

Blog

BLOG

Linking Abaqus 2017 and Fortran

Posted by  Writers Of CAE Assistant Group

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As you know, we need to link Abaqus and Intel Fortran to execute user subroutines such as VUMAT, UMAT, USDFLD, etc. Abaqus Fortran linking can be done in various versions of Abaqus and Fortran. Here in this article, we are trying to link Abaqus 2017 and Fortran on Windows 10 (x64). To do that, we also need another program named Microsoft Visual Studio.

What do we need?

As you can see in the article Compatible versions of Intel Fortran and Visual Studio for Abaqus, this is the compatibility list for Abaqus 2017:

Intel Parallel Studio XE 2013 or above

Visual Studio 2010 or above

We will use:

1. Abaqus 2017

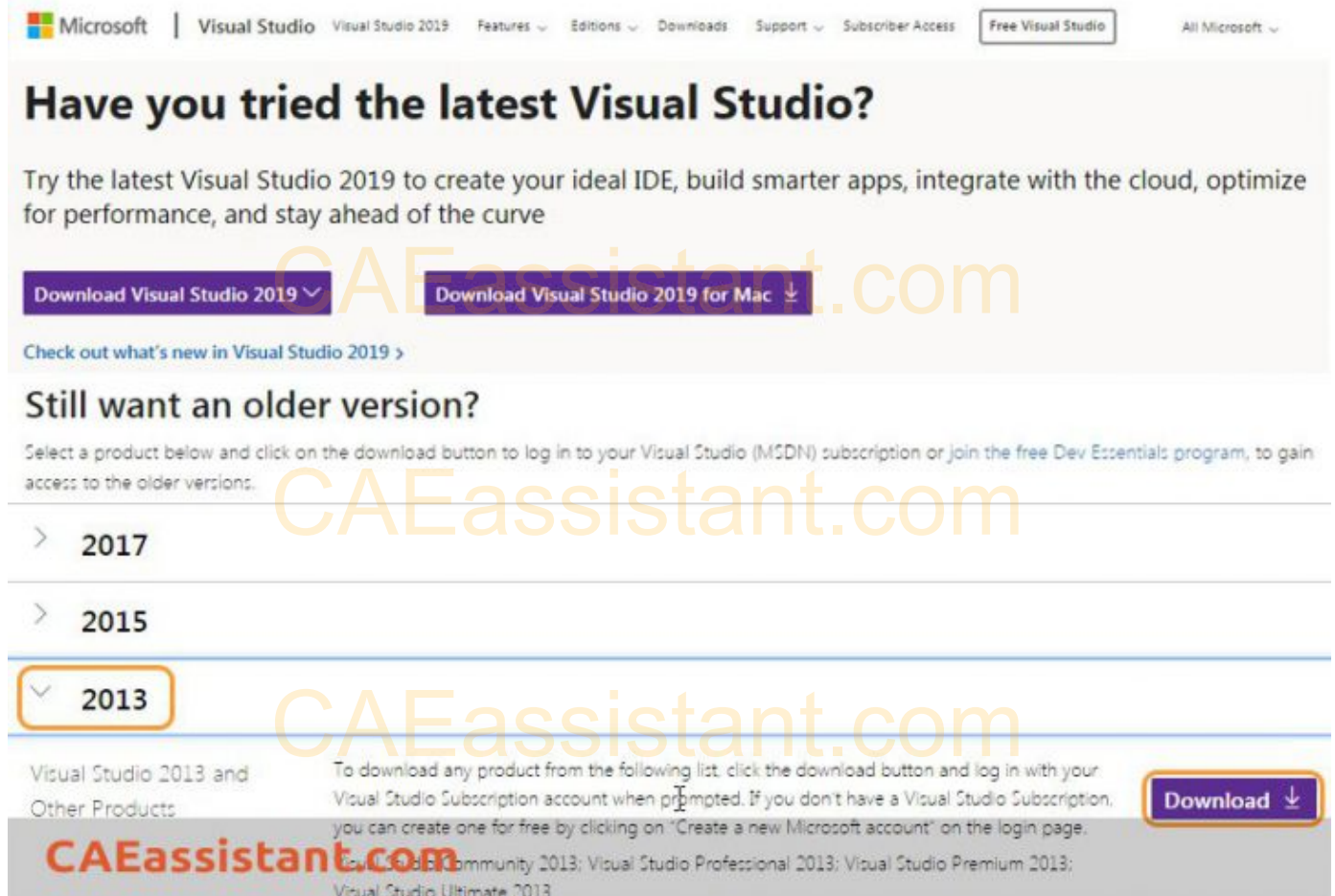
Remember that user subroutines are not available for the Student version.

2. Microsoft Visual Studio Ultimate 2013 with Update 5

It is free software. You can download it here:

<https://visualstudio.microsoft.com/vs/older-downloads>

On that page, you can also find older versions (for example, Visual Studio 2013 which is needed here):



The screenshot shows the Microsoft Visual Studio website. At the top, there's a navigation bar with links like 'Visual Studio', 'Visual Studio 2019', 'Features', 'Editions', 'Downloads', 'Support', 'Subscriber Access', and a 'Free Visual Studio' button. The main heading is 'Have you tried the latest Visual Studio?'. Below it, a subheading says 'Try the latest Visual Studio 2019 to create your ideal IDE, build smarter apps, integrate with the cloud, optimize for performance, and stay ahead of the curve'. There are two buttons: 'Download Visual Studio 2019' and 'Download Visual Studio 2019 for Mac'. Below these, a link says 'Check out what's new in Visual Studio 2019'. The next section is 'Still want an older version?'. It says 'Select a product below and click on the download button to log in to your Visual Studio (MSDN) subscription or join the free Dev Essentials program, to gain access to the older versions.' There are three expandable sections: '2017', '2015', and '2013'. The '2013' section is expanded, showing 'Visual Studio 2013 and Other Products'. To the right, there's a 'Download' button. Below the button, there's a note: 'To download any product from the following list, click the download button and log in with your Visual Studio Subscription account when prompted. If you don't have a Visual Studio Subscription, you can create one for free by clicking on "Create a new Microsoft account" on the login page.' The list of products includes 'Visual Studio Community 2013; Visual Studio Professional 2013; Visual Studio Premium 2013; Visual Studio Ultimate 2013'.

3. Intel Parallel Studio XE 2017 Update 2 Cluster Edition

You can subscribe to download the Student version of Fortran free from here:

<https://registrationcenter.intel.com/en/forms/?productid=2871>

(You need to have an academic email to receive a free student license from Intel).



