

# COM528 (504)

## Object Oriented Design and Development

### Week 1 Installing Software

*Dr Craig Gallen Eng.D MIEE, C.Eng*

Craig Gallen

Email : [craig.gallen@solent.ac.uk](mailto:craig.gallen@solent.ac.uk)

Desk : JM506 ( Mondays / Tuesdays)

Mobile: +44 (0) 7789 938012



# Contents

Installing on windows

**Installing Java Development Kit (SE) JDK 11**

Installing Apache Maven

Installing Netbeans 12

Installing Netbeans easyUML plugin

Installing Apache Tomcat Web Server

Installing git for Windows

Installing draw.io / diagrams.net

# Installing Java 11 on Windows 10

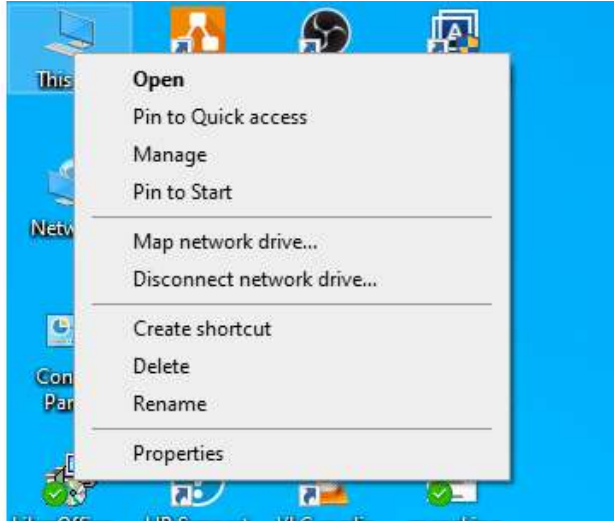
- **We will be using the Java 11 JDK**
  - Java SE Development Kit (JDK) not just the Java Runtime Environment (JRE)
  - Any Java 11 JDK will do but make sure you are using the SDK and not the JRE
  - you could use the Oracle JDK 11 but this has a fee for commercial use since April 16, 2019 (it is free for non commercial use)
    - <https://www.oracle.com/java/technologies/javase-jdk11-downloads.html>
  - There are other options
    - OpenJDK 11 from adoptOpenjdk (Eclipse Foundation)
      - <https://adoptopenjdk.net/releases.html>
    - OpenJDK 11 from RedHat
      - <https://developers.redhat.com/products/openjdk/download>
- **Using OpenJDK from RedHAT**
  - create a RedHat account and login
    - <https://developers.redhat.com/products/openjdk/download>
  - download JDK 11 windows installer
    - jdk-11.0.8-x64 MSI OpenJDK 11 Windows 64-bit
      - (a later point release of jdk-11 is also fine)
  - Double click on the installer, select the defaults and proceed with the install (you will need to have administrator privileges on your computer)

