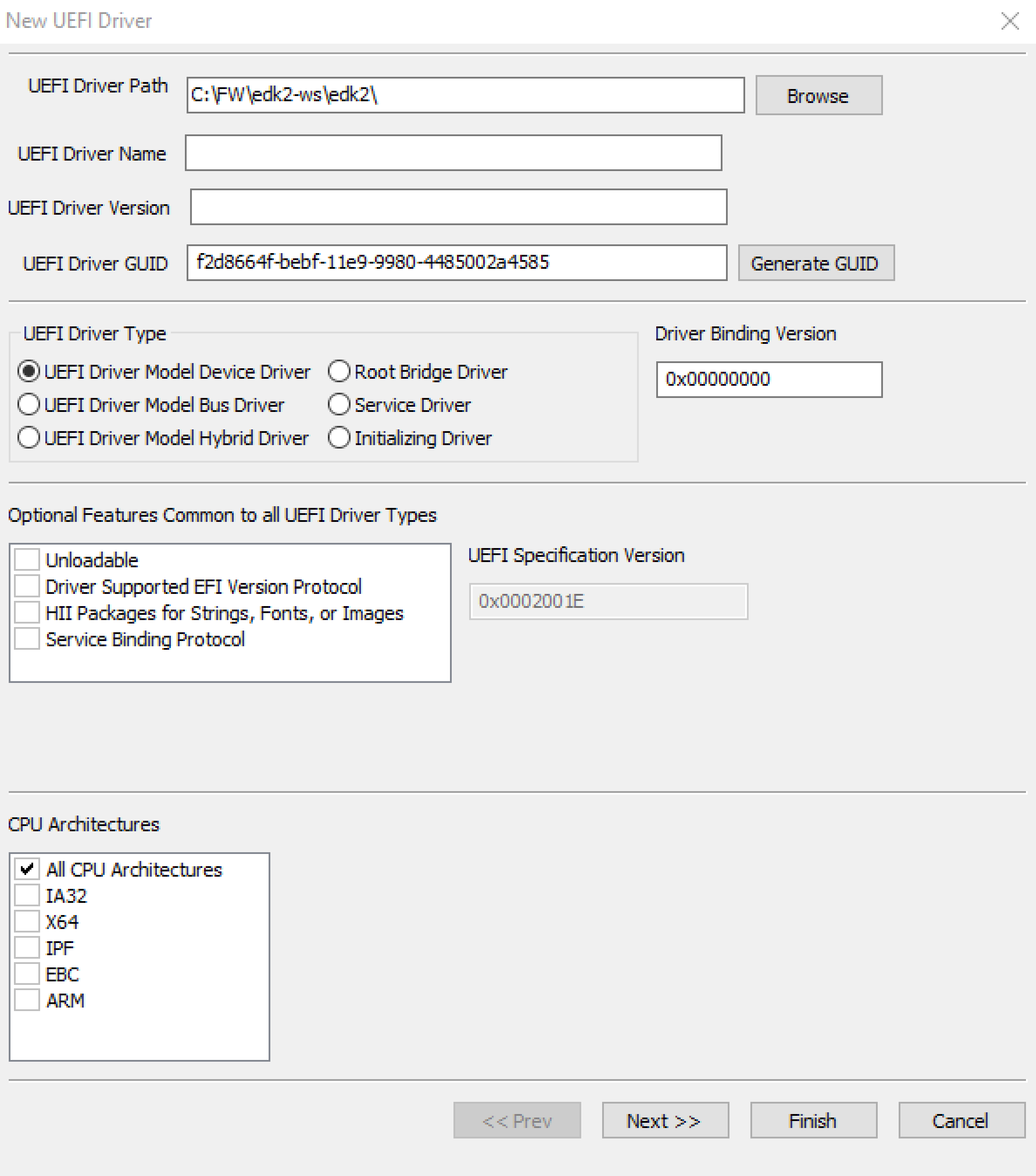
WORKSPACE C:\FW\edk2-ws\edk2 selected

WORKSPACE C:\FW\edk2-ws\edk2 selected

Lab 1: Create a New UEFI Driver

Control+N – to Open Menu




New UEFI Driver

UEFI Driver Path: C:\FW\edk2-ws\edk2\

UEFI Driver Name:

UEFI Driver Version:

UEFI Driver GUID: f2d8664f-bebf-11e9-9980-4485002a4585

UEFI Driver Type

- ● UEFI Driver Model Device Driver
- ○ UEFI Driver Model Bus Driver
- ○ UEFI Driver Model Hybrid Driver
- ○ Root Bridge Driver
- ○ Service Driver
- ○ Initializing Driver

Driver Binding Version: 0x00000000

Optional Features Common to all UEFI Driver Types

- □ Unloadable
- □ Driver Supported EFI Version Protocol
- □ HII Packages for Strings, Fonts, or Images
- □ Service Binding Protocol

UEFI Specification Version: 0x0002001E

CPU Architectures

- ☑ All CPU Architectures
- □ IA32
- □ X64
- □ IPF
- □ EBC
- □ ARM

Lab 1:
New UEFI Driver Menu

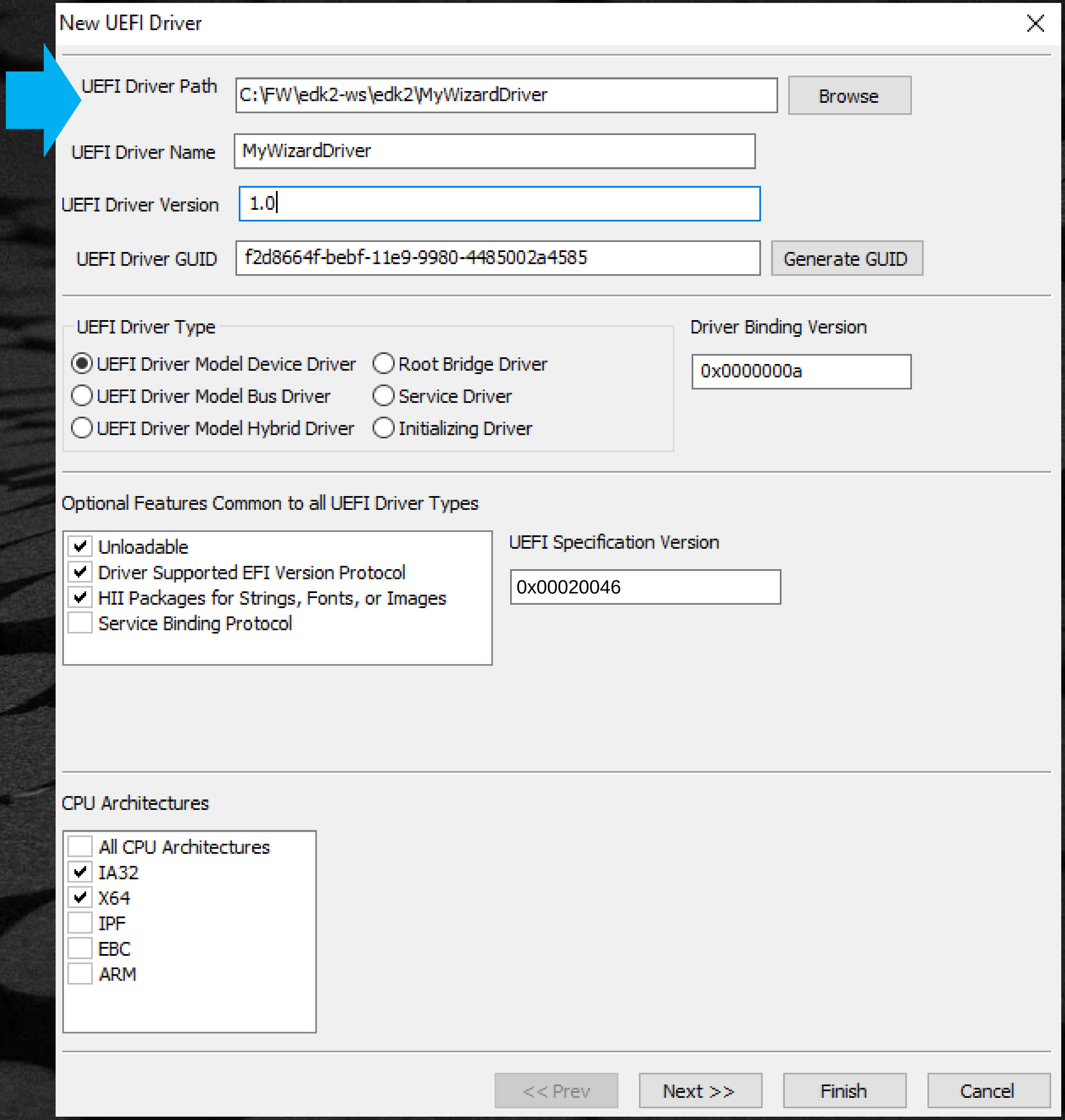
- UEFI Driver Path" – Type: "**MyWizardDriver**"

