

Java Development Environment Installation Guide (V1.9)

Excelsecu Data Technology Co., Ltd.

CONFIDENTIAL information of Excelsecu Data Technology Co., Ltd.

NO WARRANTIES OF ANY NATURE ARE EXTENDED BY THIS DOCUMENT. Any product and related material disclosed herein are only furnished pursuant and subject to the terms and conditions of a duly executed Program Product Licence or Agreement to purchase or lease equipment. The only warranties made by Excelsecu Technology, if any, with respect to the products described in this document are set forth in such Licence or Agreement. Excelsecu Technology cannot accept any financial or other responsibility that may be the result of your use of the information or software material, including direct, indirect, special or consequential damages.

You should be careful to ensure that the use of this information and/or software material complies with the laws, rules, and regulations of the jurisdictions with respect to which it is used. All rights reserved.

Copyright © 2019 Excelsecu Data Technology Co., Ltd.

Table of Contents

1. Overview	4
2. Development Environment Installation	4
2.1. Install JDK 8	4
2.1.1. Description	4
2.1.2. Download and Install JDK 8	4
2.1.3. Set Environment Variables	6
2.2. Install NetBeans 8.2.....	7
2.2.1. Download NetBeans 8.2.....	7
2.2.2. Download and install Java Card Development Kit (JCDK).....	8
2.2.3. Set Environment Variables	9
2.2.4. Notes	10
3. Build Test Demo	11
3.1. Build Test Demo	11
3.2. Install Test Demo	18

1. Overview

This document provides the guidelines in Java Card development environment Installation and how to compile applets using our Java development platform products.

2. Development Environment Installation

2.1. Install JDK 8

2.1.1. Description

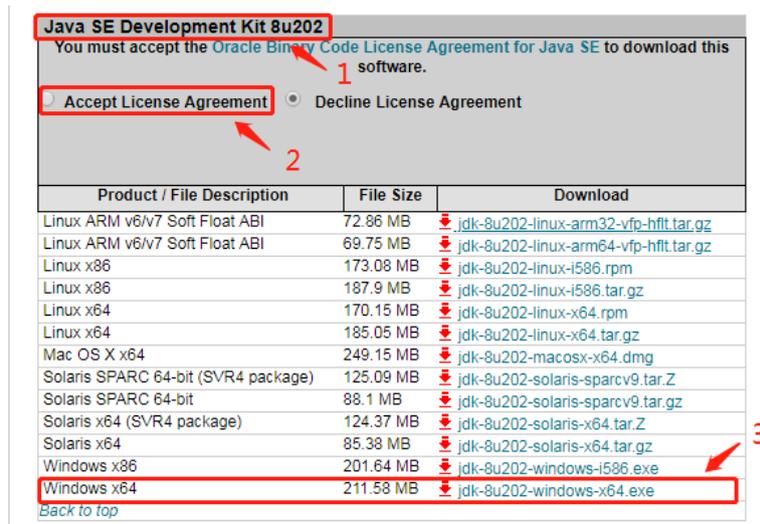
Oracle provides the Java Development Kit (JDK) for Linux, Mac OS X, Solaris, and Windows. What we need to download the Java SE Development Kit 8 (also named JDK 1.8), which can be used with NetBeans. The download link is:

<https://www.oracle.com/technetwork/java/javase/downloads/java-archive-javase8-2177648.html>

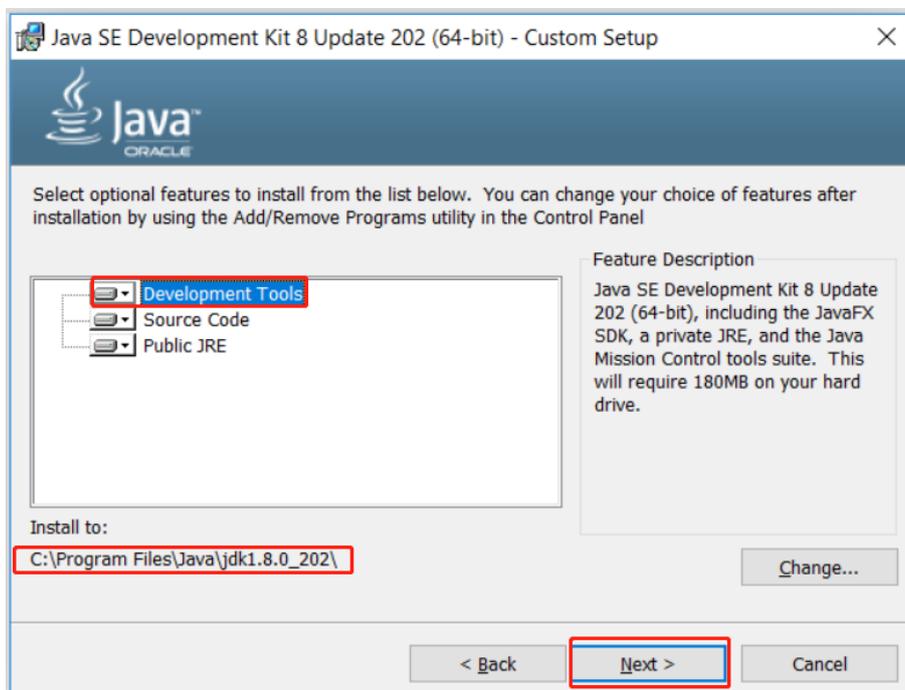
2.1.2. Download and Install JDK 8

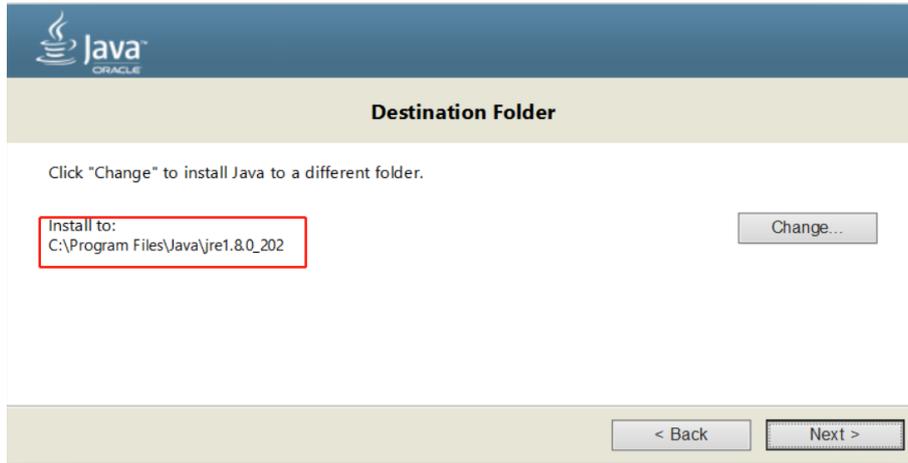
Click the link to download JDK 8 installation package (Java SE Development Kit 8u202 is recommended to download):

1. Firstly, make sure that what you are going to download is Java SE Development Kit 8u202, rather than Java SE Runtime Environment 8u202 (JRE is Java Running Environment. If you just want to run the Java program or Java Applet, download the JRE. If you need to develop the Java software by yourself, download the JDK. The JDK contains the JRE).



