

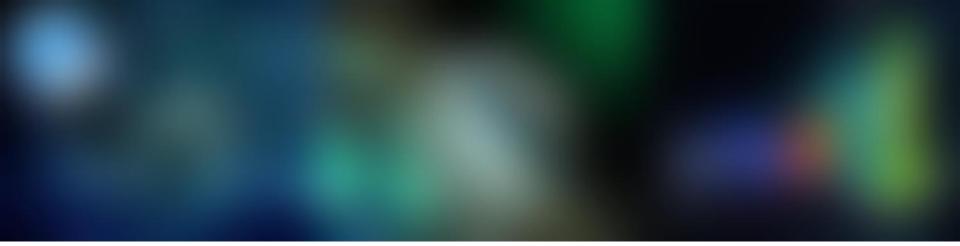
## **Object-Oriented Programming In Mechatronic Systems**

## **Summer School 2018**

#### **Final Project Preparations** Aachen, Germany

Cybernetics Lab IMA & IfU Faculty of Mechanical Engineering RWTH Aachen University



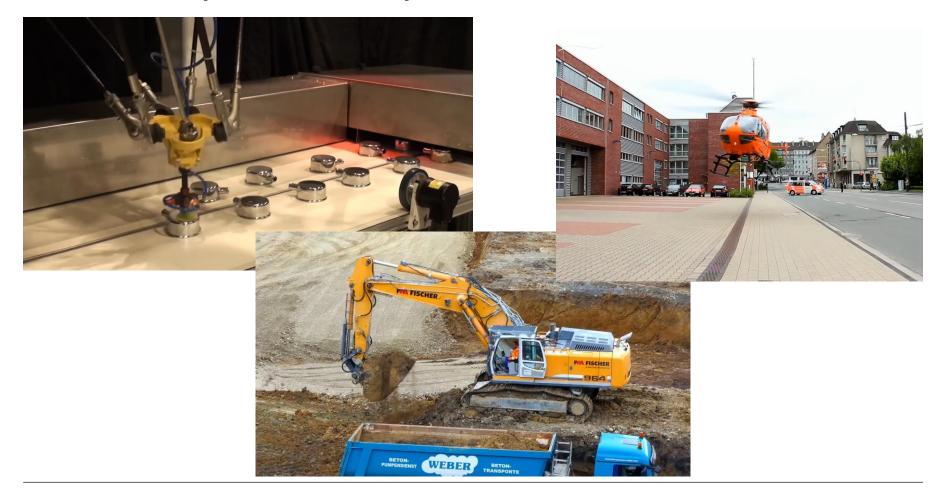


# **Final Project**



## **Final Project: Motivation**

## **Mechatronic systems are everywhere!**



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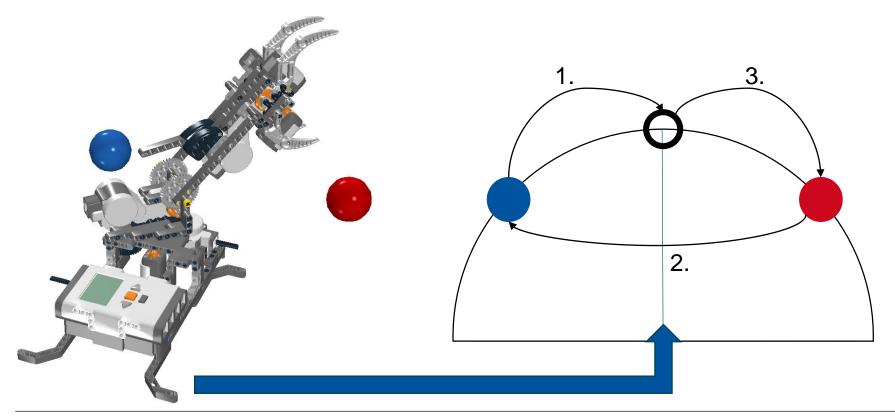
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## **Final Project: Robot Programming**

## In the final project, you will program a real robot!

- We use LEGO Mindstorm robots
- The task: Find and swap colored balls with the robot





### The robots have several elements



Touch sensor



Light sensor



Ultrasonic sensor



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## After finishing the preparation, you can start with the final project!