  ***Note**:* "UEFI Driver Name" is filled in.

- **Ensure** all the forms, radio buttons, and boxes are filled in and **selected *exactly*** like the image to the right. (except GUID)

- ***Note**:* A new, specific driver GUID will populate, so it will be different than this image

Click **Next >>**



New UEFI Driver

UEFI Driver Path: C:\FW\edk2-ws\edk2\MyWizardDriver [Browse]

UEFI Driver Name: MyWizardDriver

UEFI Driver Version: 1.0

UEFI Driver GUID: f2d8664f-bebf-11e9-9980-4485002a4585 [Generate GUID]

UEFI Driver Type

- ● UEFI Driver Model Device Driver
- ○ UEFI Driver Model Bus Driver
- ○ UEFI Driver Model Hybrid Driver
- ○ Root Bridge Driver
- ○ Service Driver
- ○ Initializing Driver

Driver Binding Version: 0x0000000a

Optional Features Common to all UEFI Driver Types

- ☑ Unloadable
- ☑ Driver Supported EFI Version Protocol
- ☑ HII Packages for Strings, Fonts, or Images
- □ Service Binding Protocol

UEFI Specification Version: 0x00020046

CPU Architectures

- □ All CPU Architectures
- ☑ IA32
- ☑ X64
- □ IPF
- □ EBC
- □ ARM

Lab 1: UEFI Driver Model Optional Features

Ensure all the forms, radio buttons, and boxes are filled in and **selected** ***exactly*** like the image to the right.