Notes:

1. In order to have a correct Abaqus Fortran linking, you should install Visual Studio first, then Intel Parallel Studio XE.

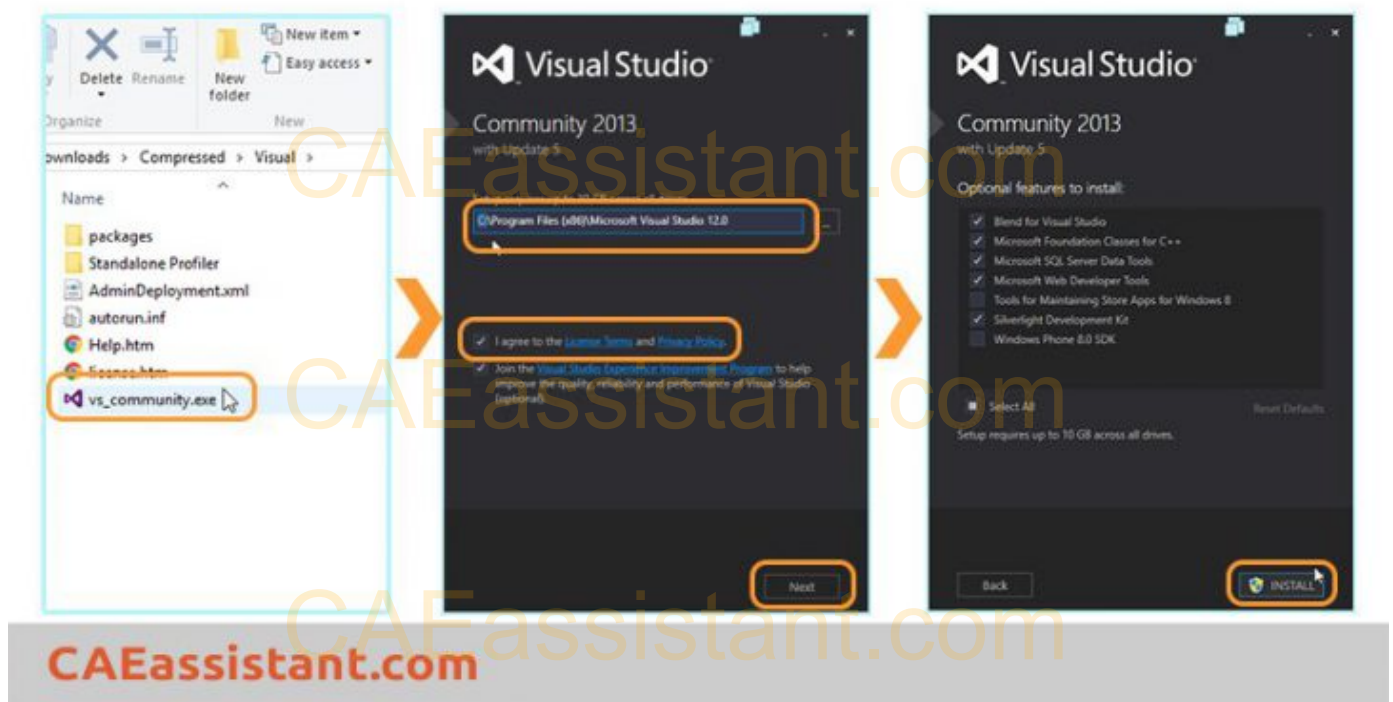
Avoid changing the installation directory structure to find files required for the next steps more easily. If you lack space in drive C, just change the installation drive. In addition, installing both programs on the same drive is recommended.

2. Some references suggest that Abaqus should be installed at last. As an experience, it does not matter at all. Therefore, you can link your existing Abaqus with Fortran just by installing compatible Visual Studio and Intel Fortran.

3. In fact, we do not need to install the full package of Visual Studio and Intel Fortran. However, if you are unsure about what Abaqus needs to be installed, install them with default options. This is the simple way to avoid the failure of Abaqus Fortran linking.

Step 1: Installing Visual Studio

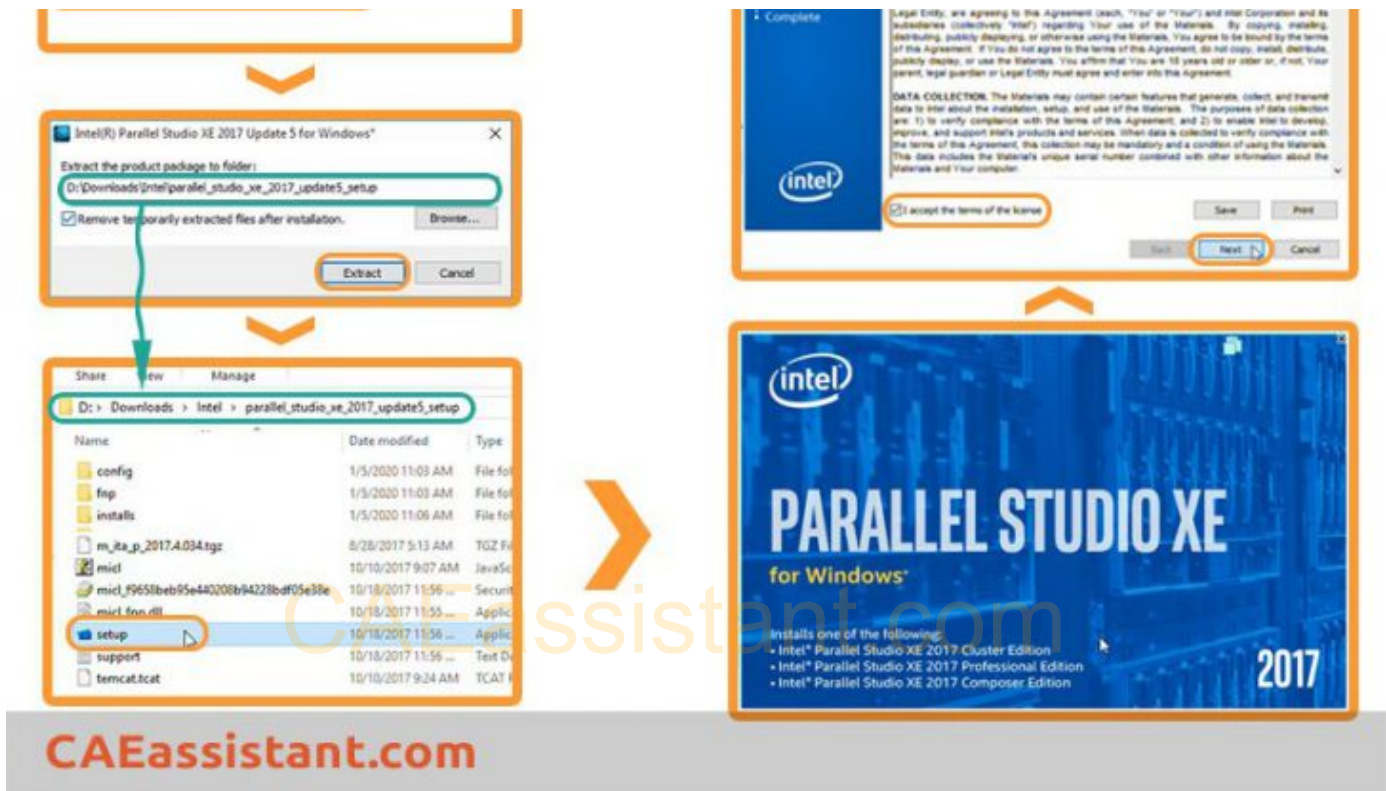
Just follow the procedure. There is no need to change any default. If you want, you can change the installation drive (considering the second note):