- Find teams to work together
- Get a LEGO Mindstorms robot pack
- Follow the instructions to install required software & prepare your Laptop

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## Download the installation files from our website

https://sloumotion.github.io/opms\_2018/

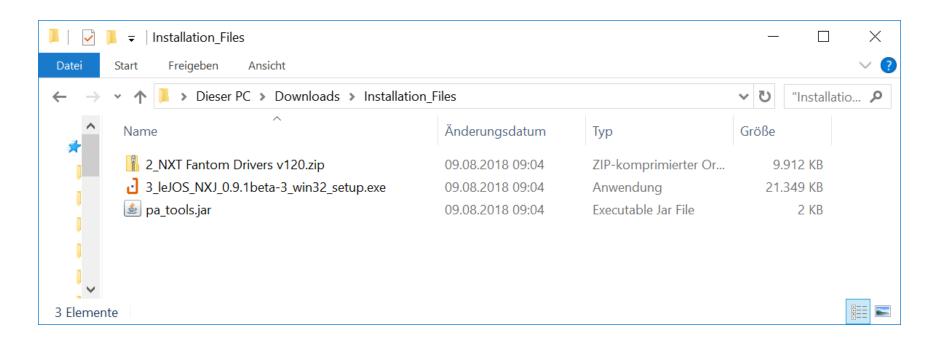
## **Final Project**

- Setup Instructions
- Installation Files
- Link to Lejos Package in Eclipse: http://www.lejos.org/tools/eclipse/plugin/nxj/
- Project Template



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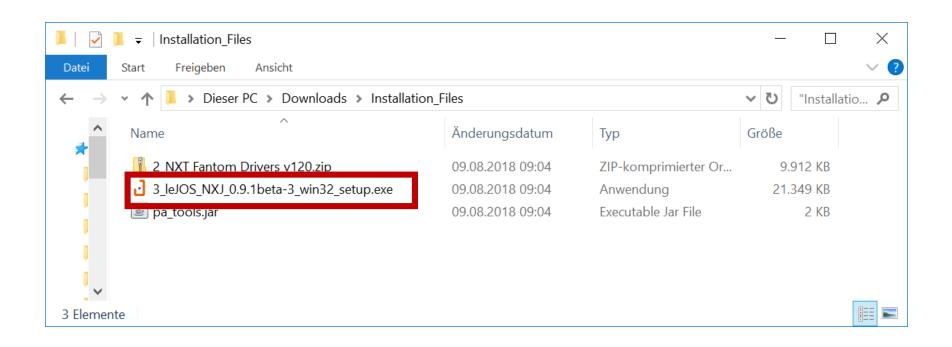
#### **Extract the Fantom driver**

- On your laptop, create the directory C:\FantomDriver\
- Enter (double-click) 2\_NXT Fantom Drivers v120.zip
- Right-click the folder and copy it to the directory created above

> Installation_Files > 2_NXT Fantom Driv	ers v120.zip »		WINDOWS	(C:) > FantomDriver		
Name NXT Fantom Drivers	Type File folder Open Explore Cut Copy Delete Properties	Compressed	x A x x x ztOr x		<ul> <li>View</li> <li>Sort by</li> <li>Group by</li> <li>Refresh</li> <li>Customise this fold</li> <li>Paste</li> <li>Paste shortcut</li> </ul>	Date modified This > } ler