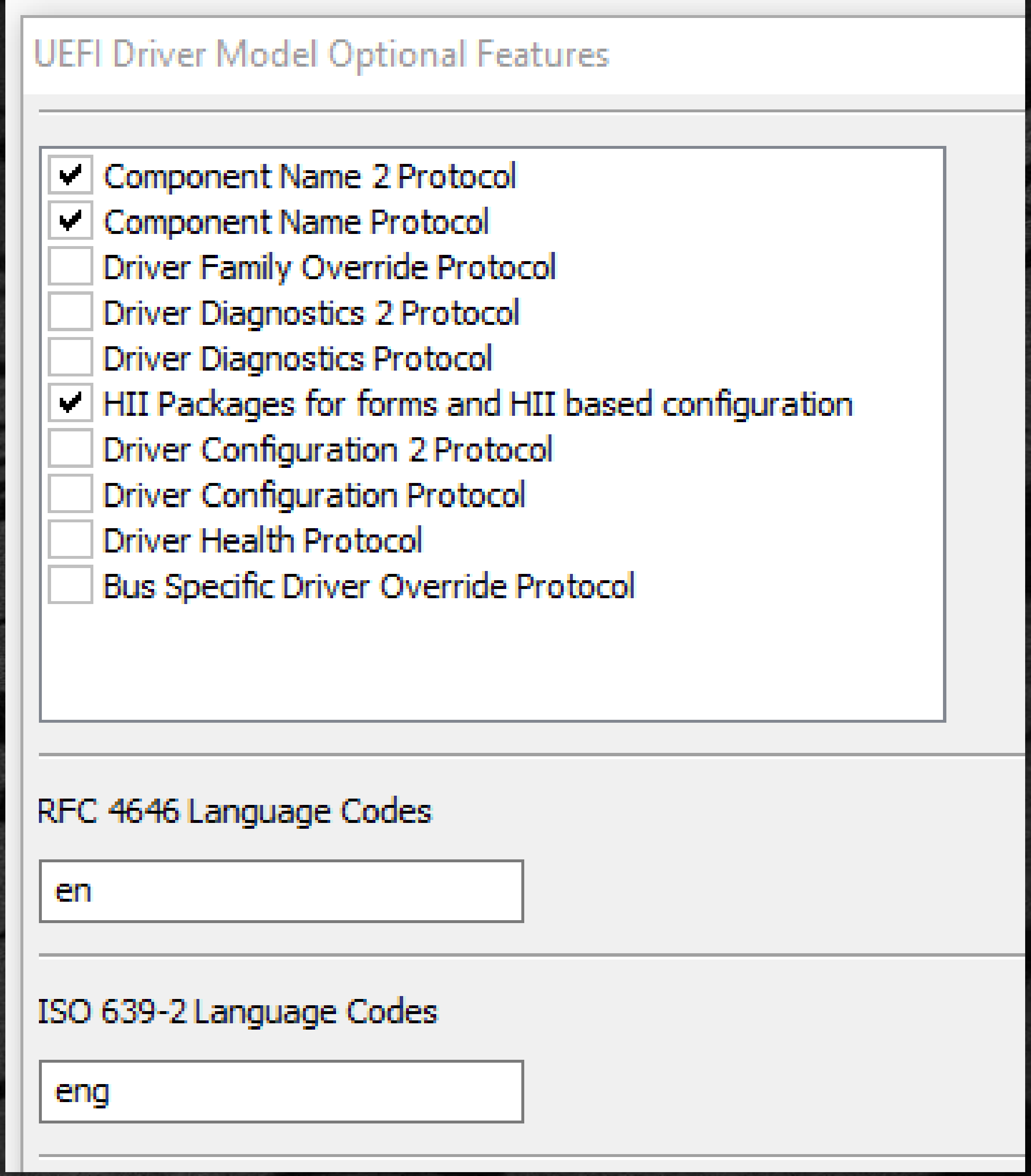
✓ "Component Name 2 Protocol”

✓ "Component Name Protocol”

✓ "HII Packages for Forms . . .”

Click

Next >>



UEFI Driver Model Optional Features

☑ Component Name 2 Protocol
☑ Component Name Protocol
□ Driver Family Override Protocol
□ Driver Diagnostics 2 Protocol
□ Driver Diagnostics Protocol
☑ HII Packages for forms and HII based configuration
□ Driver Configuration 2 Protocol
□ Driver Configuration Protocol
□ Driver Health Protocol
□ Bus Specific Driver Override Protocol