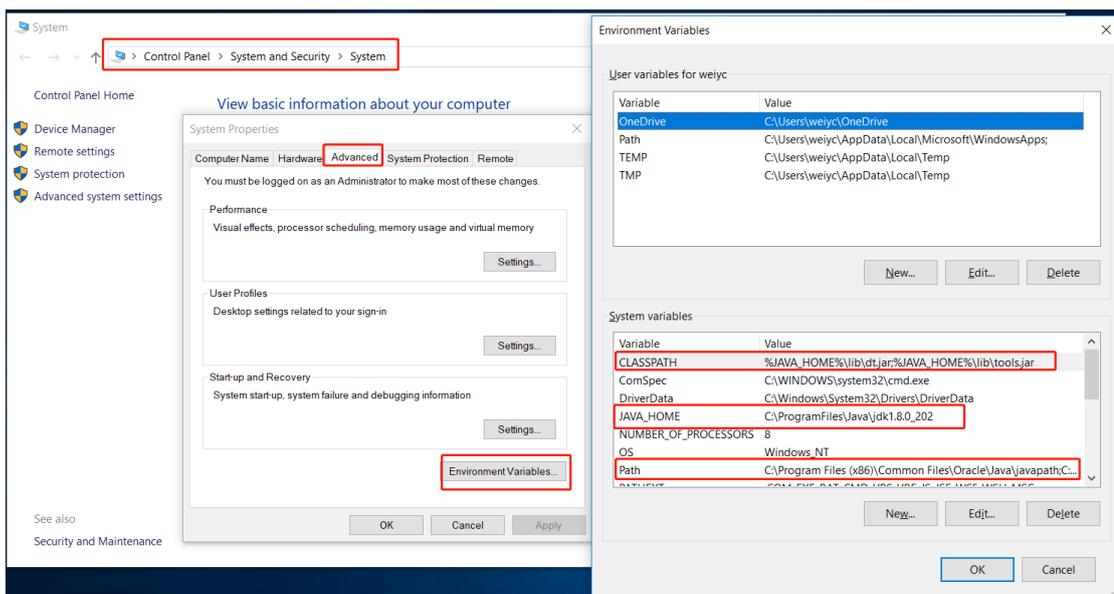
2. Select the "Accepting License Agreement", and then download the suitable version for your system. Here takes the Windows x64 as an example.
3. After downloading, click `jdk-8u202-windows-x64.exe` to install.
4. Install the JDK according to the prompt, and record your installation path of JDK and JRE. The installation path will be needed when setting the environment variables.



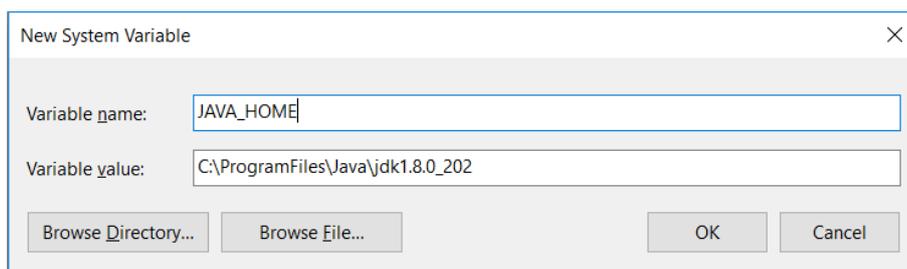


2.1.3. Set Environment Variables

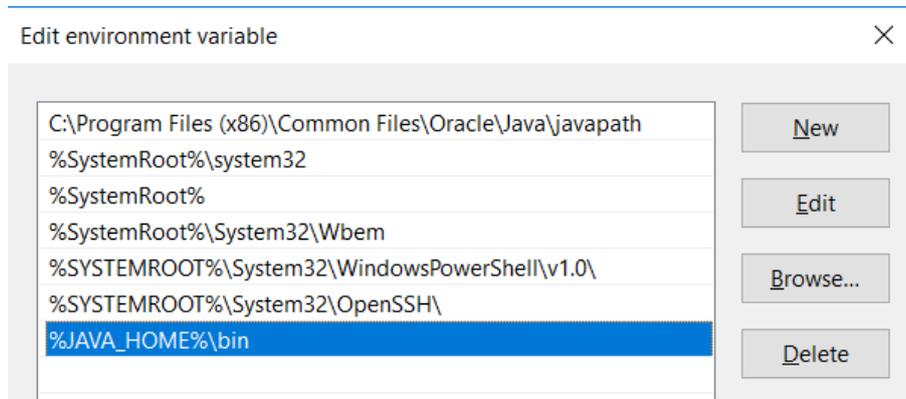
After the installation is completed, the setting of environment variables is required.



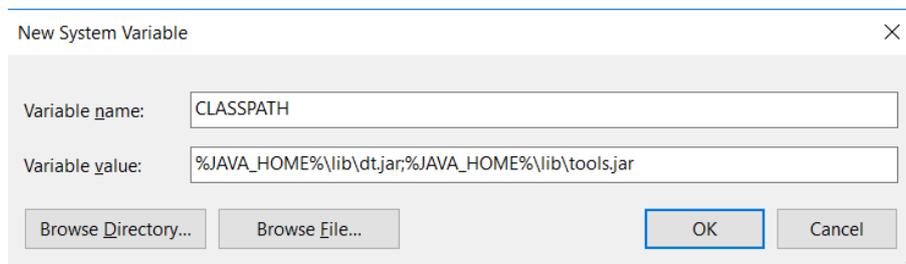
1. New a JAVA_HOME variable and set JAVA_HOME = C:\ProgramFiles\Java\jdk1.8.0_202 according to the installation path.



2. Edit Path variable and add %JAVA_HOME%\bin to the Path variable.



3. New a CLASSPATH variable and add %JAVA_HOME%\lib\dt.jar and %JAVA_HOME%\lib\tools.jar to it.



2.2. Install NetBeans 8.2

2.2.1. Download NetBeans 8.2

Download address: <https://netbeans.org/downloads/8.2/>.

See as the following picture, download the corresponding installation package according to the development language and requirements.

After downloading, install it according to the prompt.