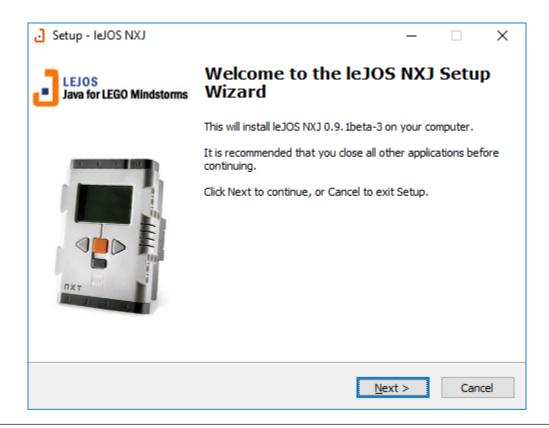




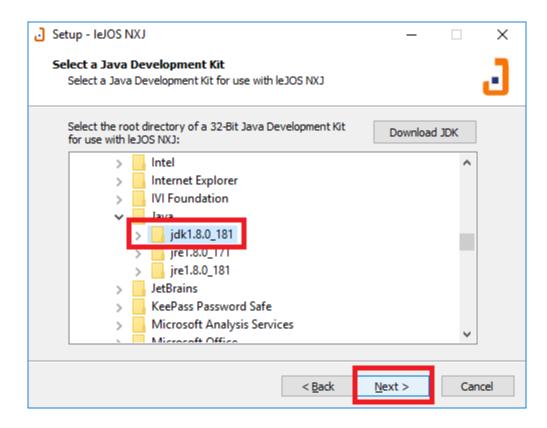


## **Install leJOS**

• Run 3\_leJOS\_NXJ\_0.9.1beta-3\_win32\_setup.exe









## **Install leJOS**

Setup - IeJOS NXJ	_		×
Select Destination Location Where should leJOS NXJ be installed?			J
Setup will install leJOS NXJ into the following folder.			
To continue, click Next. If you would like to select a different folder, cli	ck Bro	wse.	
C:\Program Files (x86)\JeJOS NXJ	Bro	owse	
At least 13.3 MB of free disk space is required.			
· · ·			
< <u>B</u> ack <u>N</u> ext >	,	Ca	ncel

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Setup - IeJOS NXJ	_		×
Select Components Which components should be installed?			J
Select the components you want to install; clear the components you o install. Click Next when you are ready to continue.	lo not	want to	_
Compact installation		~	
leJOS Development Kit		12.2 MB	]
Documentation		24.1 MB	
API Documentation (NXT)		14.9 MB	
API Documentation (PC)		9.3 MB	
Additional Sources			
··· Sample and Example Projects		0.6 MB	
Sources of leJOS Development Kit		14.7 MB	
Current selection requires at least 37.4 MB of disk space.			
< <u>B</u> ack <u>N</u> ext >	>	Cano	cel



Setup - IeJOS NXJ	—		×
Select Start Menu Folder Where should Setup place the program's shortcuts?			3
Setup will create the program's shortcuts in the following St	art Mei	nu folder.	
To continue, click Next. If you would like to select a different folder,	click Br	owse.	
IeJOS NXJ	B	rowse	
Don't create a Start Menu folder			
< <u>B</u> ack <u>N</u> ex	t >	Car	ncel



ခဲ Setup - IeJOS NXJ	_		$\times$
Ready to Install Setup is now ready to begin installing leJOS NXJ on your computer.			J
Click Install to continue with the installation, or click Back if you want change any settings.	to reviev	v or	
Destination location: C:\Program Files (x86)\eJOS NXJ		^	
Start Menu folder: leJOS NXJ			
Setup type: Compact installation			
Selected components: leJOS Development Kit			
Documentation API Documentation (NXT)		~	
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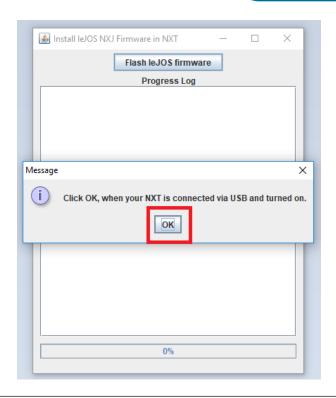