# Setting PC environment variables



- Right click on This PC on the desktop

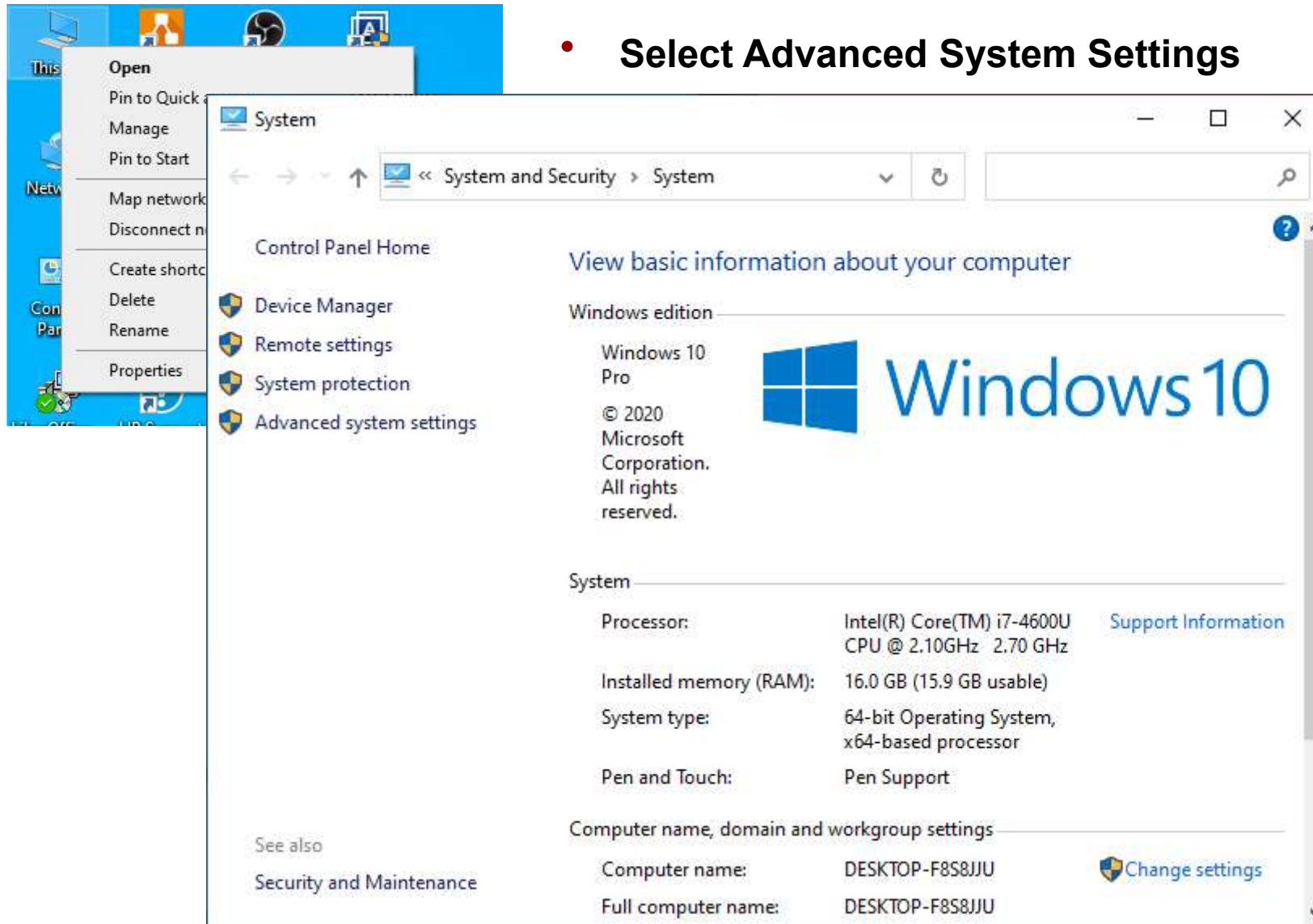
# Setting PC Environment Variables



- **Select Properties**

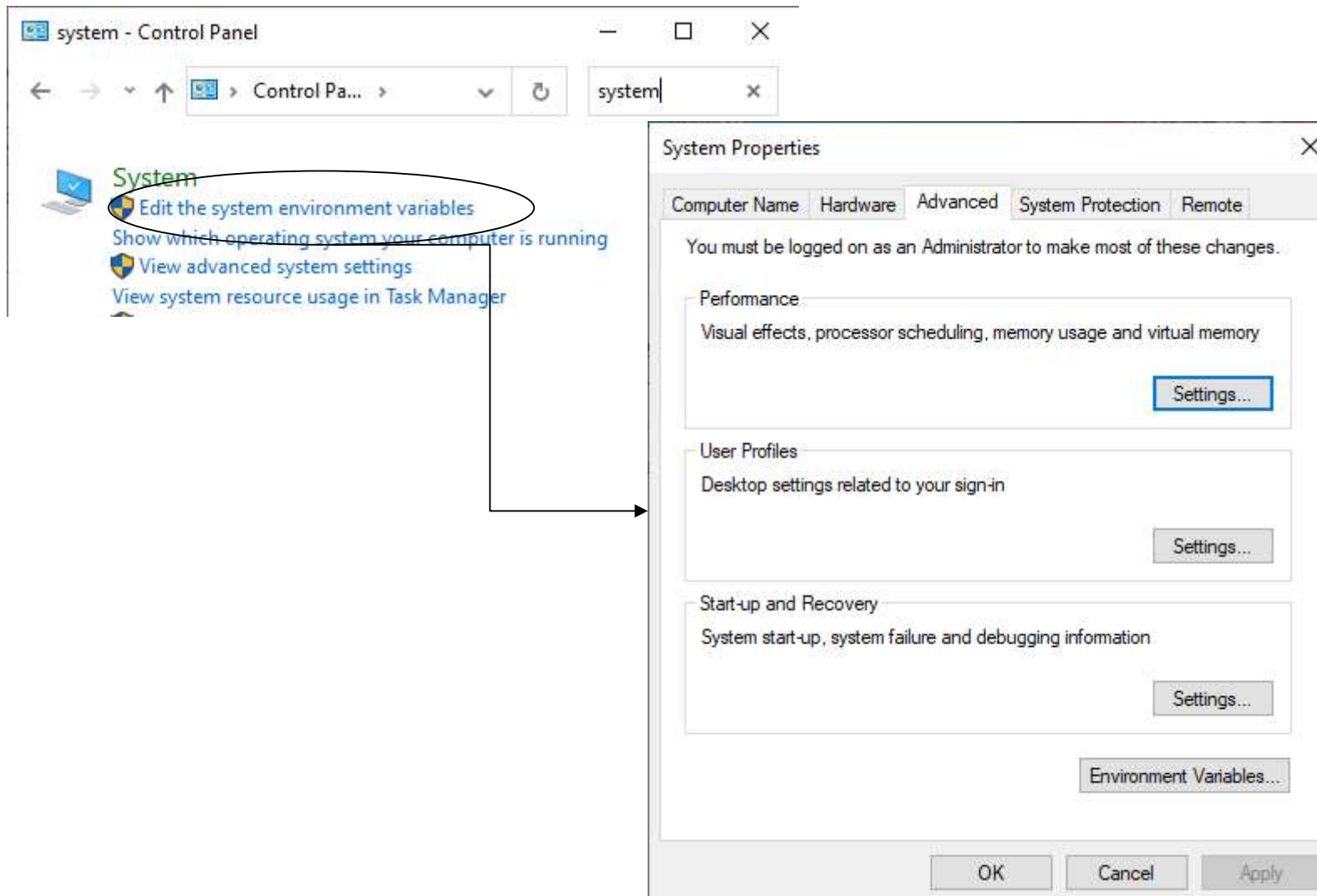
# Setting PC Environment Variables

- **Select Advanced System Settings**

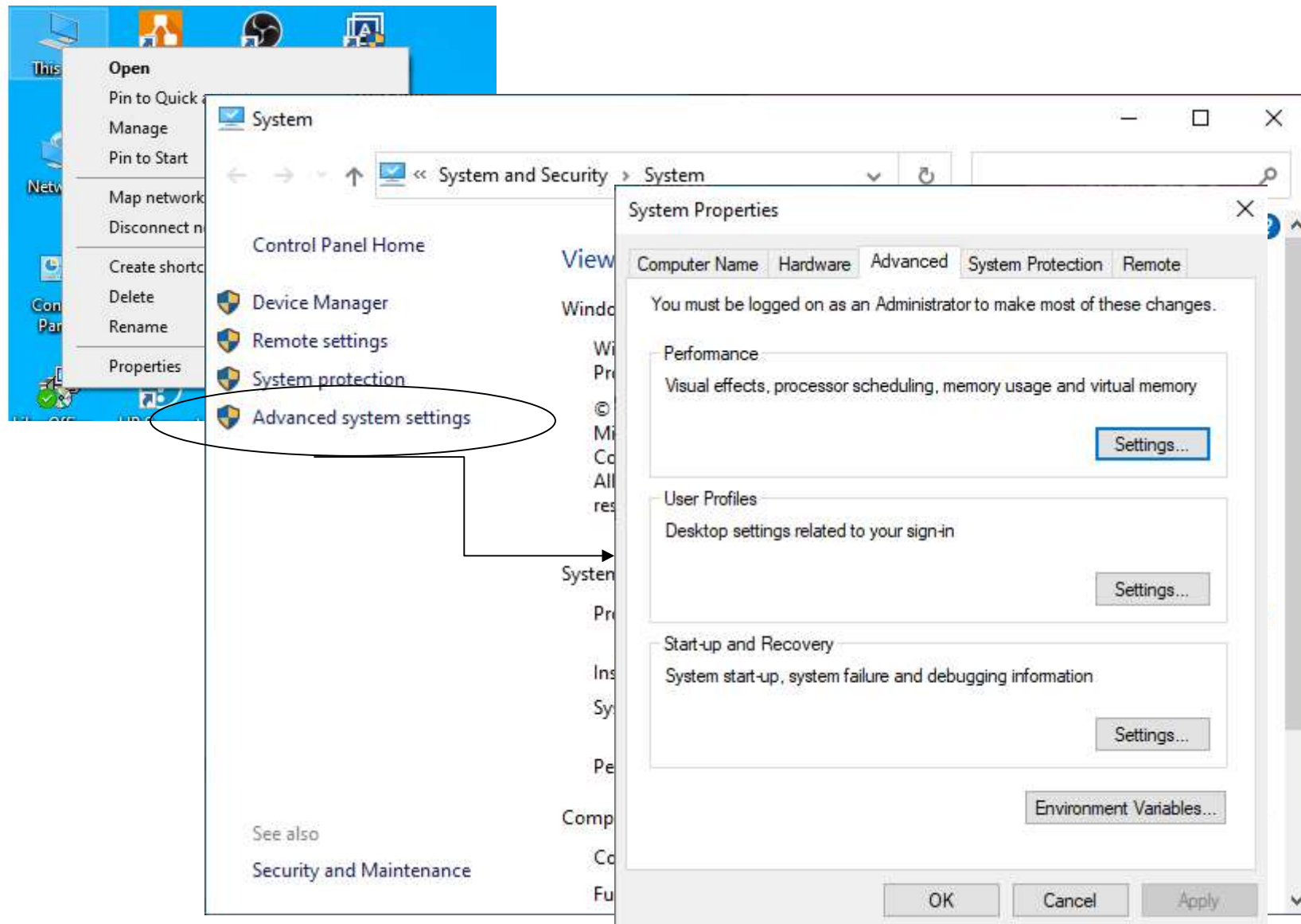


# Setting PC Environment Variables

- Alternatively - open control panel and search for 'system environment'

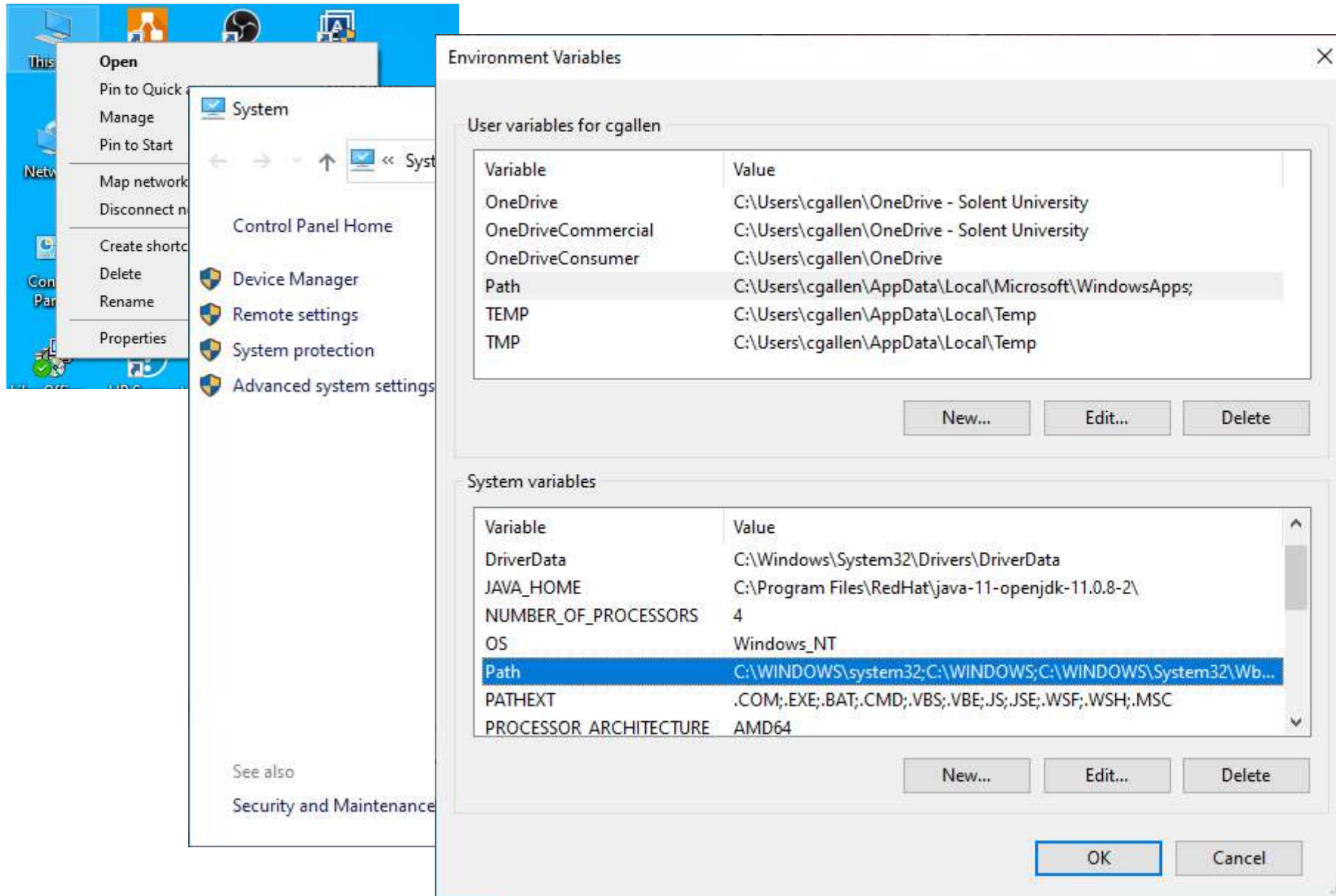


# Setting PC Environment Variables





# Java 11 setting the class path



The screenshot shows the Windows 'Environment Variables' dialog box. On the left, a context menu is open over the 'System' icon in the taskbar, with 'Advanced system settings' selected. The dialog box is divided into two sections: 'User variables for cgallen' and 'System variables'.

**User variables for cgallen**

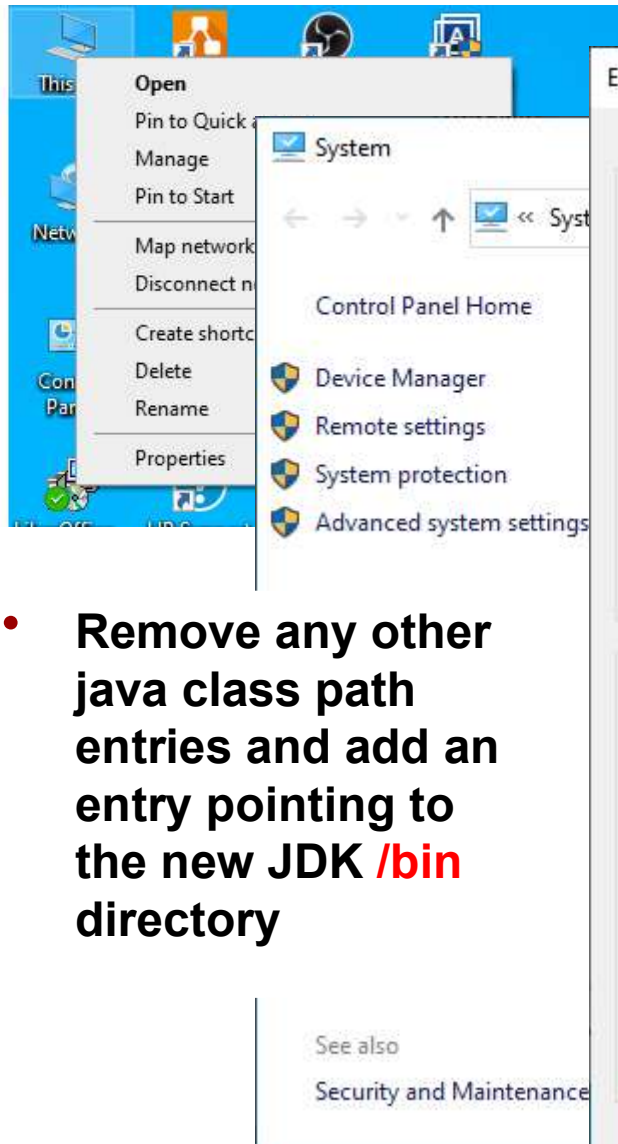
Variable	Value
OneDrive	C:\Users\cgallen\OneDrive - Solent University
OneDriveCommercial	C:\Users\cgallen\OneDrive - Solent University
OneDriveConsumer	C:\Users\cgallen\OneDrive
Path	C:\Users\cgallen\AppData\Local\Microsoft\WindowsApps;
TEMP	C:\Users\cgallen\AppData\Local\Temp
TMP	C:\Users\cgallen\AppData\Local\Temp