Note:

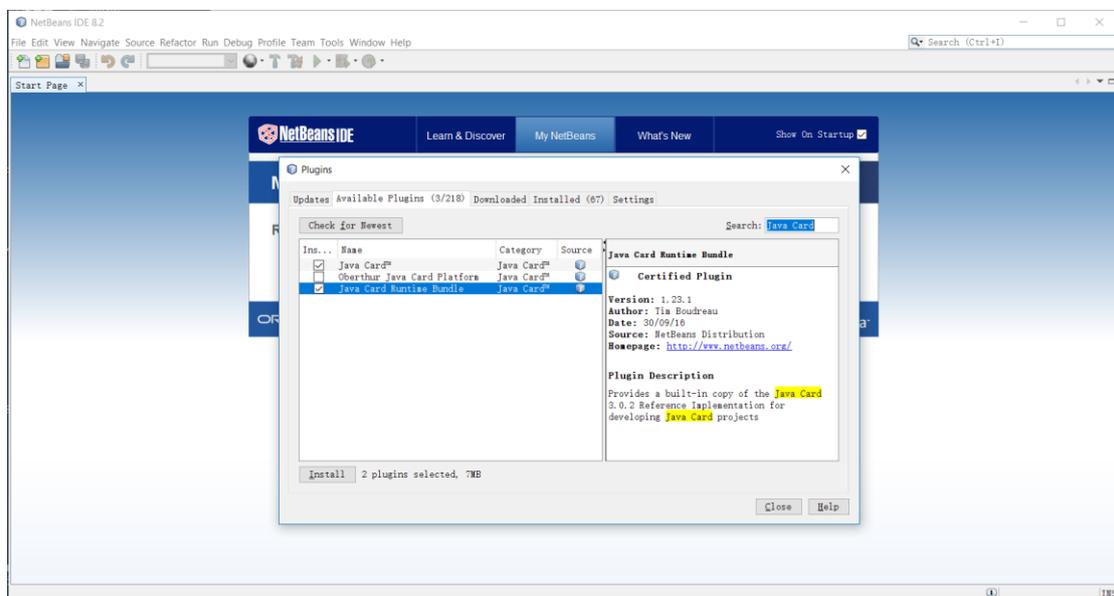
It is recommended to download the corresponding installation package in the "All" column on the rightmost, then you do not need to download and install the JCDK (Java Card Development Kit) plugin. If you download installation package in other column, you will also need to download and install JCDK plugin.

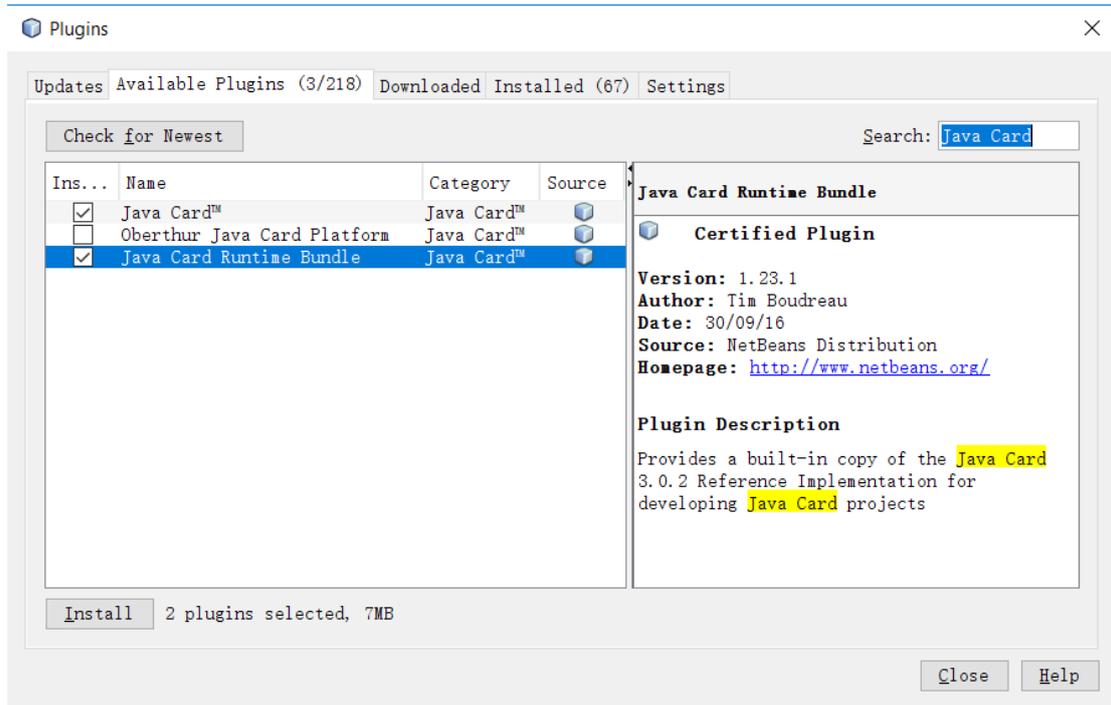
After the installation is completed, the setting of environment variables is required.



2.2.2. Download and install Java Card Development Kit (JCDK)

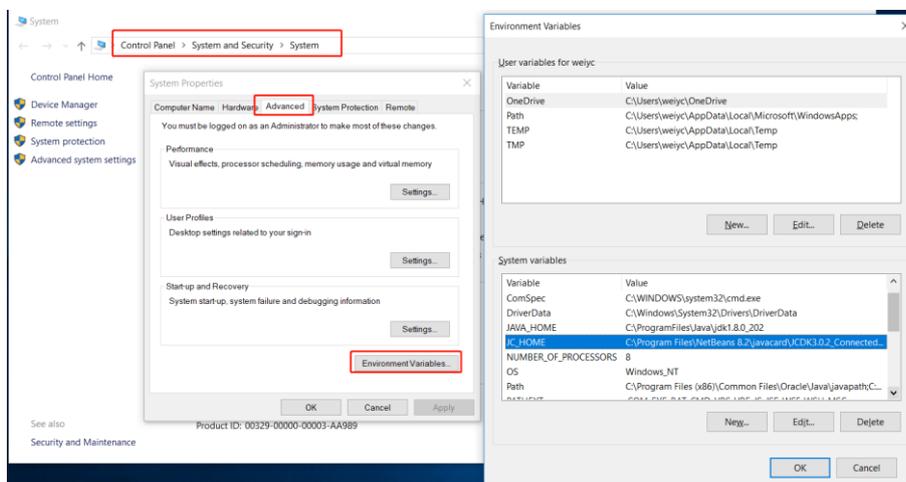
Open the NetBeans, click “Tools -> Plugins -> Available Plugins”, search “Java Card” in the “Available Plugins” page, then select “Java Card™” and “Java Card Runtime Bundle” to install.