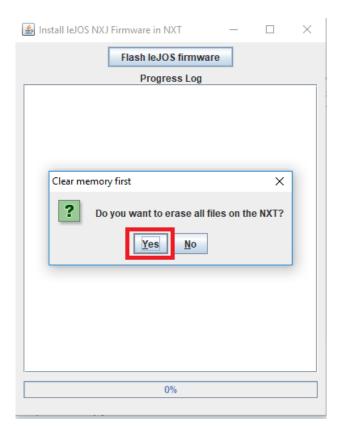


## Prepare the robot: Flash leJOS

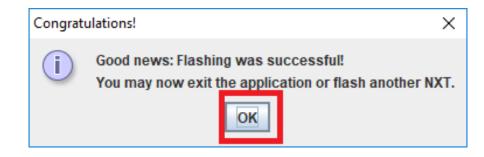
#### Connect the robot via USB & turn it on



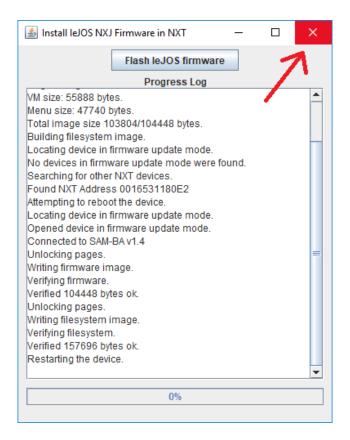




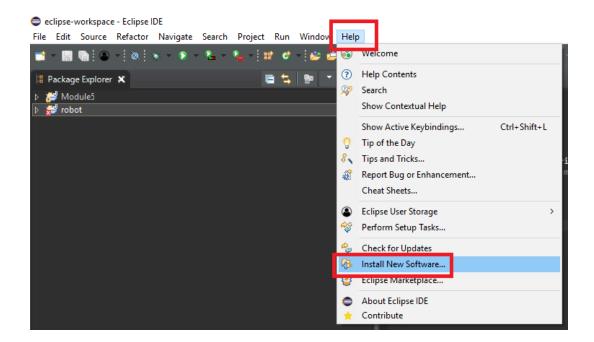














## Install robot software in Eclipse

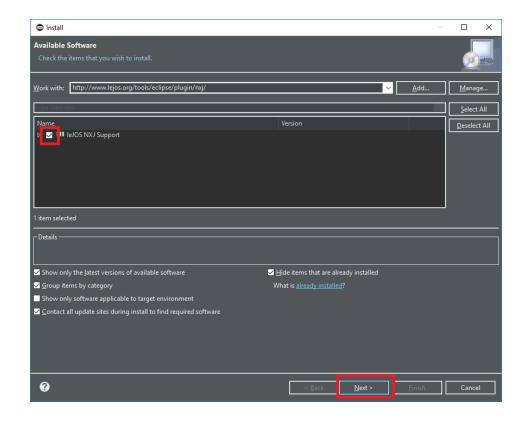
#### **Final Project**

- Setup Instructions
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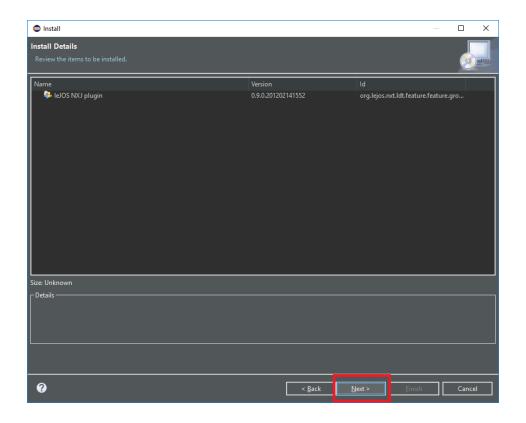
#### Copy & Paste Link from the website