**System variables**

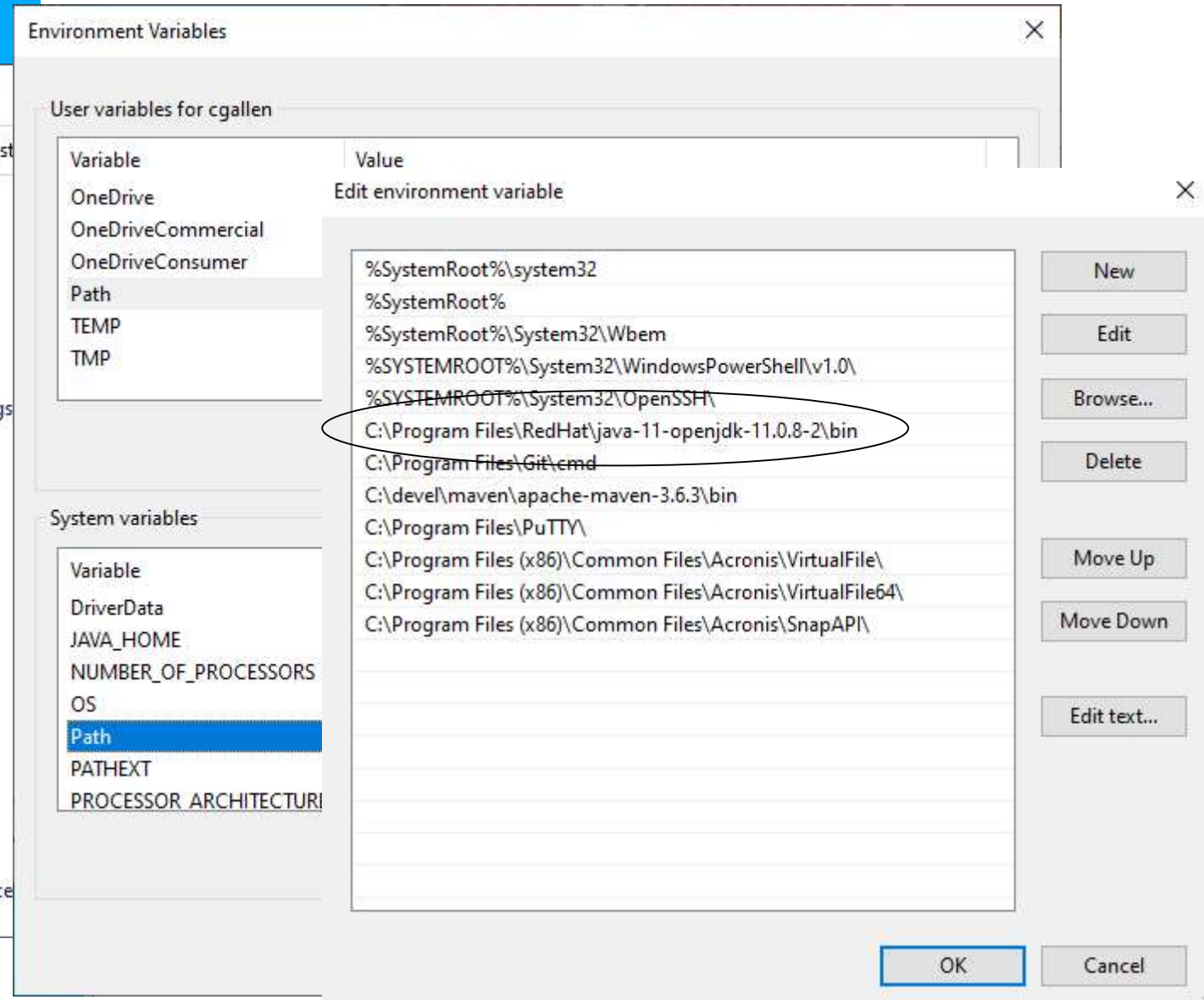
Variable	Value
DriverData	C:\Windows\System32\Drivers\DriverData
JAVA_HOME	C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wb...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
PROCESSOR_ARCHITECTURE	AMD64

Buttons: New..., Edit..., Delete, OK, Cancel

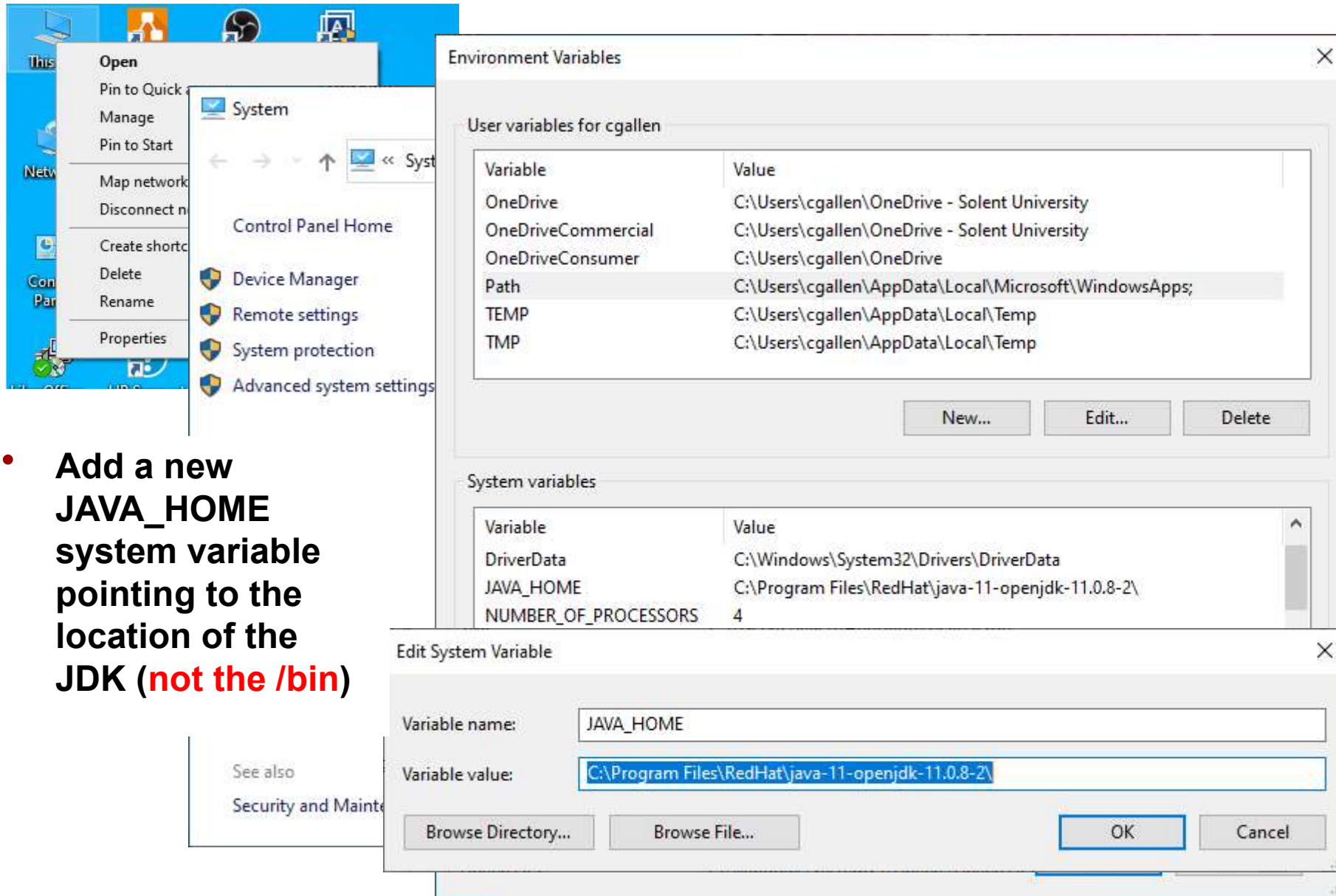
# Java 11 setting the class path



- **Remove any other java class path entries and add an entry pointing to the new JDK **/bin** directory**



# Java 11 setting JAVA\_HOME



The screenshot shows a Windows desktop with a context menu open for the 'System' icon. The menu options include 'Open', 'Pin to Quick...', 'Manage', 'Pin to Start', 'Map network...', 'Disconnect n...', 'Create shortc...', 'Delete', 'Rename', 'Properties', 'Device Manager', 'Remote settings', 'System protection', and 'Advanced system settings'. The 'Advanced system settings' option is selected, leading to the 'Environment Variables' dialog box.

The 'Environment Variables' dialog box displays two sections: 'User variables for cgallen' and 'System variables'.