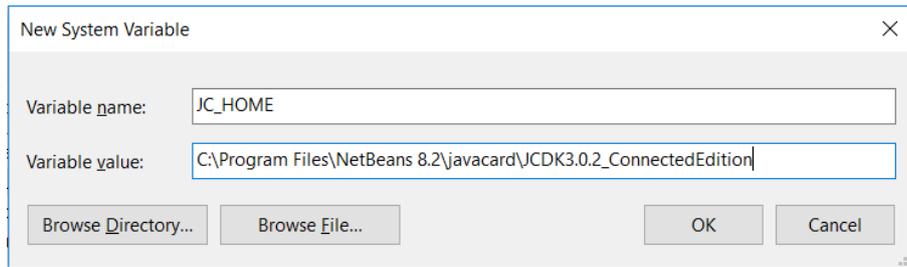


2.2.3. Set Environment Variables

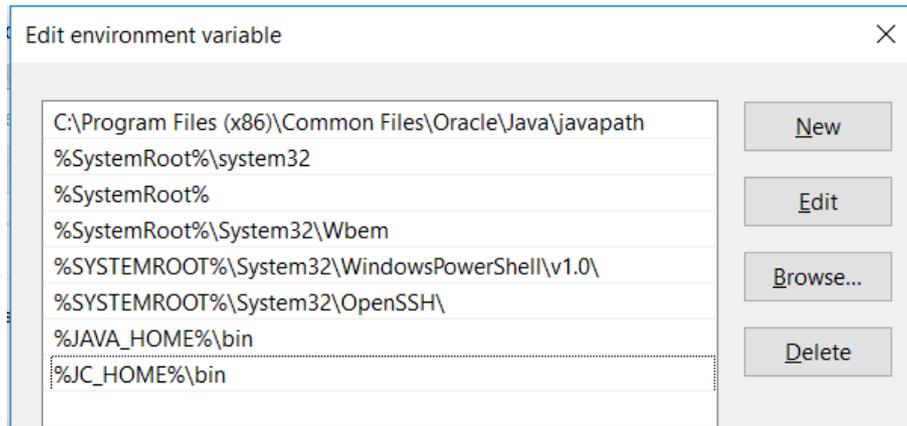
After the installation is completed, the setting of environment variables is required.



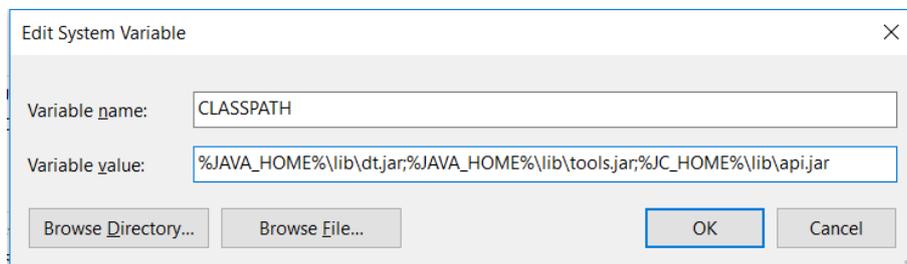
1. New a JC_HOME variable and set JC_HOME to the JCDK3.0.2_ConnectedEdition folder directory in the NetBeans installation directory. Example: C:\Program Files\NetBeans 8.2\javacard\JCDK3.0.2_ConnectedEdition



2. Edit Path variable and add %JC_HOME%\bin to the Path variable.



3. Edit CLASSPATH variable and add %JC_HOME%\lib\api.jar to it.



2.2.4. Notes

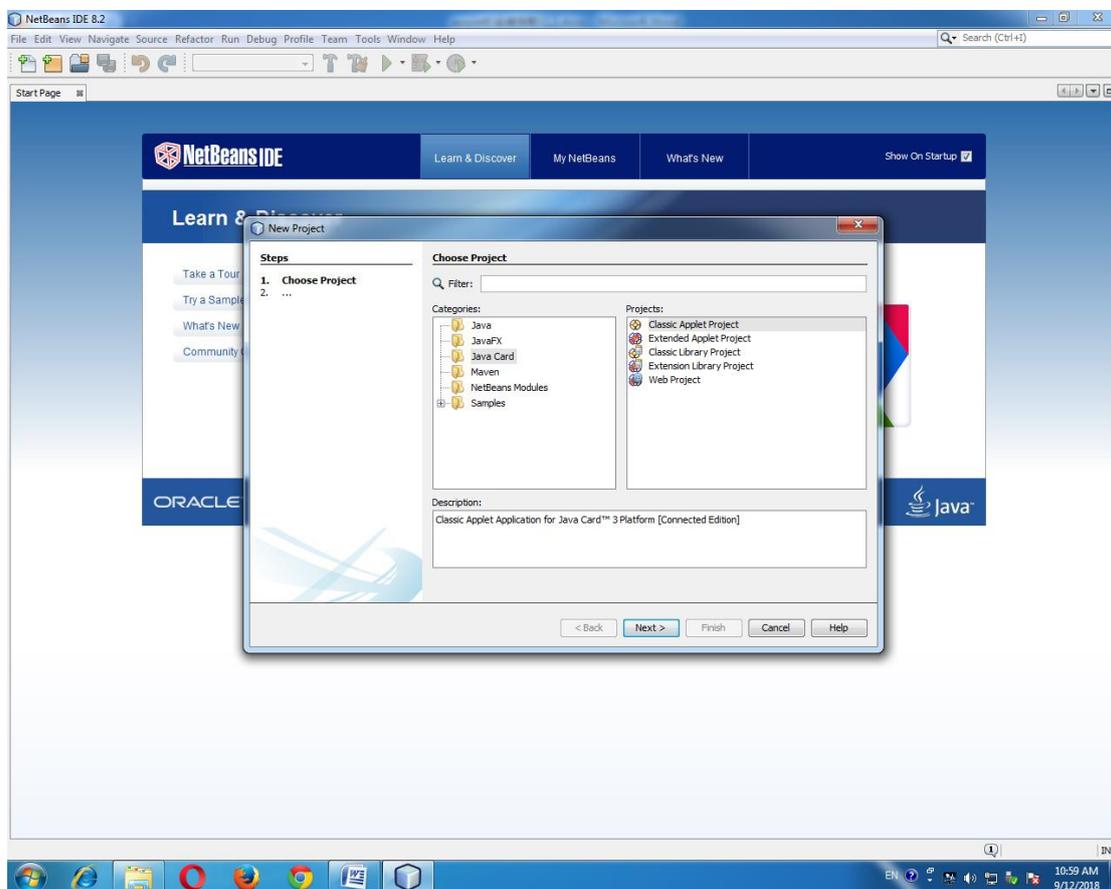
1. Before the installation of Netbeans, JDK version 1.8 is needed. Installation method see in 2.1 2.1 Install JDK 8.
2. NetBeans internally integrated JCDK version 3.0.2. After the installation is finished, you can begin to develop your own Java Card Applet.