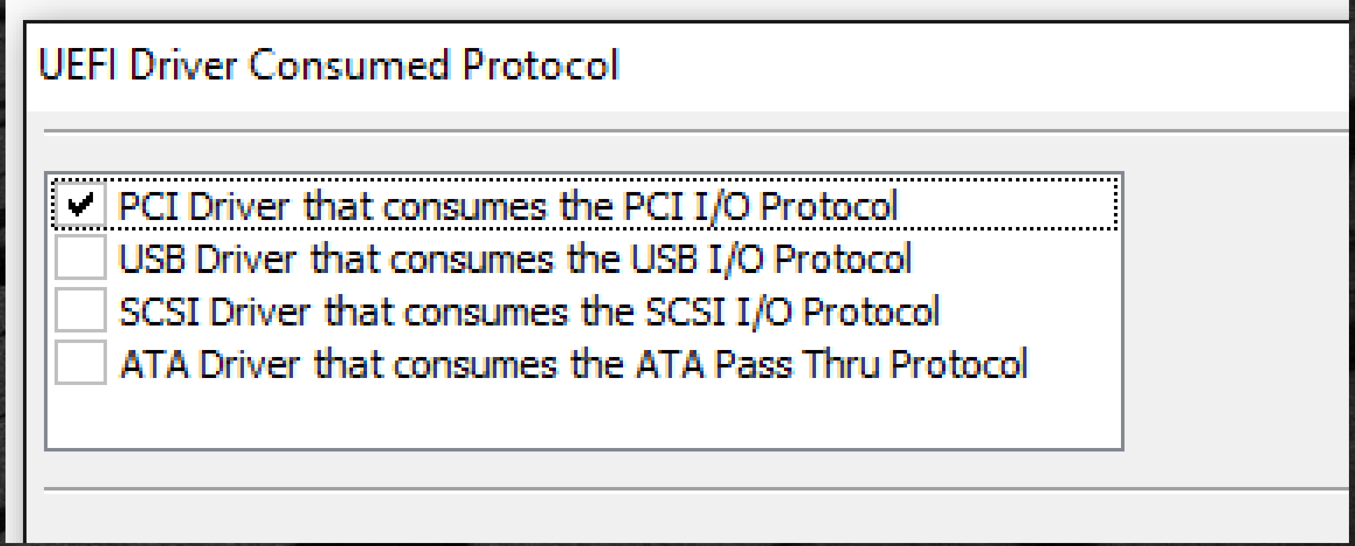
RFC 4646 Language Codes: en

ISO 639-2 Language Codes: eng

Lab 1: UEFI Driver Consumed Protocol

Select

✓ “PCI Driver that consumes the PCI I/O Protocol”



UEFI Driver Consumed Protocol

☑ PCI Driver that consumes the PCI I/O Protocol
□ USB Driver that consumes the USB I/O Protocol
□ SCSI Driver that consumes the SCSI I/O Protocol
□ ATA Driver that consumes the ATA Pass Thru Protocol