Variable	Value
OneDrive	C:\Users\cgallen\OneDrive - Solent University
OneDriveCommercial	C:\Users\cgallen\OneDrive - Solent University
OneDriveConsumer	C:\Users\cgallen\OneDrive
Path	C:\Users\cgallen\AppData\Local\Microsoft\WindowsApps;
TEMP	C:\Users\cgallen\AppData\Local\Temp
TMP	C:\Users\cgallen\AppData\Local\Temp

Buttons: New..., Edit..., Delete

Variable	Value
DriverData	C:\Windows\System32\Drivers\DriverData
JAVA_HOME	C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\
NUMBER_OF_PROCESSORS	4

Buttons: New..., Edit..., Delete

The 'Edit System Variable' dialog box is open, showing the 'Variable name' as 'JAVA\_HOME' and the 'Variable value' as 'C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\'. The 'Variable value' field is highlighted with a blue selection box.

Buttons: Browse Directory..., Browse File..., OK, Cancel

- Add a new **JAVA\_HOME** system variable pointing to the location of the JDK (**not the /bin**)



# Test the JDK

```
Command Prompt
Microsoft Windows [Version 10.0.19041.508]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\cgallen>java -version
openjdk version "11.0.8" 2020-07-14 LTS
OpenJDK Runtime Environment 18.9 (build 11.0.8+10-LTS)
OpenJDK 64-Bit Server VM 18.9 (build 11.0.8+10-LTS, mixed mode)

C:\Users\cgallen>javac -version
javac 11.0.8

C:\Users\cgallen>_
```

- open a new command prompt and check java (java runtime) and javac (the java compiler) versions are both the same and java 11

- open a new command prompt and check variables are now set

```
Command Prompt

C:\Users\cgallen>set
...
JAVA_HOME=C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\
LOCALAPPDATA=C:\Users\cgallen\AppData\Local
LOGONSERVER=\\DESKTOP-F8S8JJU
M2_HOME=C:\devel\maven\apache-maven-3.6.3
MAVEN_HOME=C:\devel\maven\apache-maven-3.6.3
NUMBER_OF_PROCESSORS=4
OneDrive=C:\Users\cgallen\OneDrive - Solent University
OneDriveCommercial=C:\Users\cgallen\OneDrive - Solent University
OneDriveConsumer=C:\Users\cgallen\OneDrive
OS=Windows_NT
Path=C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\WINDOWS\System32\WindowsPowerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\bin;C:\Program Files\Git\cmd;C:\devel\maven\apache-maven-3.6.3\bin;C:\Program Files\PuTTY\;C:\Program Files (x86)\Common Files\Acronis\VirtualFile\;C:\Program Files (x86)\Common Files\Acronis\VirtualFile64\;C:\Program Files (x86)\Common Files\Acronis\SnapAPI\;C:\Users\cgallen\AppData\Local\Microsoft\WindowsApps;
```

# **DEMO**

## **Installing OpenJDK 11**

Installing on windows

Installing Java Development Kit (SE) JDK 11

**Installing Apache Maven**

Installing Netbeans 12

Installing Netbeans easyUML plugin

Installing Apache Tomcat Web Server

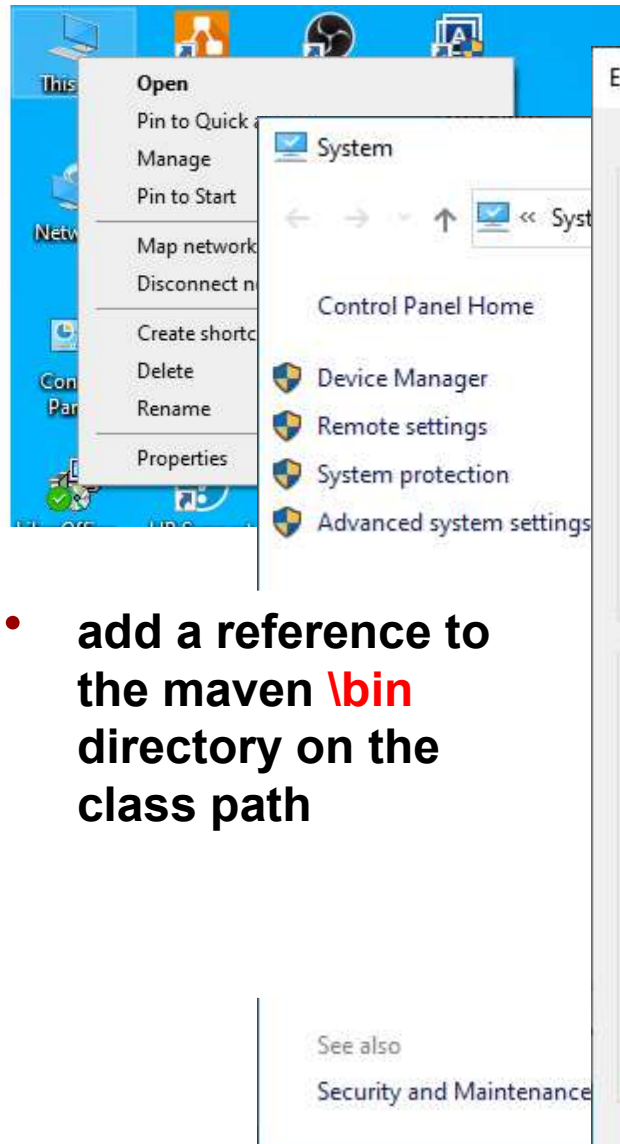
Installing git for Windows

Installing draw.io / diagrams.net

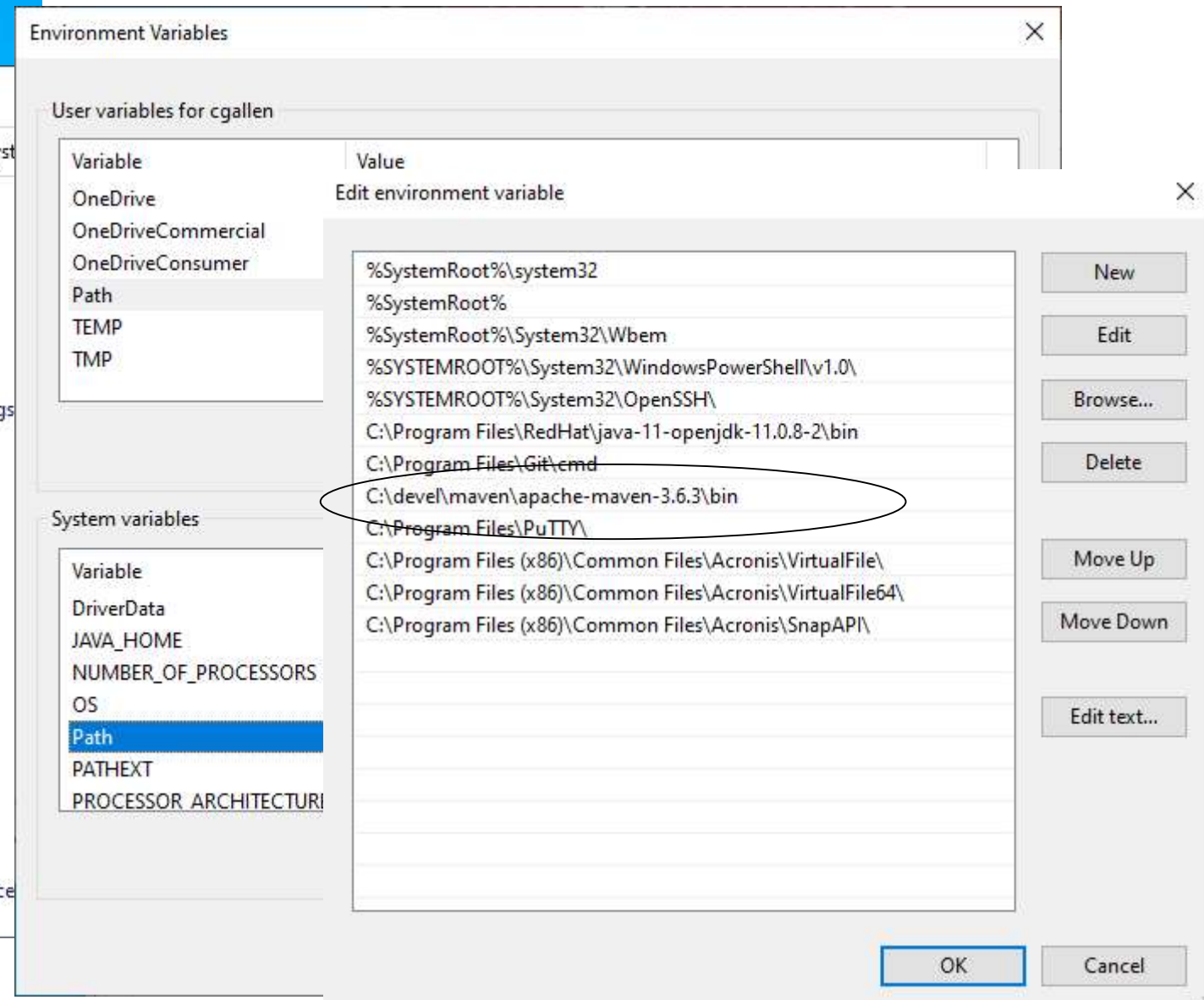
# Installing Apache Maven

- **What is Maven**
  - Maven is an automated build system which downloads project dependencies from maven repositories on the internet and builds, tests and packages java projects.
- **Download Apache Maven**
  - <https://maven.apache.org/download.cgi>
  - Download the latest maven 3 zip package (currently apache-maven-3.6.3-bin.zip)
- **Installation steps**
  - (there are many variations on-line. e,g, <https://maven.apache.org/install.html>. These following are the steps I use)
  - 1. unpack the zip file into C:\devel\maven\apache-maven-3.6.3
  - 2. create a class path reference to C:\devel\maven\apache-maven-3.6.3\bin
  - 3. create system variables MAVEN\_HOME and M2\_HOME pointing to C:\devel\maven\apache-maven-3.6.3
  - 4. open a command window and check maven works using mvn -version