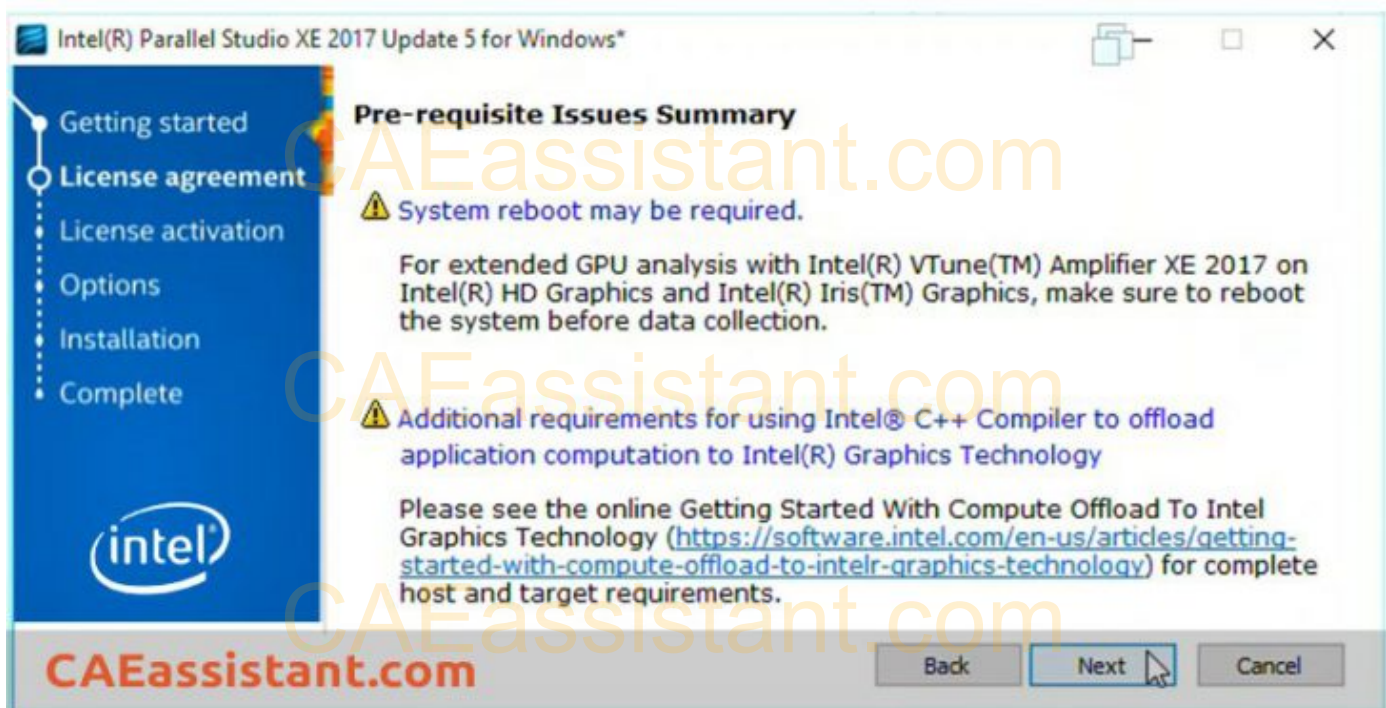
Step 2: Installing Intel Parallel Studio

Look at the image below and follow the installation procedure:



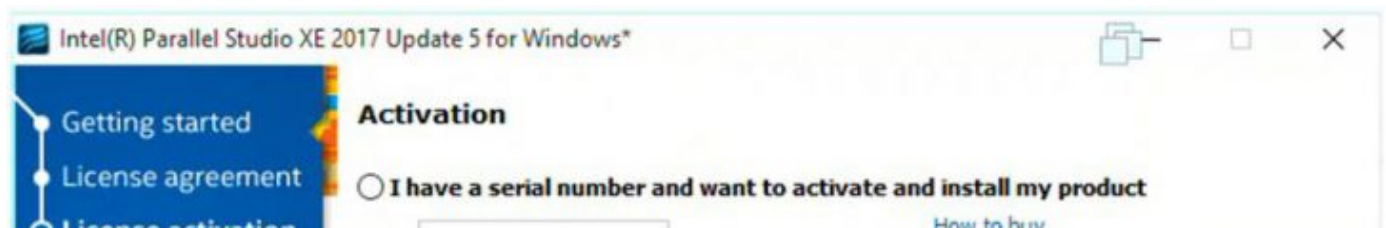


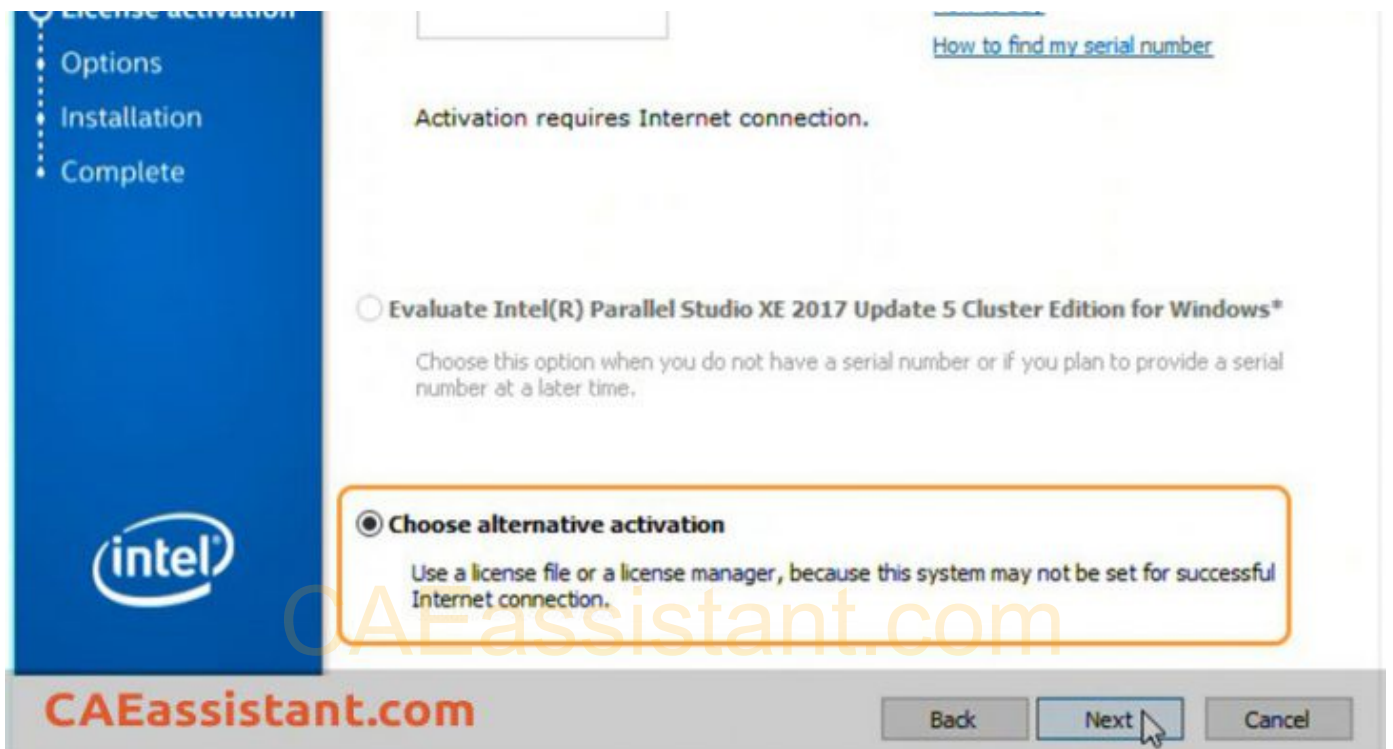
In the next window, the installation wizard may report some issues:



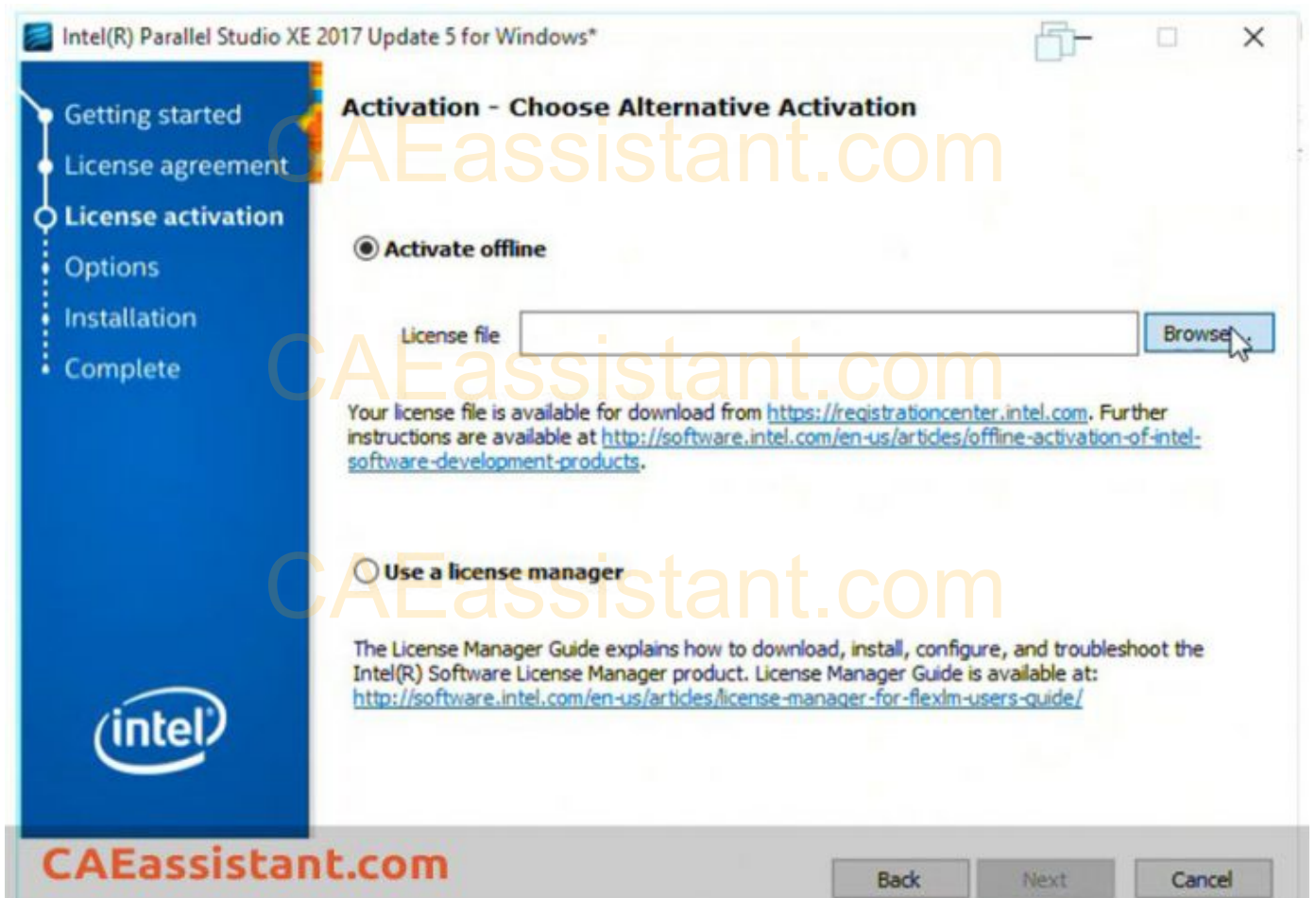
Issues like these are OK. Press **Next**.