3. Build Test Demo

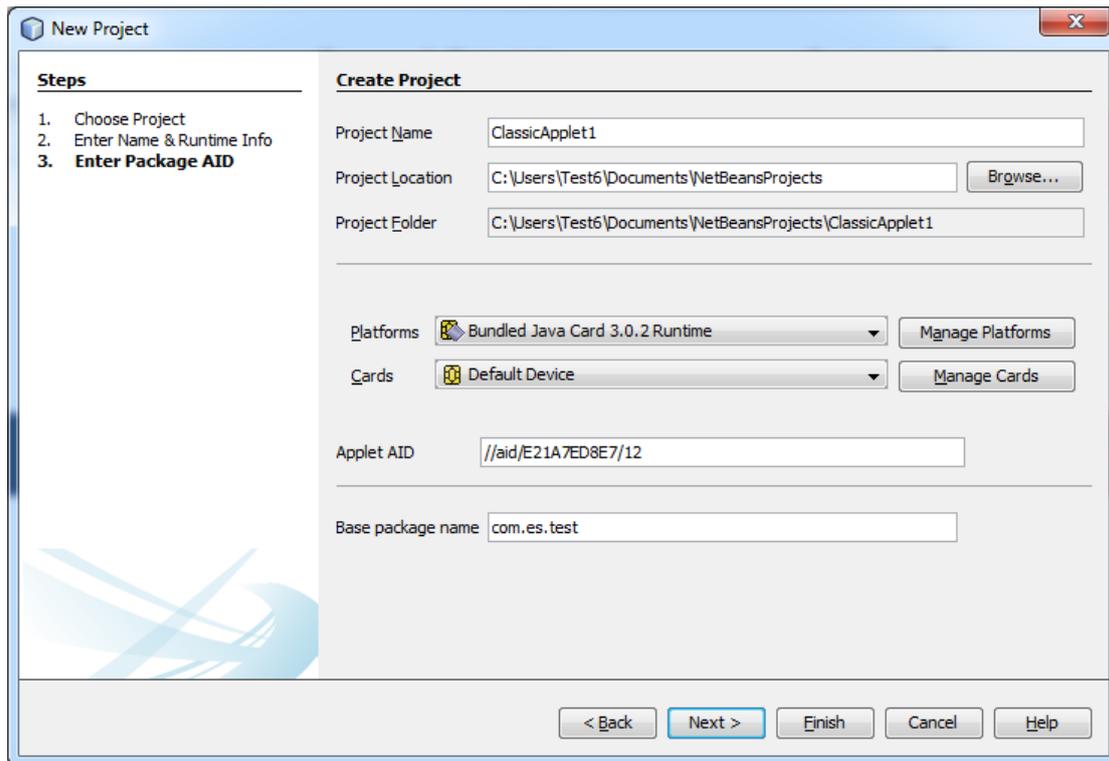
Extended packages, which are not included in standard JCAPI, refer to packages that are extended by vendors or third parties. The extended API interfaces such as display, keypad controlling, and Bluetooth communication are defined by Excelsecu Company.

3.1. Build Test Demo

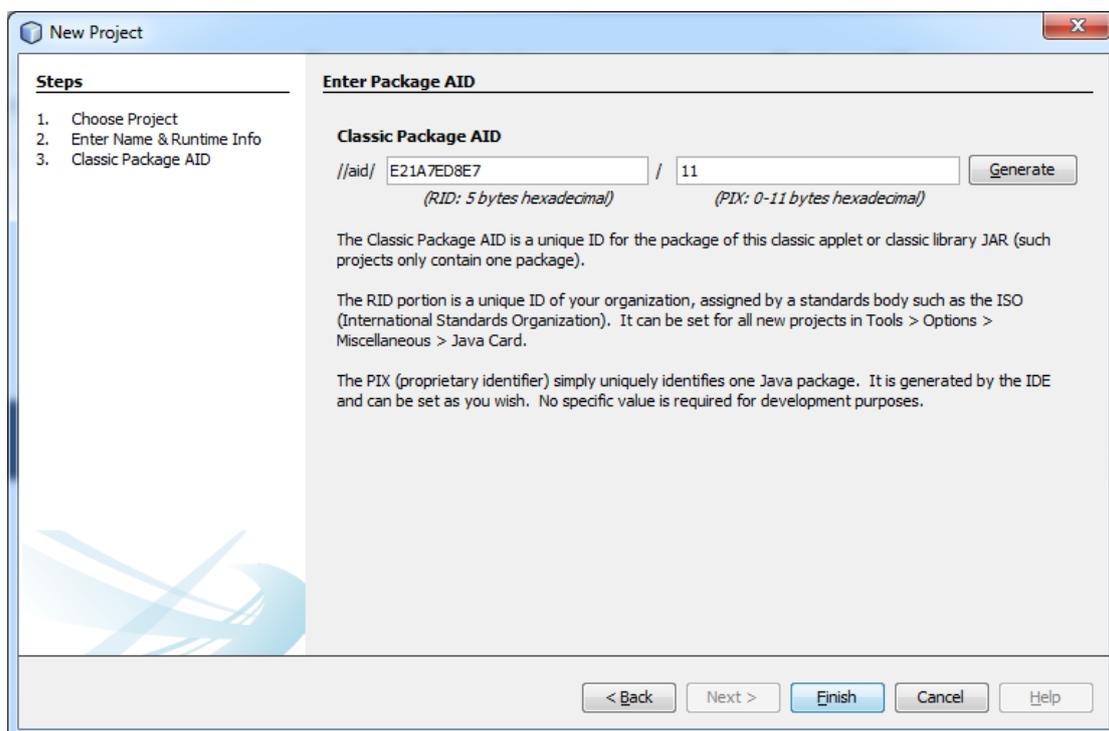
1. Open NetBeans, new a project and select Classic Applet Project.