# Setting the Maven class path

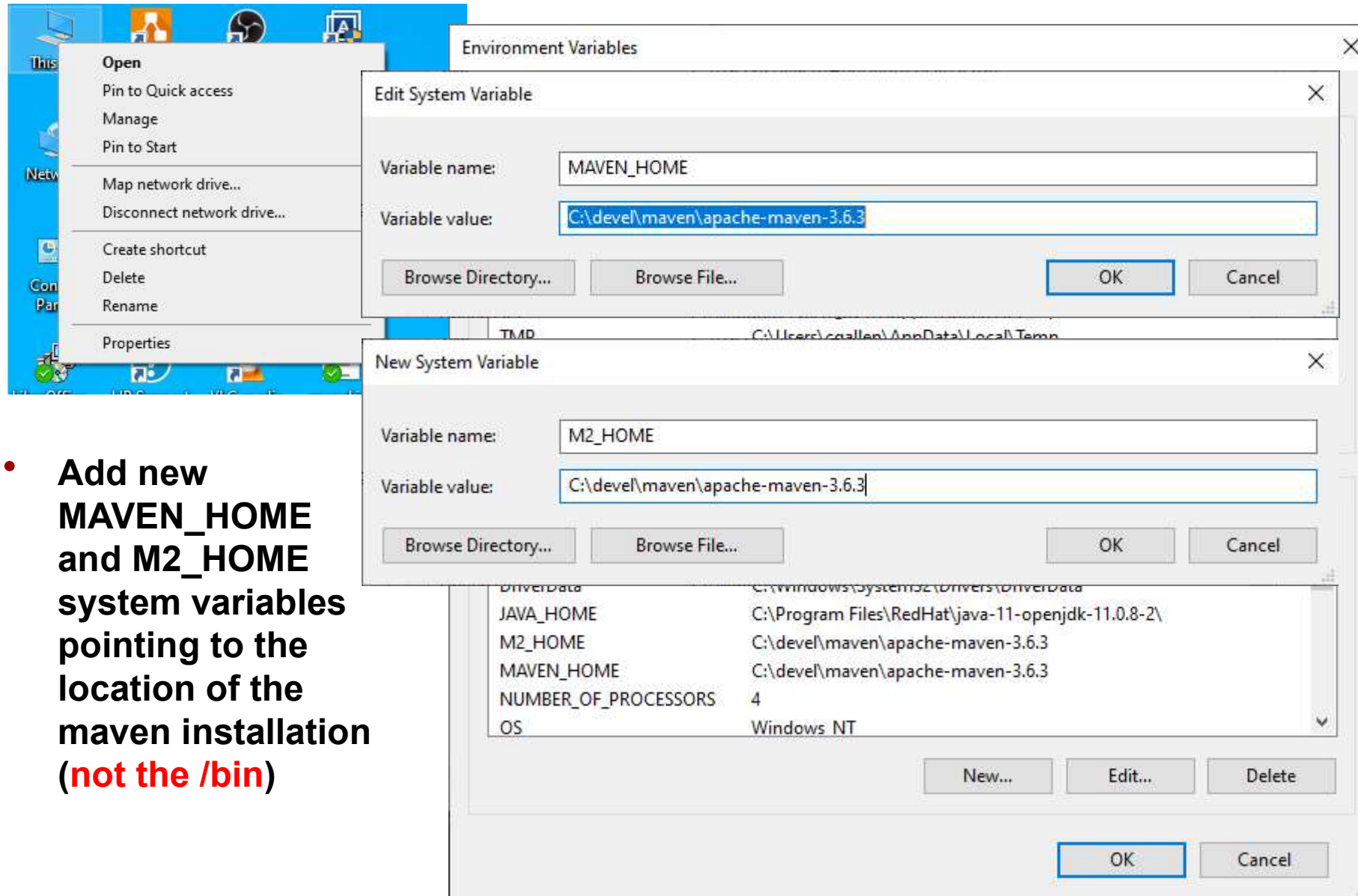


- add a reference to the maven **bin** directory on the class path





# setting MAVEN\_HOME and M2\_HOME



- **Add new MAVEN\_HOME and M2\_HOME system variables pointing to the location of the maven installation (not the /bin)**

# Test Maven

```
Command Prompt
C:\Users\cgallen>java -version
openjdk version "11.0.8" 2020-07-14 LTS
OpenJDK Runtime Environment 18.9 (build 11.0.8+10-LTS)
OpenJDK 64-Bit Server VM 18.9 (build 11.0.8+10-LTS, mixed mode)

C:\Users\cgallen>javac -version
javac 11.0.8

C:\Users\cgallen>mvn -version
Apache Maven 3.6.3 (cecedd343002696d0abb50b32b541b8a6ba2883f)
Maven home: C:\devel\maven\apache-maven-3.6.3\bin\..
Java version: 11.0.8, vendor: Red Hat, Inc., runtime: C:\Program Files\RedHat\
java-11-openjdk-11.0.8-2
Default locale: en_GB, platform encoding: Cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

C:\Users\cgallen>
```

- open a new command prompt and check maven is installed correctly
- mvn -version

open a new command prompt and check

- M2\_HOME
- MAVEN\_HOME

variables are now set

```
Command Prompt
C:\Users\cgallen>set
...
JAVA_HOME=C:\Program Files\RedHat\java-11-openjdk-11.0.8-2\
LOCALAPPDATA=C:\Users\cgallen\AppData\Local
LOGONSERVER=\\DESKTOP-F8S8JJU
M2_HOME=C:\devel\maven\apache-maven-3.6.3
MAVEN_HOME=C:\devel\maven\apache-maven-3.6.3
NUMBER_OF_PROCESSORS=4
OneDrive=C:\Users\cgallen\OneDrive - Solent University
OneDriveCommercial=C:\Users\cgallen\OneDrive - Solent University
OneDriveConsumer=C:\Users\cgallen\OneDrive
OS=Windows_NT
Path=C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\WINDOWS\System32\WindowsP
owerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Program Files\RedHat\java-11-openjdk-11.0
.8-2\bin;C:\Program Files\Git\cmd;C:\devel\maven\apache-maven-3.6.3\bin;C:\Program Files\
PuTTY\;C:\Program Files (x86)\Common Files\Acronis\VirtualFile\;C:\Program Files (x86)\Co
mmon Files\Acronis\VirtualFile64\;C:\Program Files (x86)\Common Files\Acronis\SnapAPI\;C:
\Users\cgallen\AppData\Local\Microsoft\WindowsApps;
```

# DEMO

## Installing Maven

# Contents

Installing on windows

Installing Java Development Kit (SE) JDK 11

Installing Apache Maven

**Installing Netbeans 12**

Installing Netbeans easyUML plugin

Installing Apache Tomcat Web Server

# Installing Netbeans 12

- **Netbeans 8 or Netbeans 12**

- Oracle (Sun) were the original hosts of Netbeans up to Netbeans 8
  - <https://netbeans.org/>
- Netbeans after Netbeans 8 has been contributed to the Apache foundation
  - <http://netbeans.apache.org/>
- Some netbeans 8 plugins have not been migrated to Apache yet – but still work
  - e.g easyUML plugin <http://plugins.netbeans.org/plugin/55435/easyuml>
- Tomcat and other servers were packaged with the Netbeans 8 installer but need to be installed separately with Apache Netbeans

- **Java 8 or Java 11**

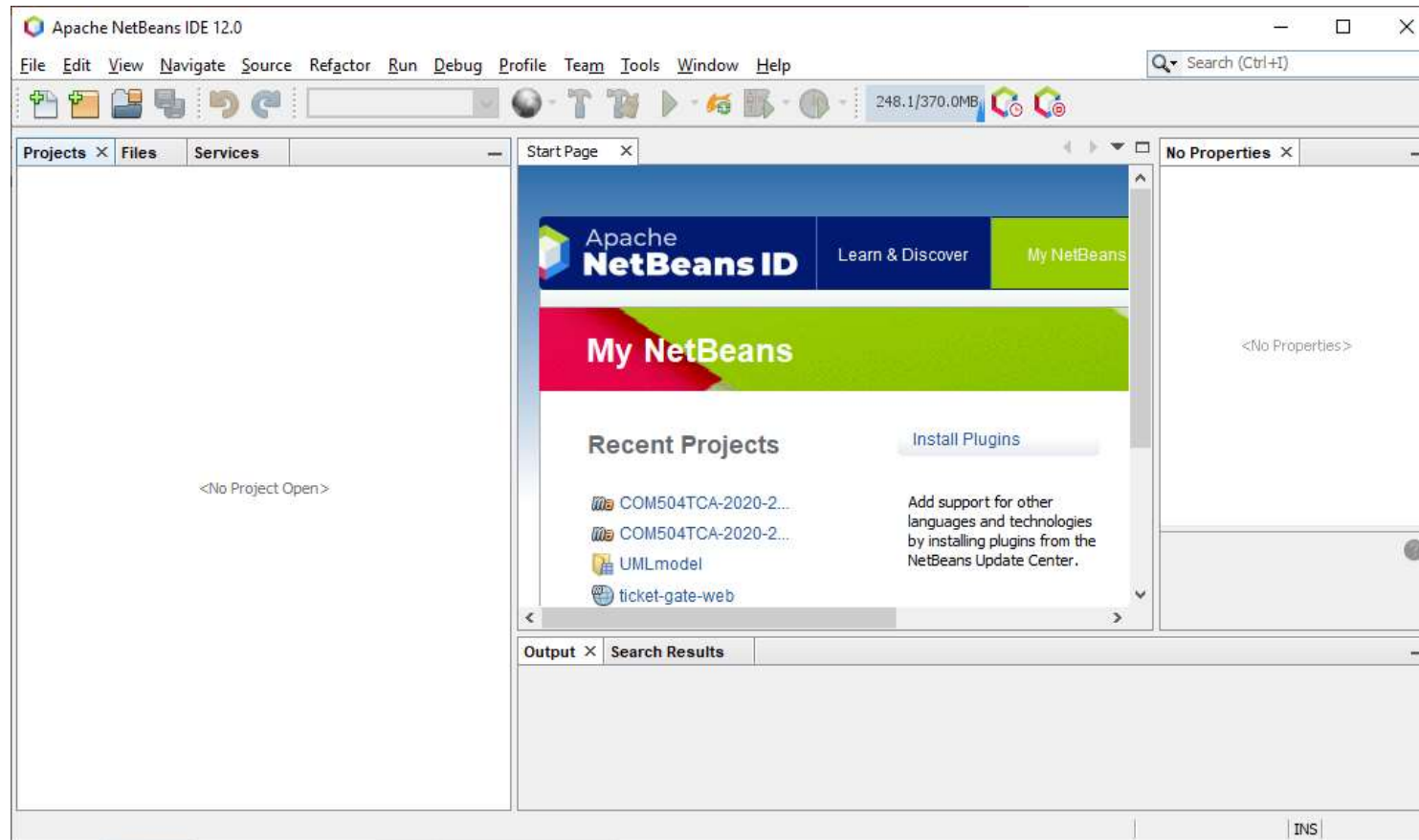
- Java 8 is End of Life and Java 11 is the current stable version
- There are some breaking changes in Java 11 (packages such as jaxb are removed)
- Netbeans 8.1 does not work with Java 11
- Netbeans 12 does not work with Java 8
- Netbeans 12 is the latest Long Term Support version of Netbeans