Click

Next >>

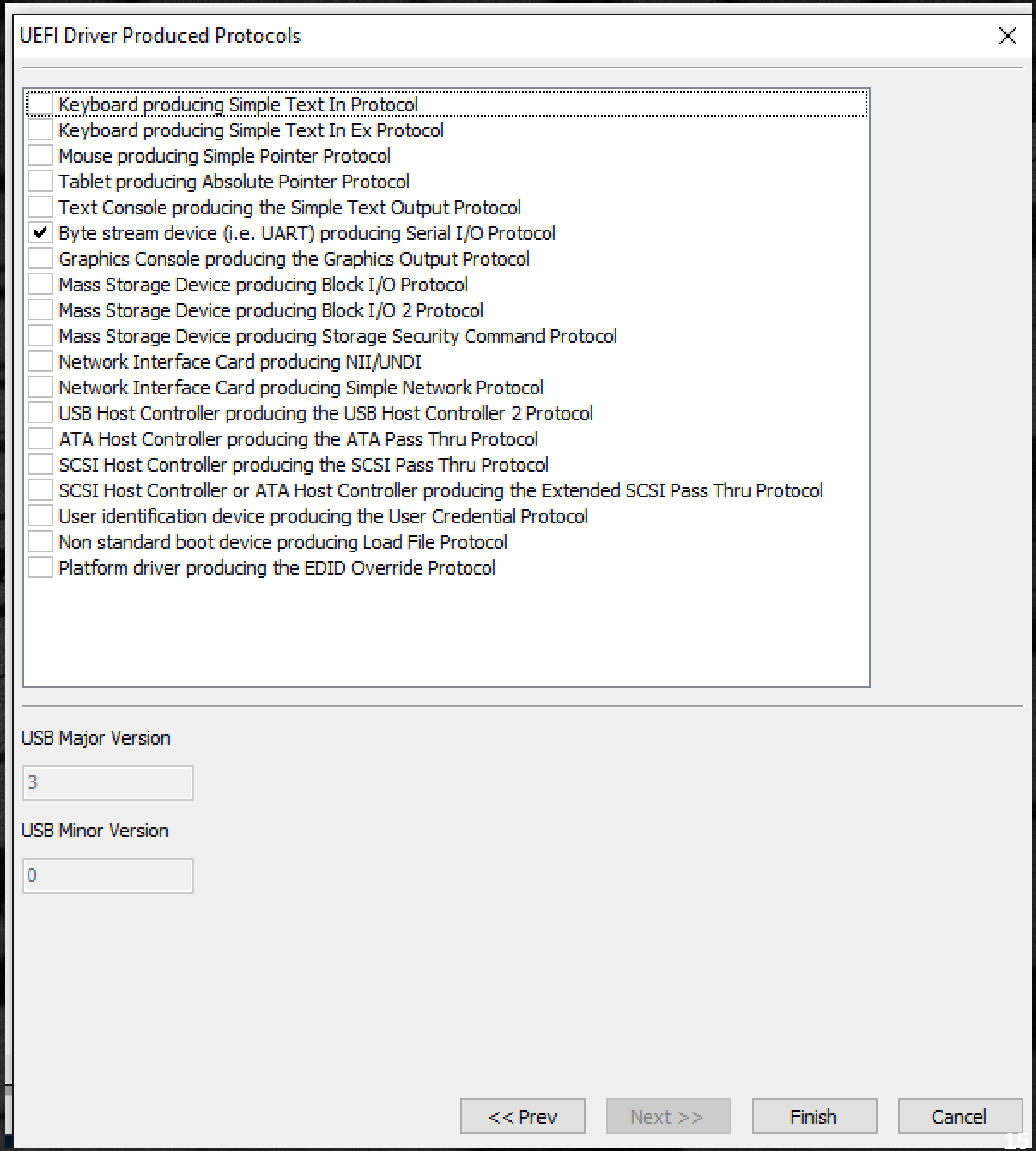
Lab1: UEFI Driver Produced Protocols

Select

✓ "Byte stream device (i.e.UART) producing Serial I/O Protocol”

Click

Finish



UEFI Driver Produced Protocols

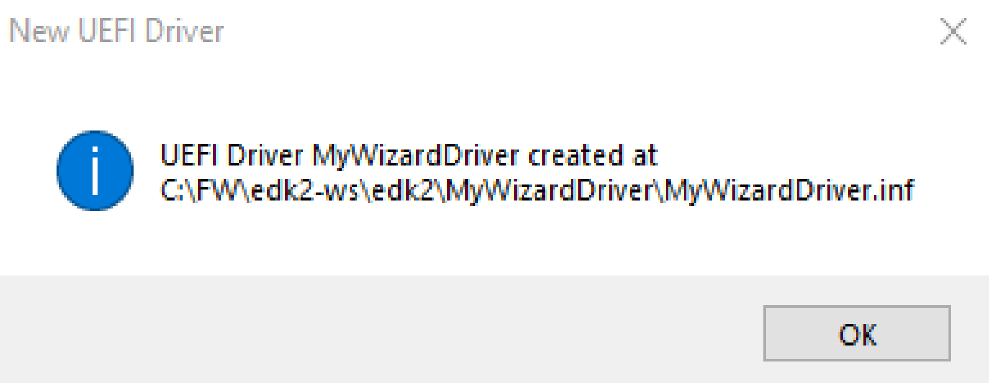
- ☐ Keyboard producing Simple Text In Protocol
- ☐ Keyboard producing Simple Text In Ex Protocol
- ☐ Mouse producing Simple Pointer Protocol
- ☐ Tablet producing Absolute Pointer Protocol
- ☐ Text Console producing the Simple Text Output Protocol
- ☑ Byte stream device (i.e. UART) producing Serial I/O Protocol
- ☐ Graphics Console producing the Graphics Output Protocol
- ☐ Mass Storage Device producing Block I/O Protocol
- ☐ Mass Storage Device producing Block I/O 2 Protocol
- ☐ Mass Storage Device producing Storage Security Command Protocol
- ☐ Network Interface Card producing NII/UNDI
- ☐ Network Interface Card producing Simple Network Protocol
- ☐ USB Host Controller producing the USB Host Controller 2 Protocol
- ☐ ATA Host Controller producing the ATA Pass Thru Protocol
- ☐ SCSI Host Controller producing the SCSI Pass Thru Protocol
- ☐ SCSI Host Controller or ATA Host Controller producing the Extended SCSI Pass Thru Protocol
- ☐ User identification device producing the User Credential Protocol
- ☐ Non standard boot device producing Load File Protocol
- ☐ Platform driver producing the EDID Override Protocol