2. Project name and package name: No requirement. Applet AID: 0xE21A7ED8E712.



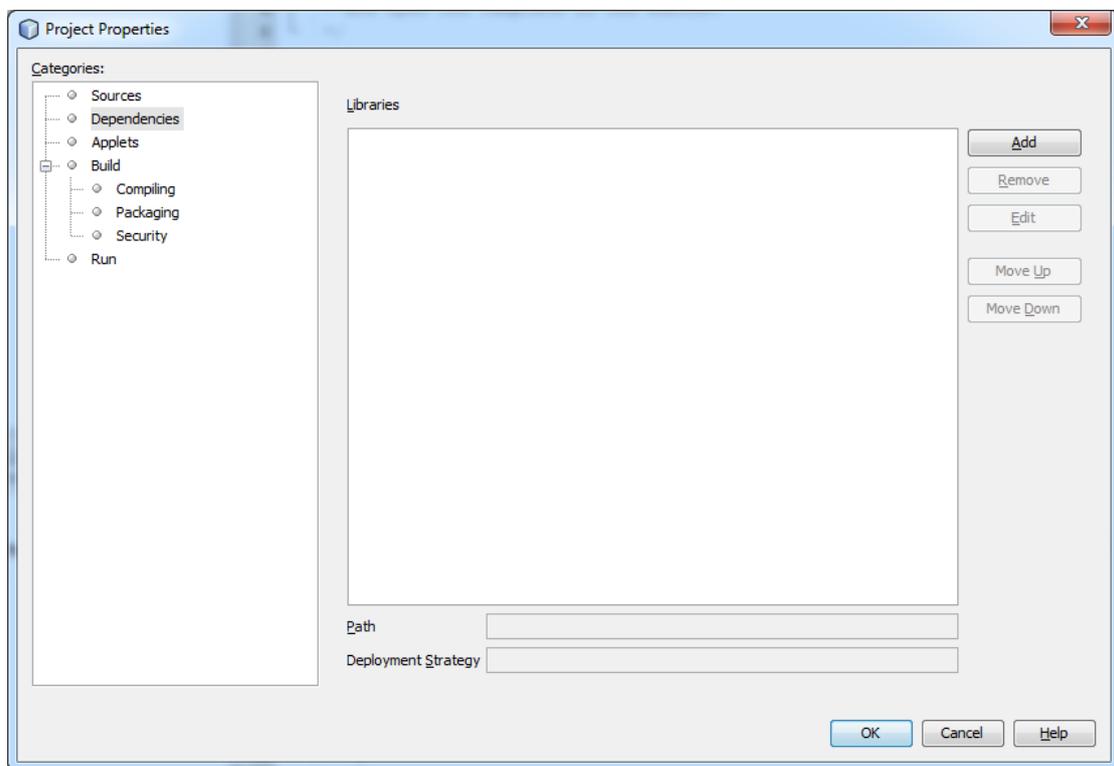
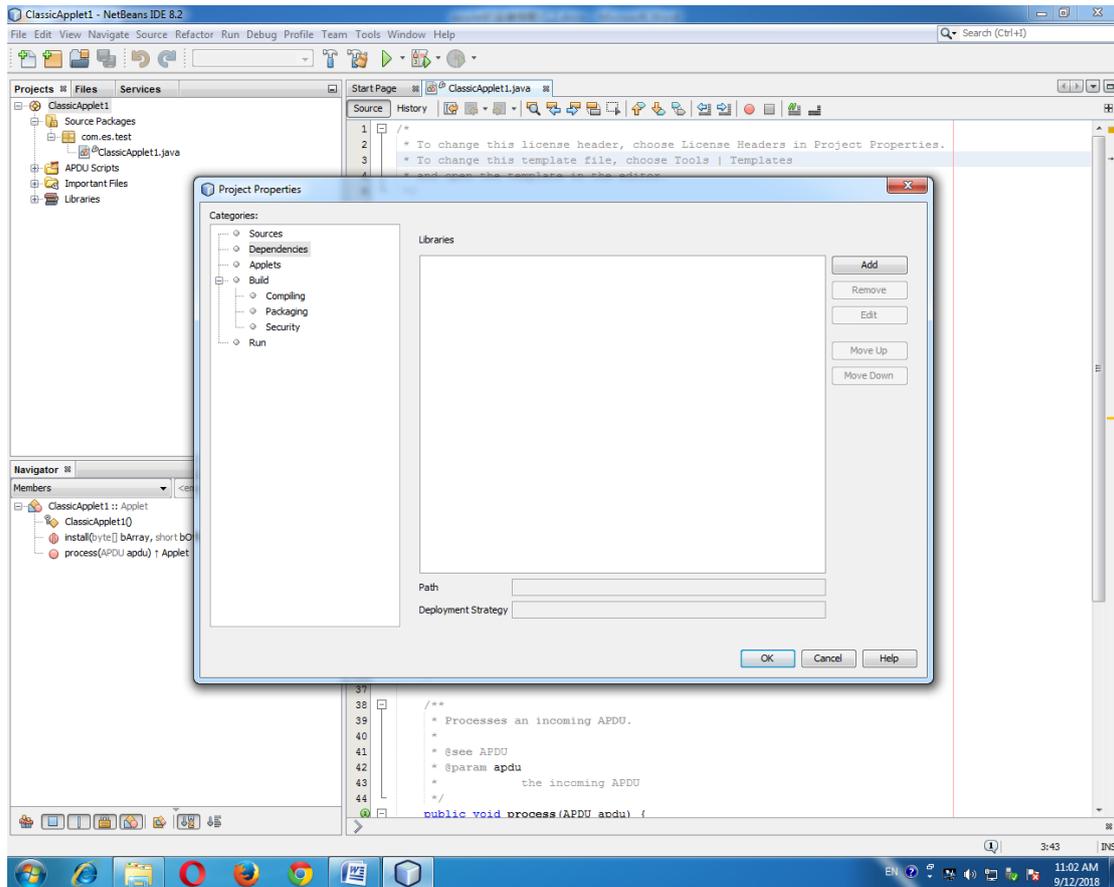
3. Package AID: 0xE21A7ED8E711.



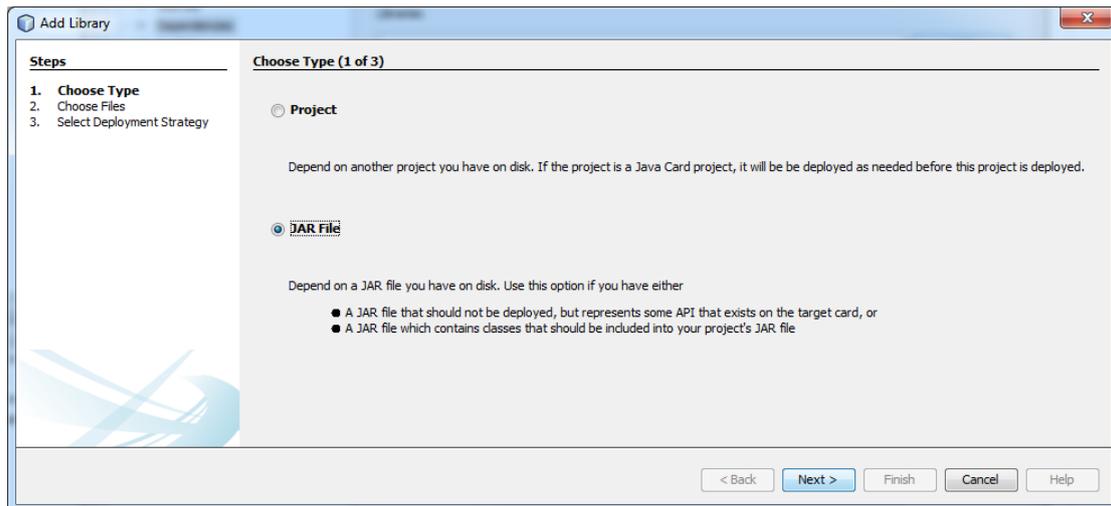
4. Import the agent Package. (Skip this step if the product you are using does not contain an extension API)