- **Which version to use**

- All of the class exercises have been upgraded and tested so that they will (should) work with Netbeans 8.1 / Java 8 and with Netbeans 12 / Java 11
- **At university**
  - Currently the university lab machines have Java 8, maven and Netbeans 8.1 installed
- **At home,**
  - I recommend you install the latest Netbeans 12 / Java 11

# Installing Netbeans 12 and easyUML

- Install Java 11 first ☺
- Download and run the Apache 12 Netbeans windows installer
  - <https://netbeans.apache.org/download/nb120/nb120.html>
  - Apache-NetBeans-12.0-bin-windows-x64.exe
  - Accept all of the default settings



# **DEMO**

## **Installing Netbeans 12**



# Contents

Installing on windows

Installing Java Development Kit (SE) JDK 11

Installing Apache Maven

Installing Netbeans 12

**Installing Netbeans easyUML plugin**

Installing Apache Tomcat Web Server

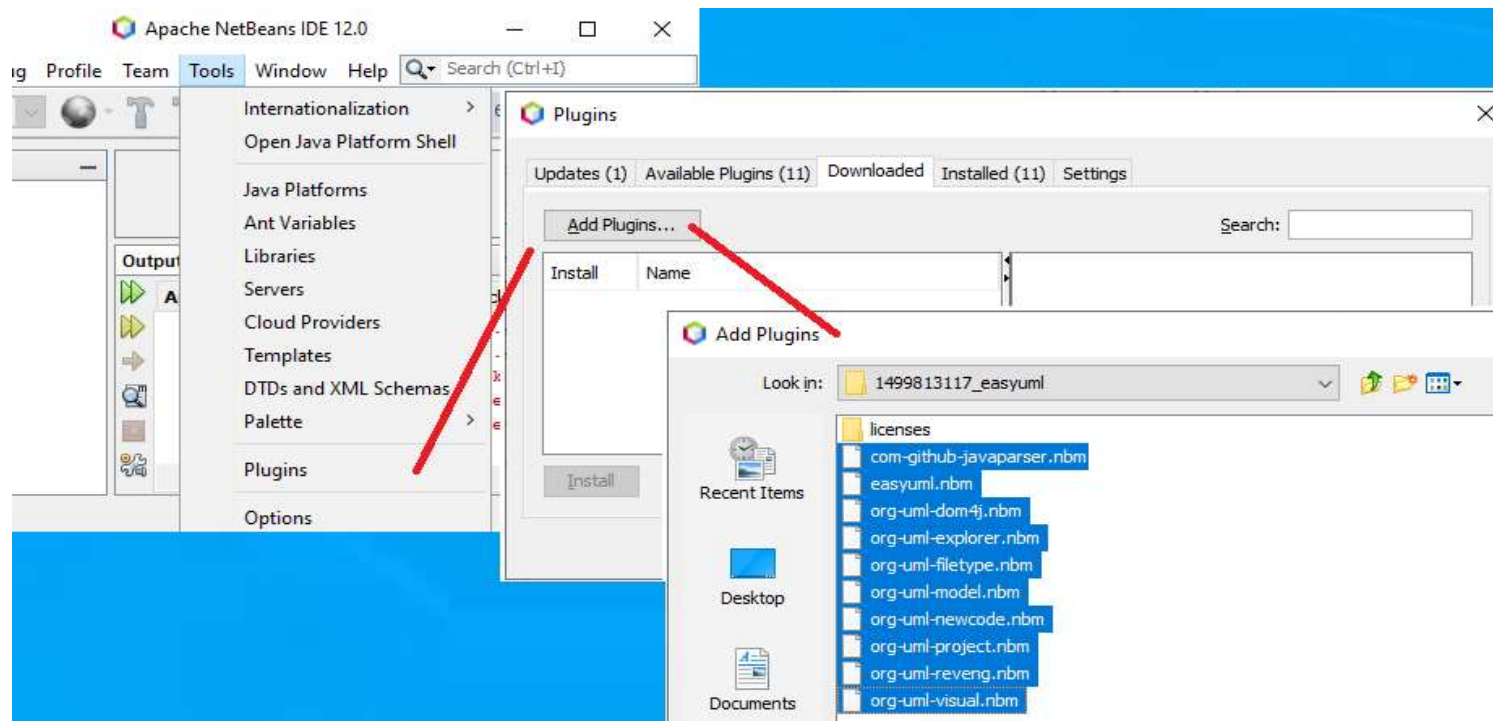
Installing git for Windows

Installing draw.io / diagrams.net



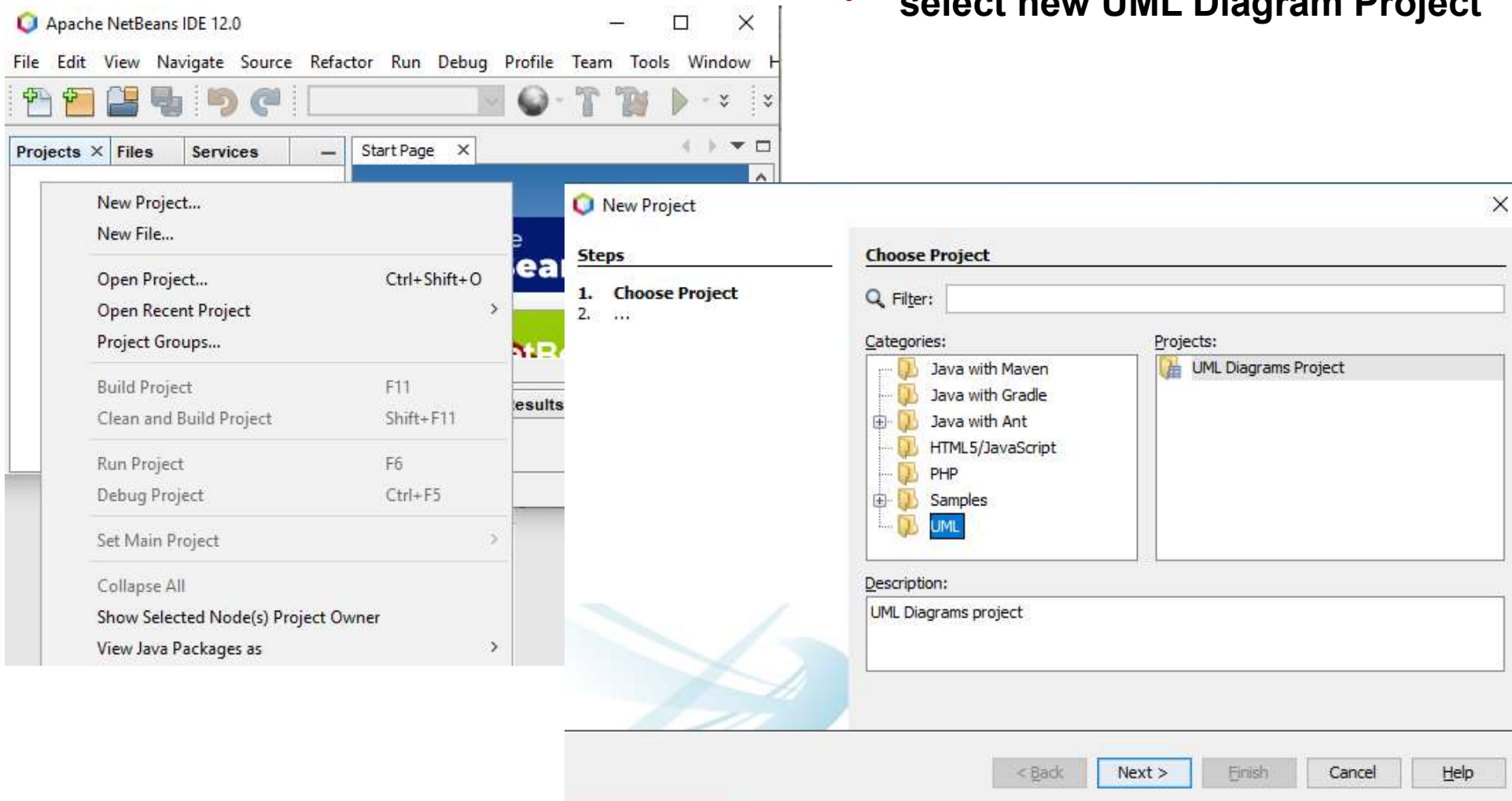
# Installing easyUML in Netbeans 12

- **Download the easyUML plugin zip**
  - version for Netbeans 8.1
  - <http://plugins.netbeans.org/plugin/55435/easyuml>
  - 1499813117\_easyuml.zip
  - extract this zip file into a folder
- **Install the easyUML plugin**
  - Tools>Plugins
  - Select all .nbm files
  - Accept licences and install all selected modules.