In the **License Activation** step, select **Choose alternative activation**:



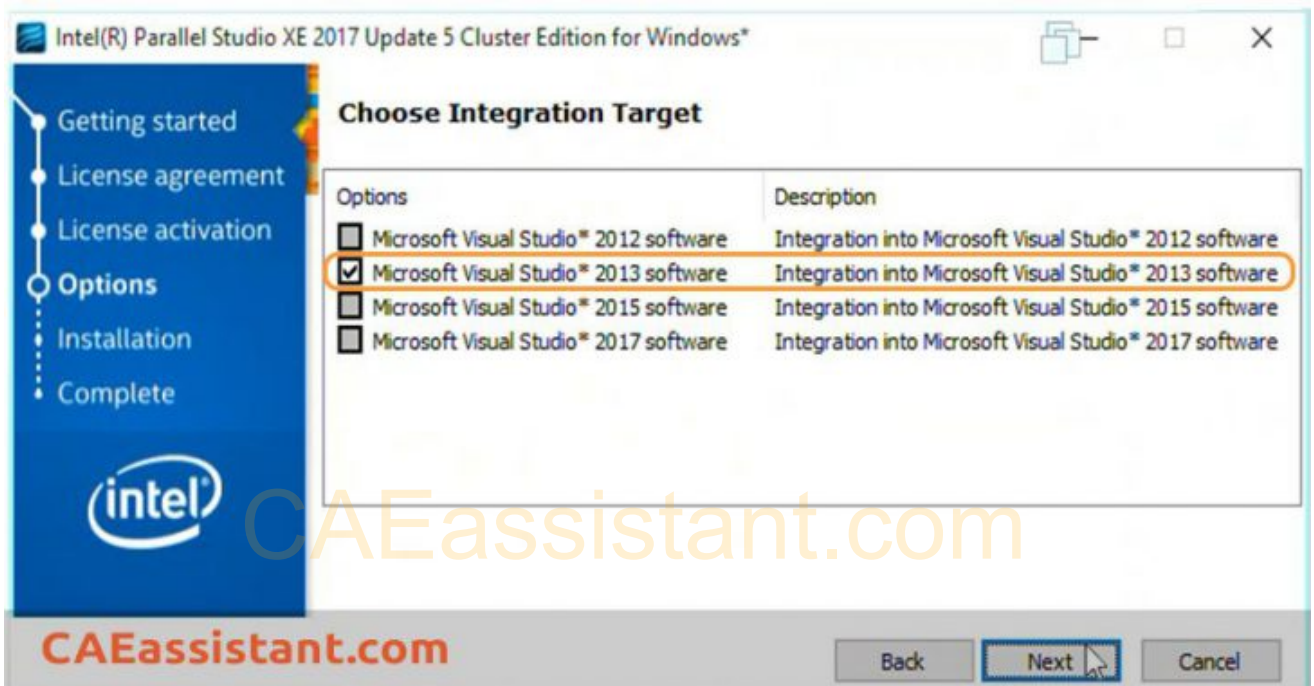


Then **Browse** the **License file** (with .lic suffix) provided by Intel. You have received this file via email if you requested an academic license.



Then follow the procedure. There is no need to change any default. If you want, you can change the installation drive (considering Note 1).

Then you will see this window:



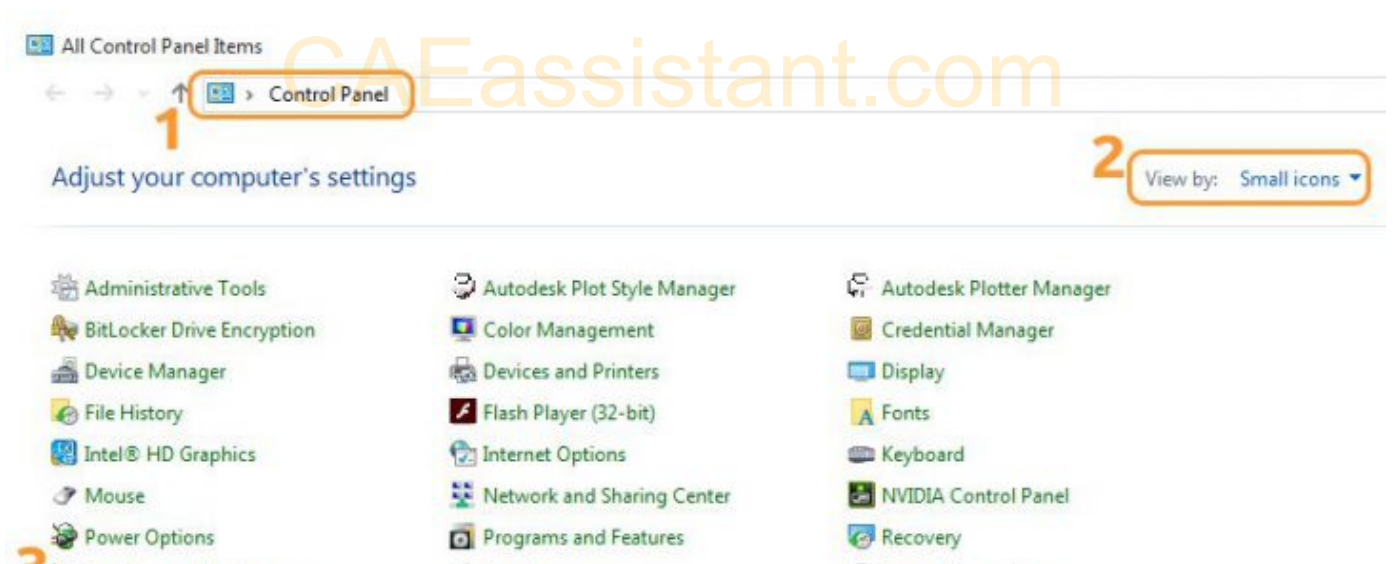
Select **Visual Studio 2013** as **Integration Target**. Press **Next**.
Finally, after pressing **Install**, you should be patient for some minutes.