1) Right click the project name, choose Properties -> Project Properties ->

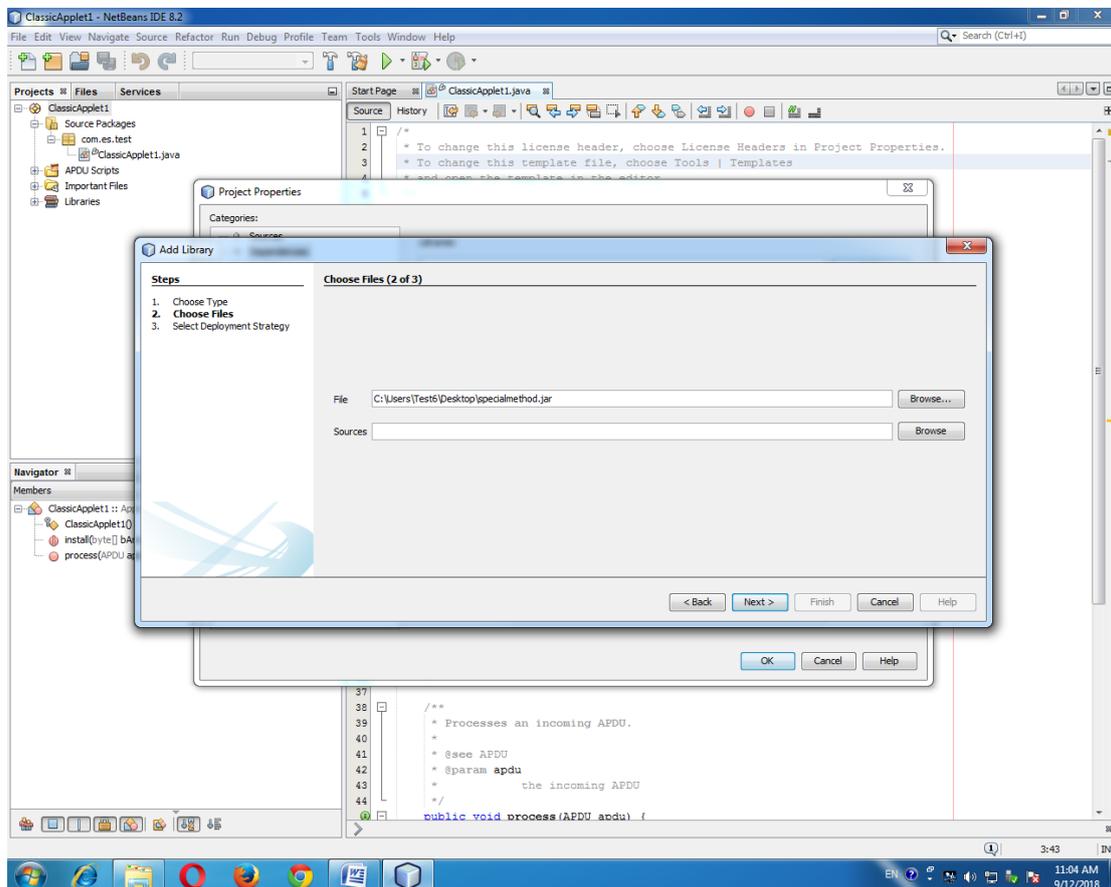
Dependencies -> Add.