# Test easyUml Plugin

- **select new UML Diagram Project**



Apache NetBeans IDE 12.0

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window

Projects Files Services Start Page

New Project...  
New File...  
Open Project... Ctrl+Shift+O  
Open Recent Project  
Project Groups...  
Build Project F11  
Clean and Build Project Shift+F11  
Run Project F6  
Debug Project Ctrl+F5  
Set Main Project  
Collapse All  
Show Selected Node(s) Project Owner  
View Java Packages as

New Project

Steps

1. Choose Project
2. ...

Choose Project

Filter:

Categories:

- Java with Maven
- Java with Gradle
- Java with Ant
- HTML5/JavaScript
- PHP
- Samples
- UML**

Projects:

- UML Diagrams Project**

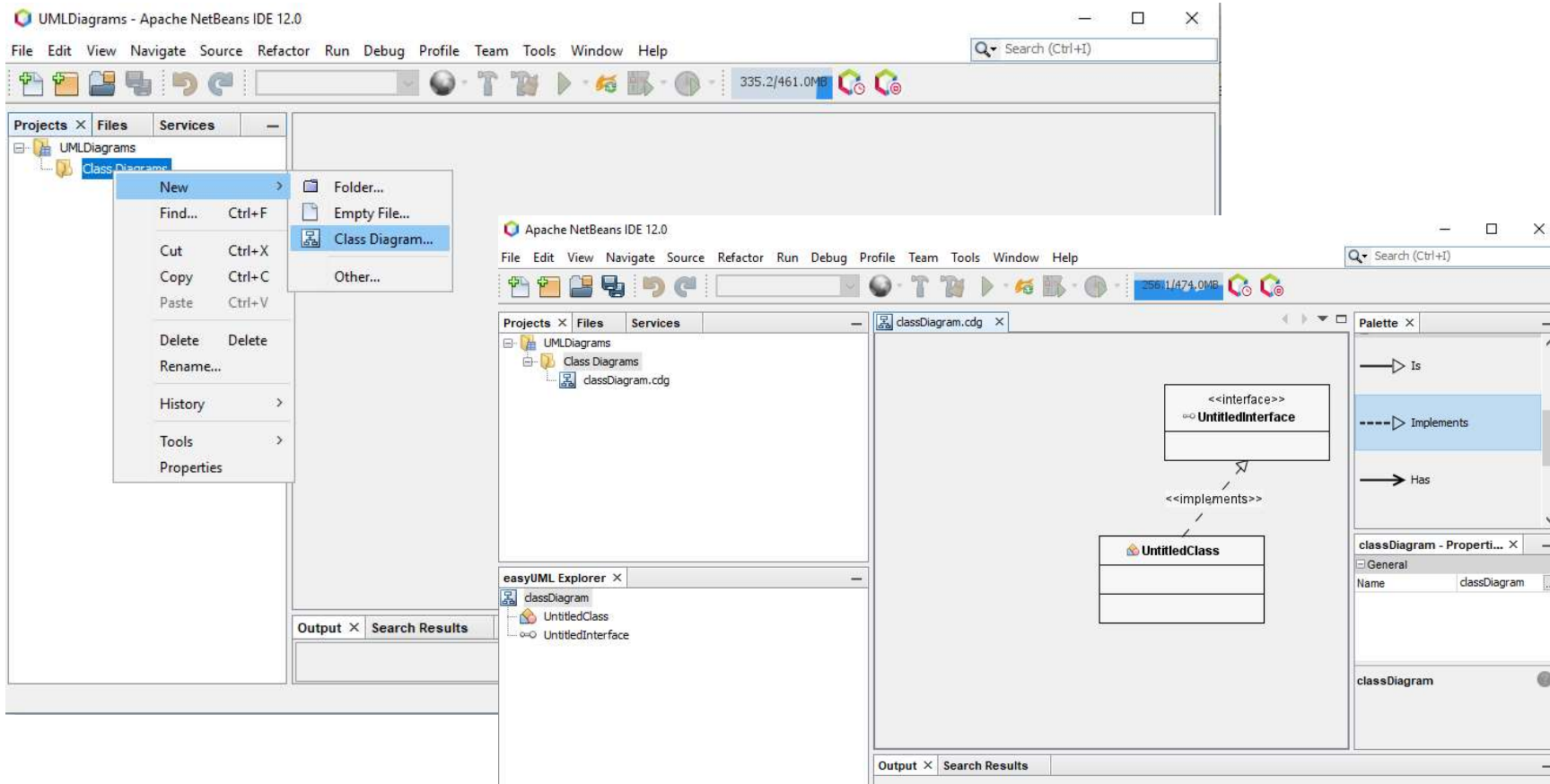
Description:

UML Diagrams project

< Back Next > Finish Cancel Help

# Test easyUml Plugin

- create a new class diagram in project



# **DEMO**

## **Installing Netbeans easyUML**

# Contents

Installing on windows

Installing Java Development Kit (SE) JDK 11

Installing Apache Maven

Installing Netbeans 12

Installing Netbeans easyUML plugin

**Installing Apache Tomcat Web Server**

Installing git for Windows

Installing draw.io / diagrams.net

# Installing Tomcat

- **What is Tomcat**

- Tomcat is a java Web Application Server.

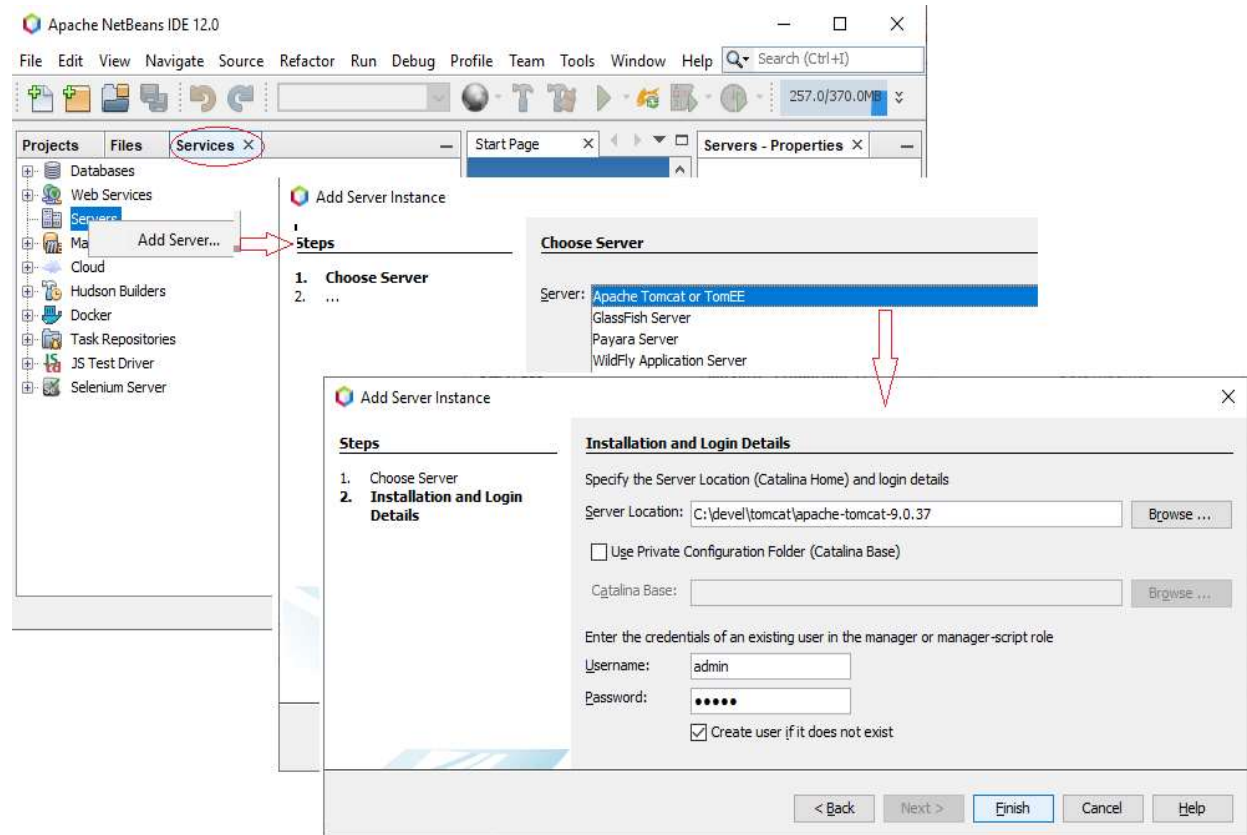
- **Download Tomcat 9**

- <https://tomcat.apache.org/download-90.cgi>
- Download the latest core 64-bit Windows
- (<https://mirrors.ukfast.co.uk/sites/ftp.apache.org/tomcat/tomcat-9/v9.0.38/bin/apache-tomcat-9.0.38-windows-x64.zip>)

- **Installation steps**

- (there are many variations online. These following are the steps I used)