Work with: http://w	ww.lejos.org/tools/eclipse/plugin/nxj/		~	<u>A</u> dd	<u>M</u> ar
type filter text					<u>S</u> ele
Name	o site selected. Press E	nter Version			<u>D</u> esel
Details	st versions of available software	☑ Hide items that are alrea	adv installed		
	st versions of available software egory	✓ Hide items that are alrea What is <u>already installed</u>			
✓ Show only the <u>l</u> ate: ✓ <u>G</u> roup items by cat					

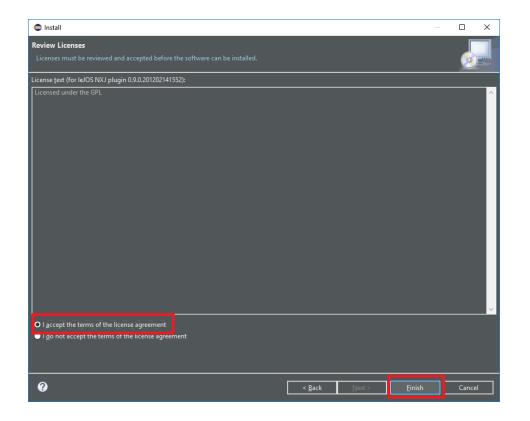




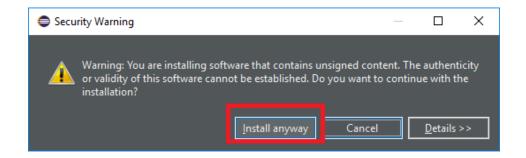




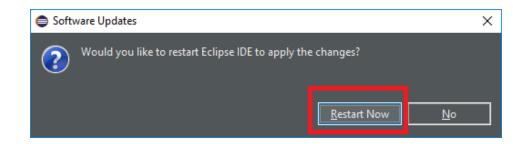






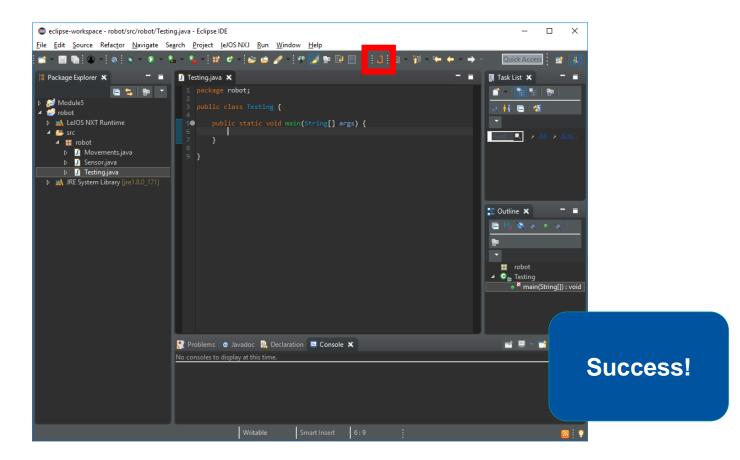








#### Install robot software in Eclipse



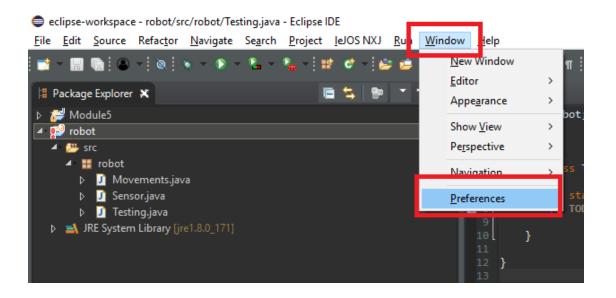
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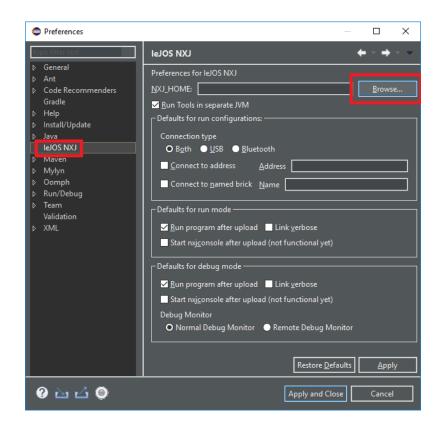
### Create a Java project "FinalProject"