USB Major Version: 3

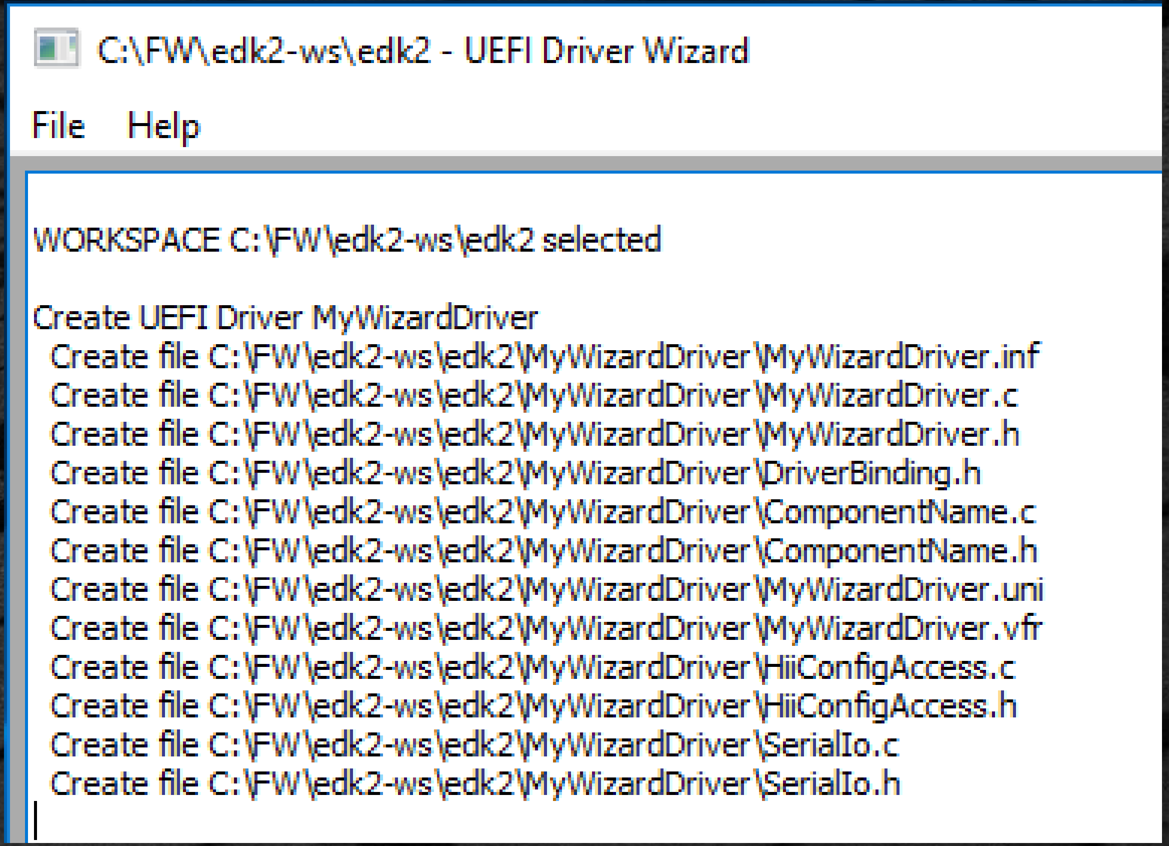
USB Minor Version: 0

Lab 1: UEFI Driver Created

UEFI Driver template created



UEFI Driver MyWizardDriver created at C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.inf



```
WORKSPACE C:\FW\edk2-ws\edk2 selected

Create UEFI Driver MyWizardDriver
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.inf
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.c
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.h
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\DriverBinding.h
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\ComponentName.c
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\ComponentName.h
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.uni
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\MyWizardDriver.vfr
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\HiiConfigAccess.c
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\HiiConfigAccess.h
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\SerialIo.c
  Create file C:\FW\edk2-ws\edk2\MyWizardDriver\SerialIo.h
```

SUMMARY

- Setup the UEFI Driver Wizard
- Create a UEFI Driver Template

Questions?

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ACKNOWLEDGEMENTS