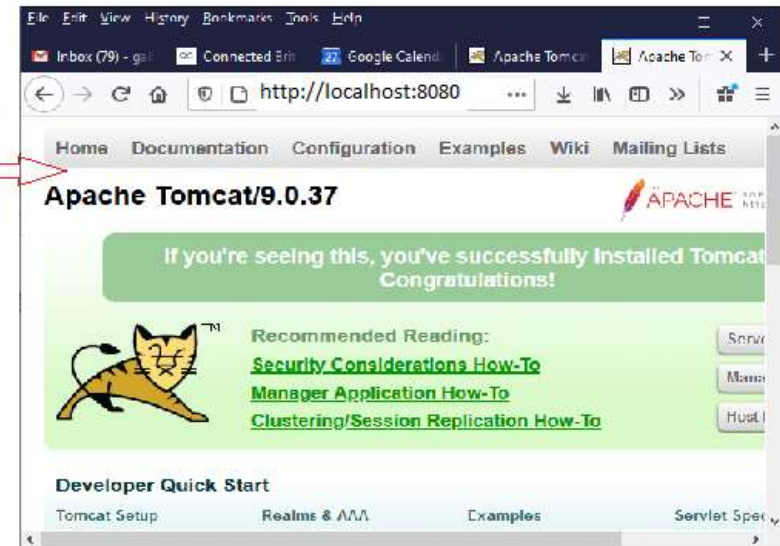
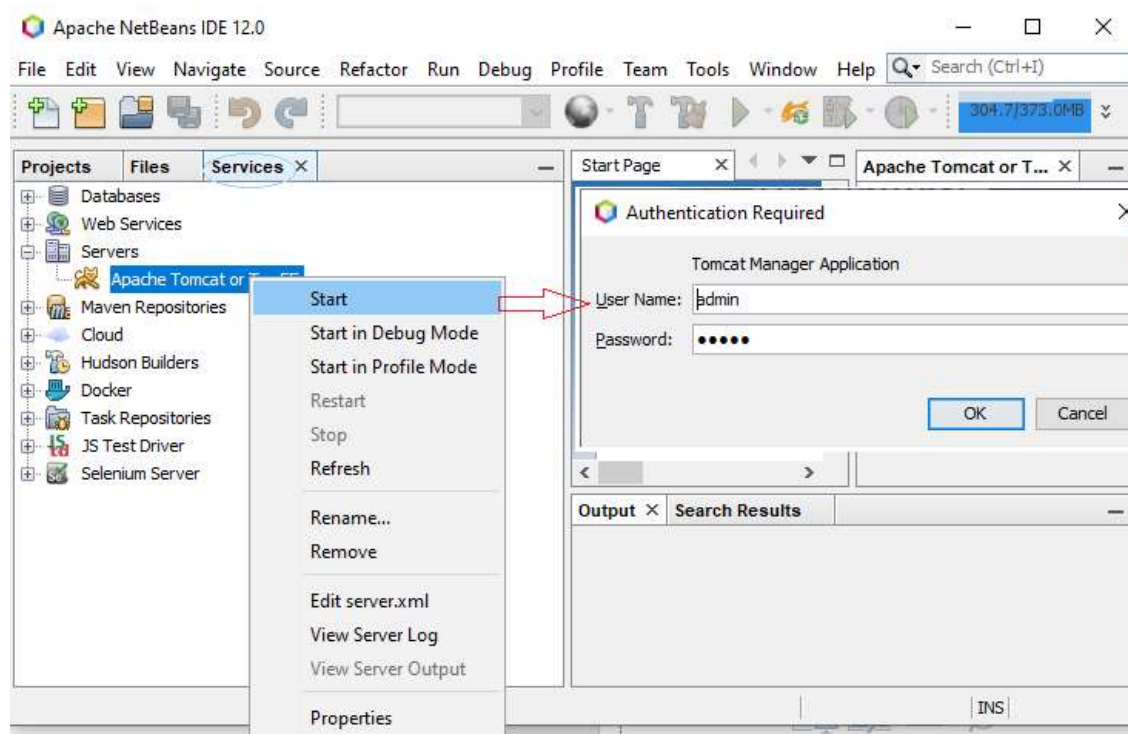
- 1. unpack apache-tomcat-9.0.38-windows-x64.zip into C:\devel\tomcat\apache-tomcat-9.0.37
- 2. select services tab > servers > add server > Tomcat TomEE
- 3. add the location of apache tomcat, tick add user and fill in user name (e.g. admin pw admin)





# Testing Tomcat Installation

1. On services tab, right click on Apache tomcat
  2. Enter username and password
  3. Open browser at <http://localhost:8080>
- you should see the tomcat manager home page



# DEMO

## Installing Tomcat



# Contents

Installing on windows

Installing Java Development Kit (SE) JDK 11

Installing Apache Maven

Installing Netbeans 12

Installing Netbeans easyUML plugin

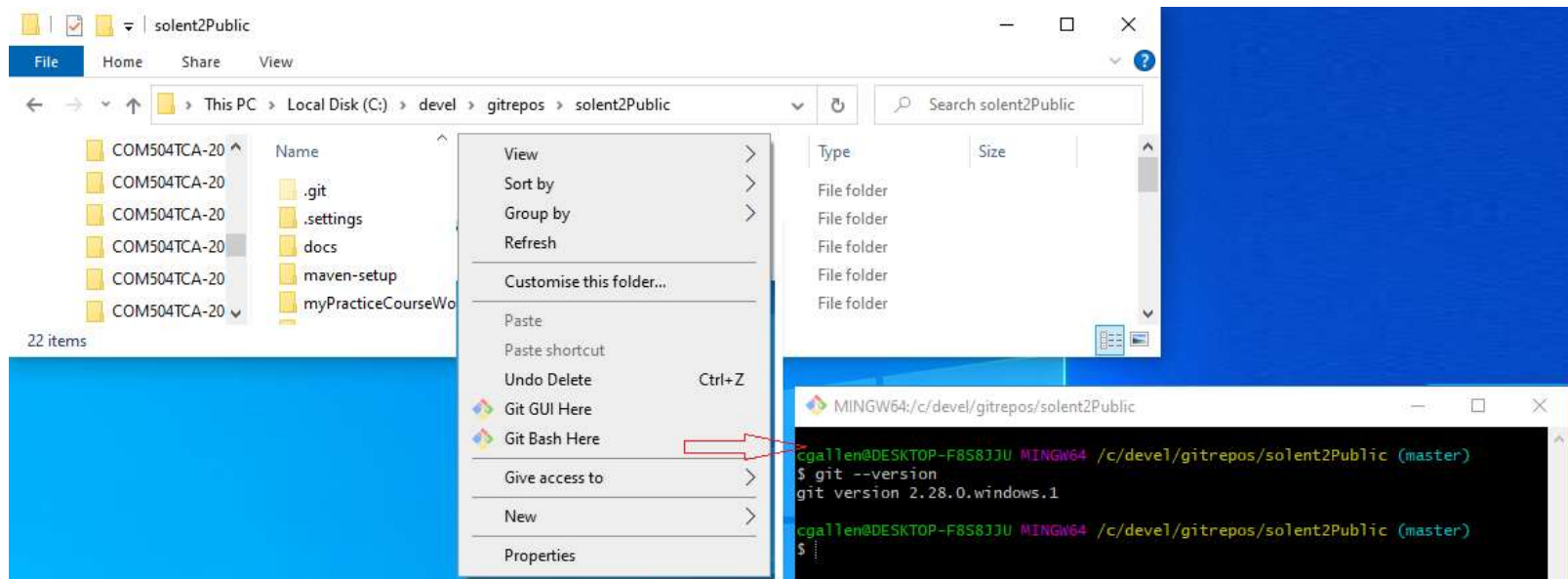
Installing Apache Tomcat Web Server

**Installing git for Windows**

Installing draw.io / diagrams.net

# Installing Git for Windows

- **What is git**
  - git is a version control system originally developed by Linus Torvalds for managing contributions to the Linux kernel
  - unlike its predecessors cvs and subversion, git is fully distributed.
  - github is a centralised repository but local github repositories cloned from github are identical and can work stand alone.
- **Download git**
  - git for windows <https://git-scm.com/download/win> 64-bit Git for Windows Setup.
- **Installing git**
  - run the installer with administrator privileges (select the default settings)
  - if all goes well right click on a folder and you should have a git bash option



# **DEMO**

## **Installing Git for Windows**

# Contents

Installing on windows

Installing Java Development Kit (SE) JDK 11

Installing Apache Maven

Installing Netbeans 12

Installing Netbeans easyUML plugin

Installing Apache Tomcat Web Server

Installing git for Windows

**Installing draw.io / diagrams.net**

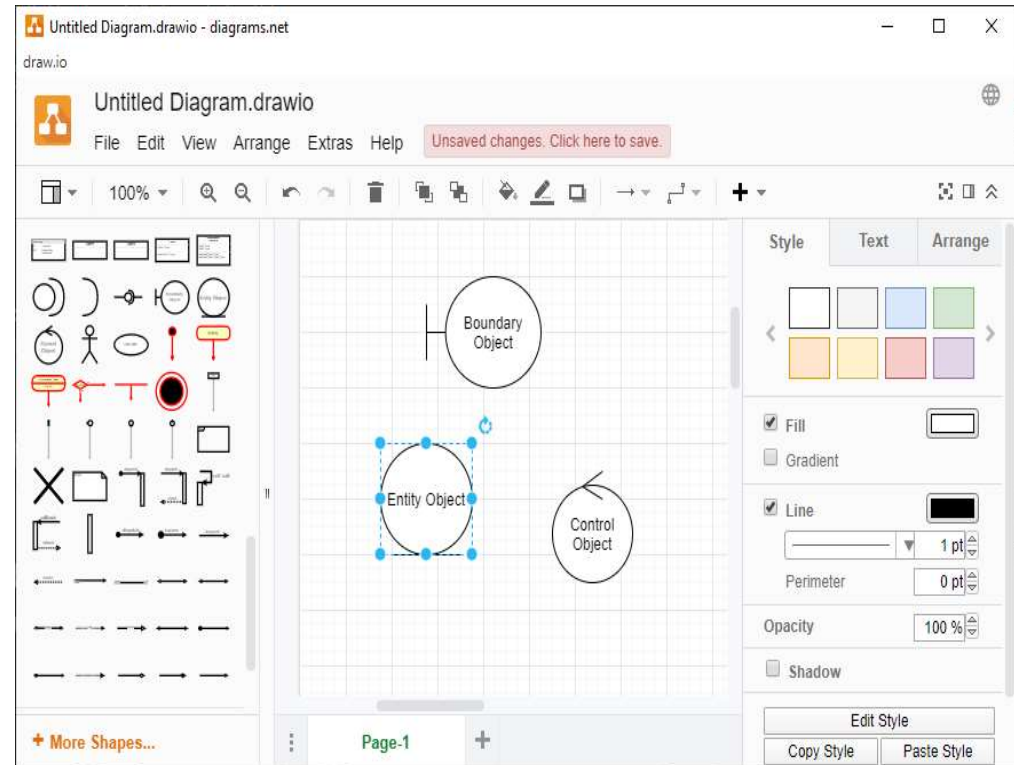
# Installing draw.io / diagrams.net

- **What is draw.io**

- draw.io (which has just been renamed diagrams.net) is a javascript based drawing tool which runs in a browser but is also available as a stand alone package

- **Using Draw.io**

- You can create new draw.io drawings by browsing to <https://app.diagrams.net/> or <https://draw.io>
- You can also download a package which will run locally on your machine from <https://www.diagrams.net/>
- We will use this package to create drawings which will be saved with our code on github



# DEMO

## Installing DrawIO