It is hard to start new software

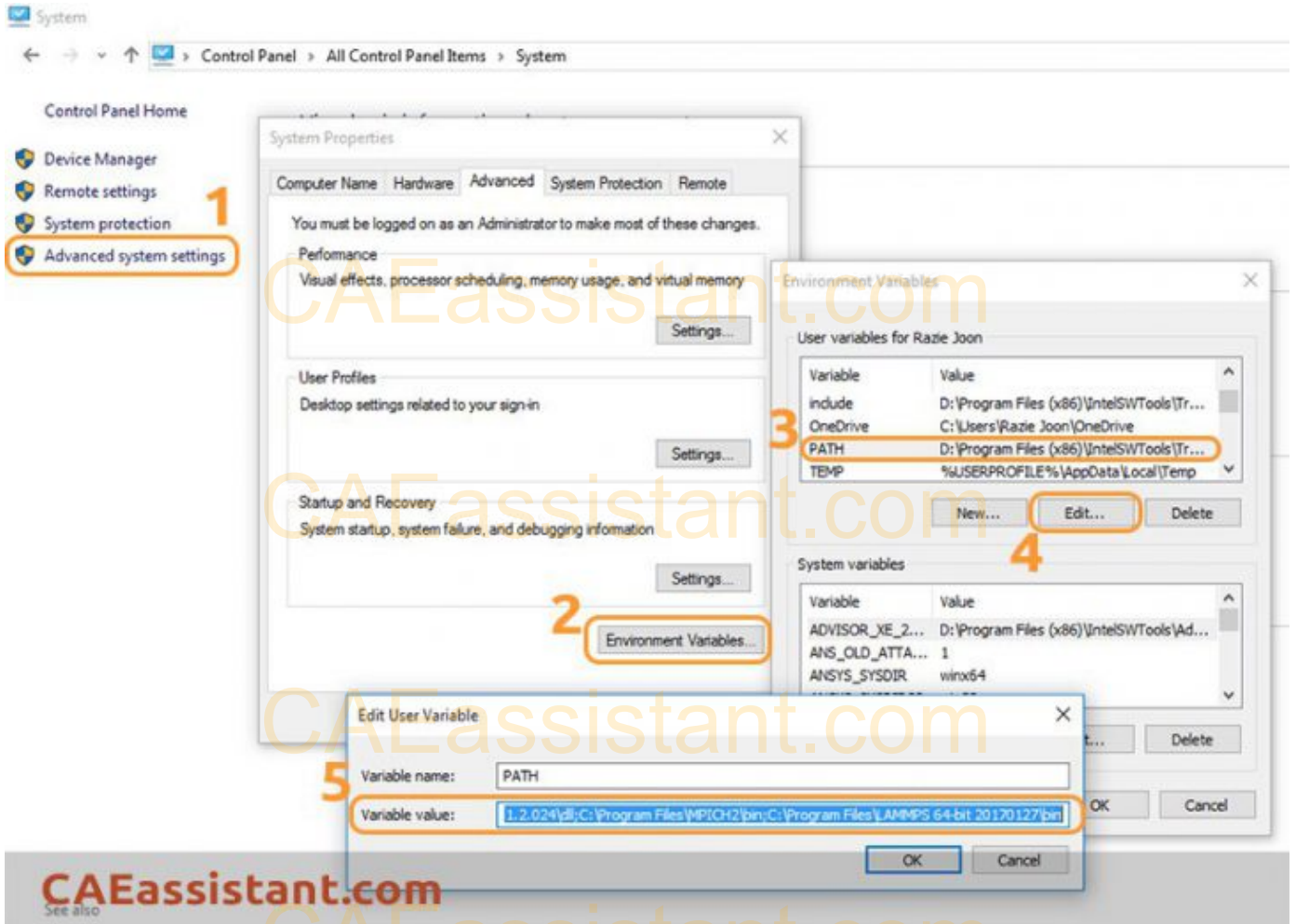
Step 3: Adding some Paths to System Variables of Windows

In the Control Panel of your Windows, find the “System” item:





Then follow the instructions below to find the “path”. Select “Edit”.

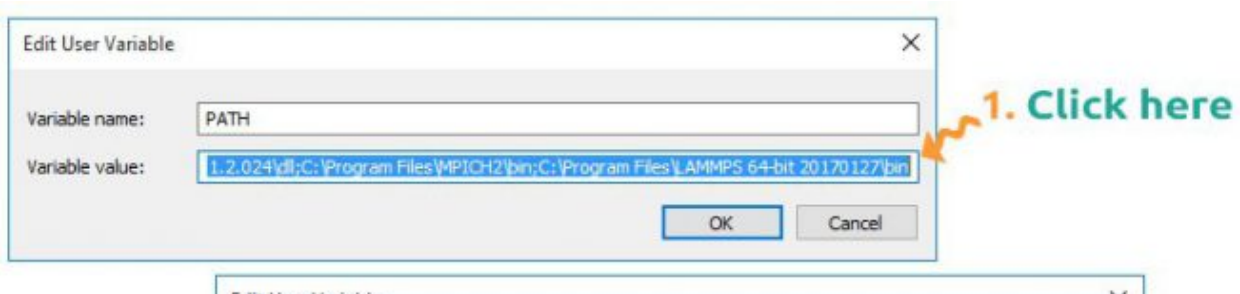


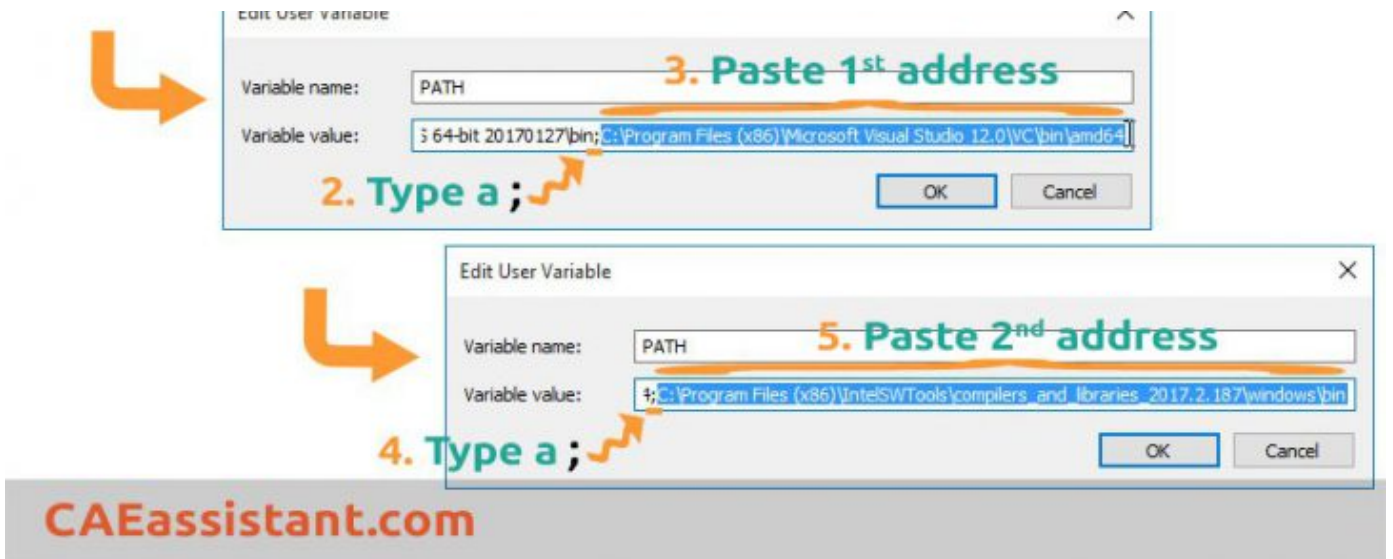
You should add these two addresses to the existing Variable Value:

C:\Program Files (x86)\Microsoft Visual Studio 12.0\VC\bin\amd64

C:\Program Files (x86)\IntelSWTools\compilers_and_libraries_2017.2.187\windows\bin

Just click at the end of the existing Value, put a semicolon (;), type (or paste) the first address, put a semicolon again, and type the second address:

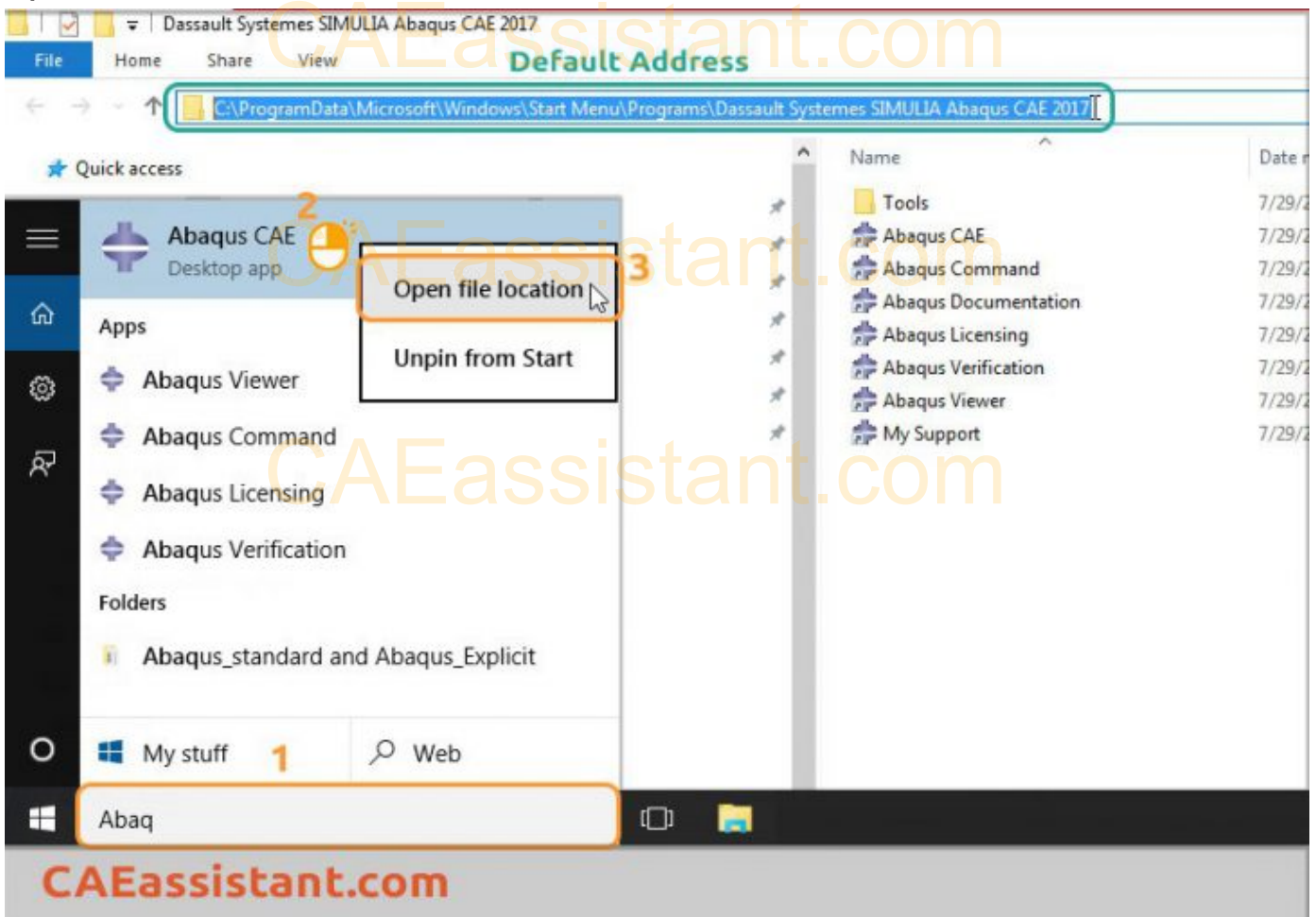




If you have changed the default installation drive (C:) you should use that drive letter instead of C: in the above-mentioned addresses.

Step 4: Setting Abaqus to call Visual Studio and Intel Fortran

Find the default directory of Abaqus shortcuts. Just type "Abaqus CAE" in the Search box of Windows 10 (lower left corner near Start). Then right-click on the program name. Select **Open file location**.