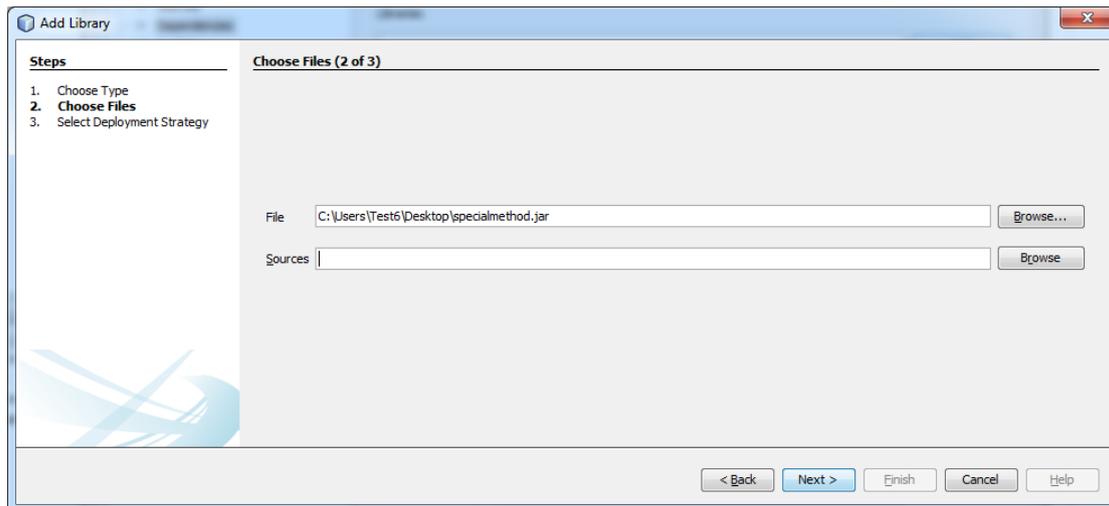


2) Add Library -> JAR File

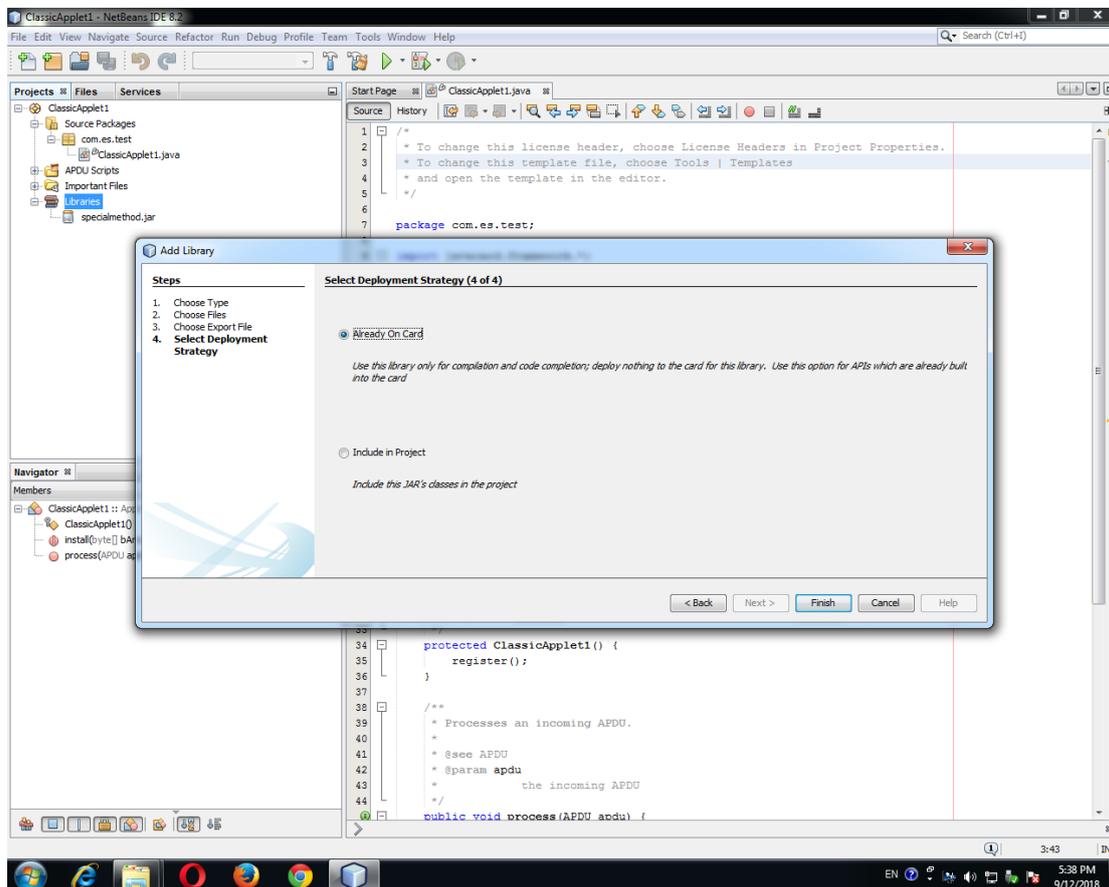


3) Choose the specialmethod.jar which is provided by Excelsecu Company

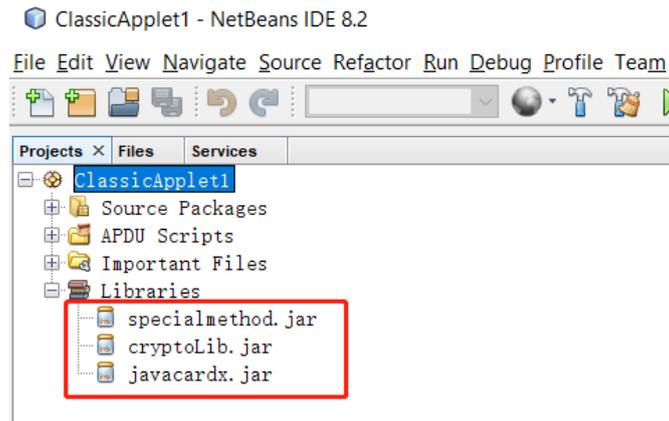




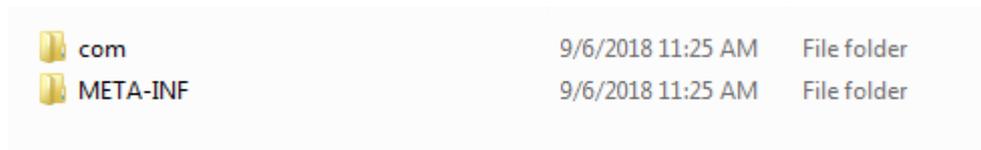
4) Choose “Already on Card”.



5) Add cryptoLib.jar, javacardx.jar provided by our company in the same way shown above. After all the .jar files are added, you can view them in the project's library directory, as shown below.



- Unzip the specialmethod.jar file provided by Excelsecu Company to obtain the following files.



> specialmethod > com > es > specialmethod >

Name	Date modified	Type	Size
javacard	14/02/2019 17:48	File folder	
constant.class	14/02/2019 17:48	CLASS File	3 KB
ESComm.class	14/02/2019 17:48	CLASS File	2 KB
ESUtil.class	14/02/2019 17:48	CLASS File	3 KB
ESWallet.class	14/02/2019 17:48	CLASS File	3 KB
method.class	14/02/2019 17:48	CLASS File	2 KB

Note:

Pay attention to the COM folder architecture.

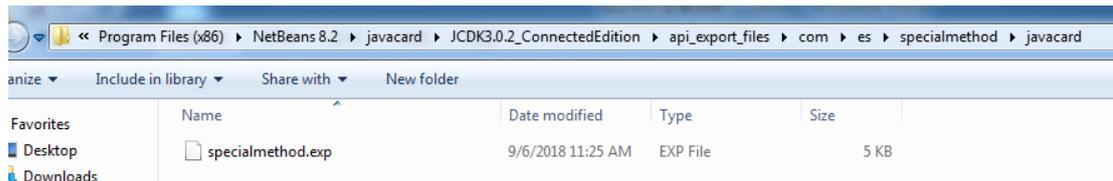
Copy the whole folder `com/es/specialmethod/javacard/specialmethod.exp` to `\javacard\JCDK3.0.2_ConnectedEdition\api_export_files` under the Netbeans installation path. Must be copied along with the `com/es/specialmethod/javacard` folder (In the specialmethod directory, only the javacard folder is reserved, and do not copy the .class files.)

If Netbeans is installed in the default path, you need to copy the whole folder `com/es/specialmethod/javacard/specialmethod.exp` to `C:\Program Files\NetBeans 8.2\javacard\JCDK3.0.2_ConnectedEdition\api_export_files`. The final path is `C:\Program`

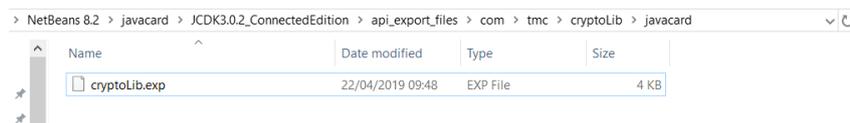
Files\NetBeans

8.2\javacard\JCDK3.0.2_ConnectedEdition\api_export_files\com\es\specialmethod\javacard\specialmethod.exp

Only the path is compliant to \com\es\specialmethod\javacard\specialmethod.exp as described above can the EXP file be found and compiled successfully in Netbeans.



6. Add the cryptoLib extension package in the same way as adding the specialmethod extension package. Unzip the cryptoLib.jar package and copy com/tmc/cryptoLib/javacard/cryptoLib.exp to the \javacard\JCDK3.0.2_ConnectedEdition\api_export_files folder in the Netbeans installation path. The resulting path is \javacard\JCDK3.0.2_ConnectedEdition\api_export_files\com\tmc\cryptoLib\javacard\cryptoLib.exp



Note: Only the path is compliant to com\tmc\cryptoLib\javacard\cryptoLib.exp as described above can the EXP file be found and compiled successfully in Netbeans.

7. Build applet and compile it to cap file.

```
switch (buf[ISO7816.OFFSET_INS]) {
    case (byte) 0x00:
        len = state.GetDeviceCapacity(buf, ISO7816.OFFSET_CDATA);
        apdu.setOutgoingAndSend(ISO7816.OFFSET_CDATA, len);
        break;
```

3.2. Install Test Demo

Refer to the *Java Applet Installation Guide* to install the cap file into the JavaCard product.