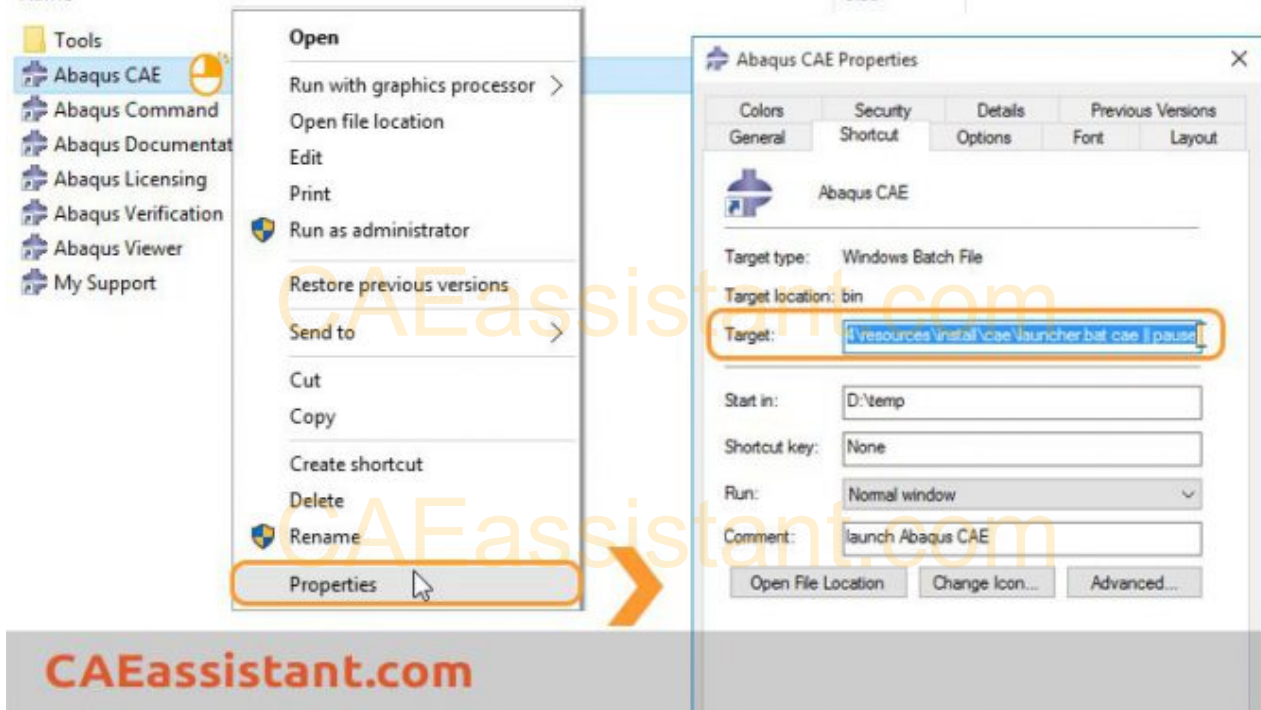


In addition, you can follow this address on your PC as the default folder for Abaqus 2017 shortcuts:

C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Dassault Systemes\SIMULIA\Abaqus CAE 2017

Also, You can Copy & Paste this into your Address bar.

Now, right-click on “Abaqus CAE” and select Properties:

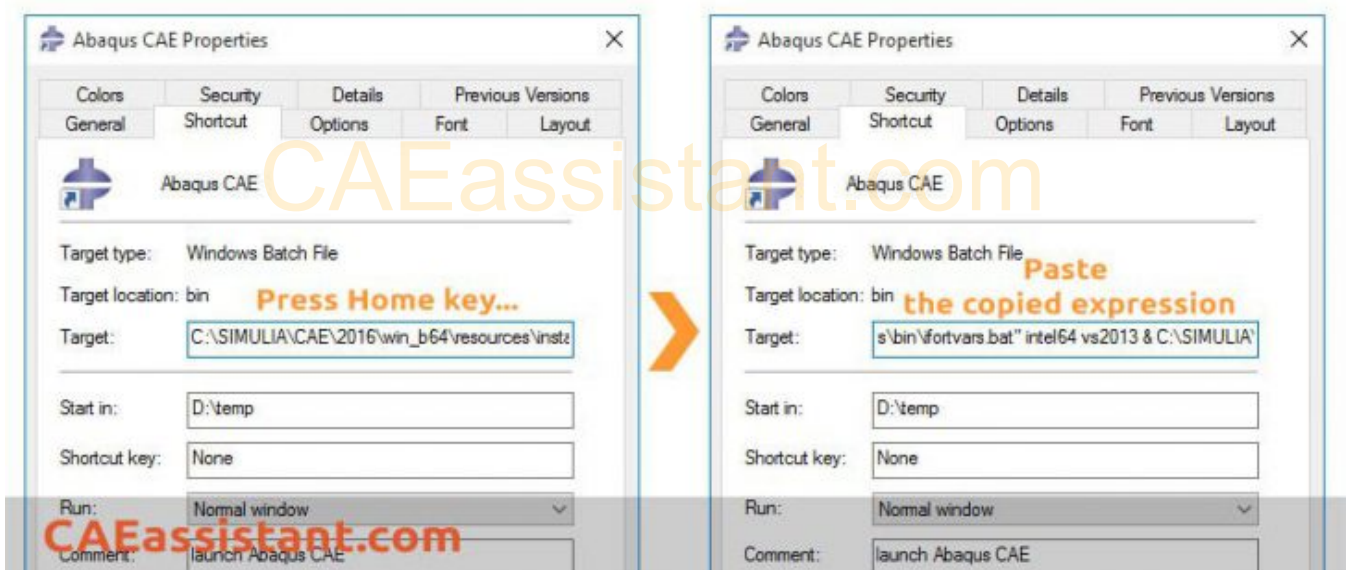


Then, in Target, come to the beginning of the present expression (press the Home key on your keyboard) and add this expression:

“C:\Program

Files(x86)\IntelSWTools\compilers_and_libraries_2017.2.187\windows\bin\ifortvars.bat” intel64 vs2013 &

(Just Copy and Paste. Do not forget the final Space after &)



If you have installed Intel Fortran on another drive, replace C: in the above expression with

the appropriate drive letter.

Do exactly what you have done for Abaqus/CAE with **Abaqus Command** and **Abaqus Verification** in the **Abaqus shortcuts** folder.



Step 5: Check Your Subroutine Interface

Run **Abaqus CAE** (the shortcut in Desktop or from the Start menu). If you see this window, you can get happy 😊. Abaqus Fortran Linking seems successful.

A screenshot of a Windows command prompt window titled "Intel Compiler 16.0 Update 3 Intel(R) 64 Visual Studio 2013". The text inside the window is as follows:

```
Intel(R) MPI Library 5.1 Update 3 for Windows* Target Build Environment for Intel(R) 64 applications
Copyright (C) 2007-2015 Intel Corporation. All rights reserved.
Copyright (C) 1985-2016 Intel Corporation. All rights reserved.
Intel(R) Compiler 16.0 Update 3 (package 207)

Abaqus License Manager checked out the following license:
"cae" release 6.16 from Flexnet server localhost
<1023 out of 1024 licenses remain available>.
```

A yellow rectangular box highlights the three copyright lines. The text "CAEAssistant.com" is watermarked across the image in a large, semi-transparent font. At the bottom of the screenshot, the text "CAEAssistant.com" is written in a smaller, red font.

• ABAQUS

• Abaqus 2017

• Compatible

• Fortran

• Subroutine

• UMAT

• Visual Studio

• VUMAT



◀ NEWER



OLDER ▶

ONE THOUGHT ON "LINKING ABAQUS 2017 AND FORTRAN"



Michael Vigliotti says:

December 24, 2020 at 3:22 am

This is one awesome blog post. Really thank you! Keep writing.

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