🖨 New Java Project		– 🗆 X
Create a Java Project Create a Java project in the workspace or in an		
Project name: FinalProject		
Use <u>d</u> efault location		
Location: C:\Users\jl028480\eclipse-workspa	ce\FinalProject	Browse
JRE		
• Use an execution en <u>v</u> ironment JRE:	JavaSE-1.8	~
○ U <u>s</u> e a project specific JRE:	jre1.8.0_171	~
O Use default JRE (currently 'jre1.8.0_171')		Configure JREs
Project layout		
O Use project folder as root for sources and	class files	
<u>Create separate folders for sources and cl</u>		onfigure default
Working sets		
Add projec <u>t</u> to working sets		Ne <u>w</u>
W <u>o</u> rking sets:	$\sim$	S <u>e</u> lect
		_
(?) < <u>B</u> ack <u>N</u> e	xt > <u>F</u> inish	Cancel

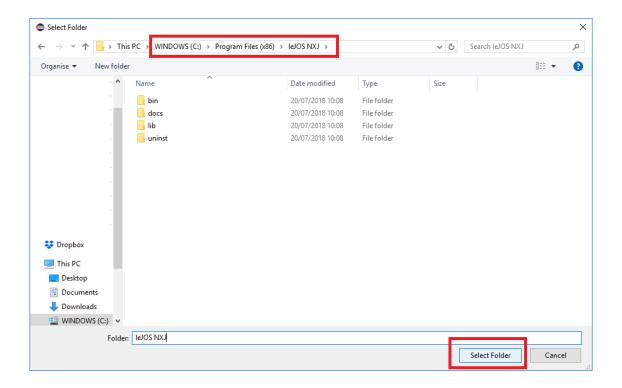




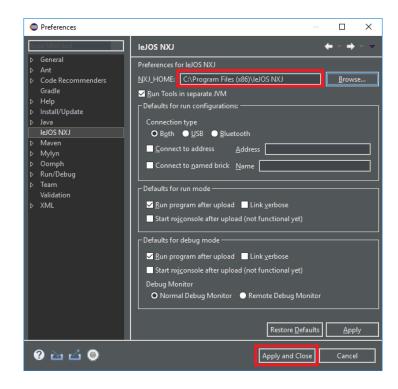






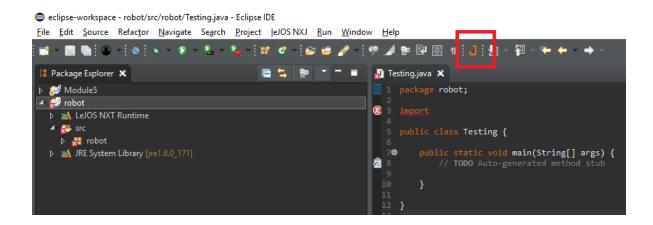






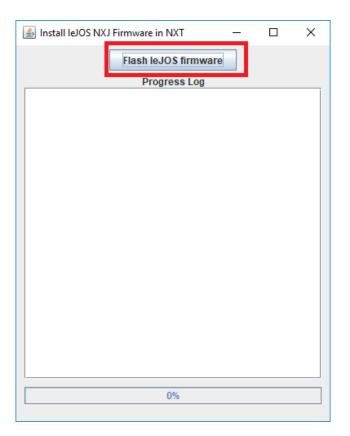


#### Use leJOS to access the robot!



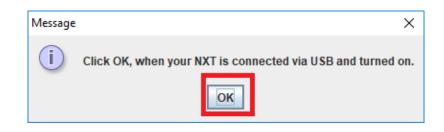


#### Use leJOS to access the robot!





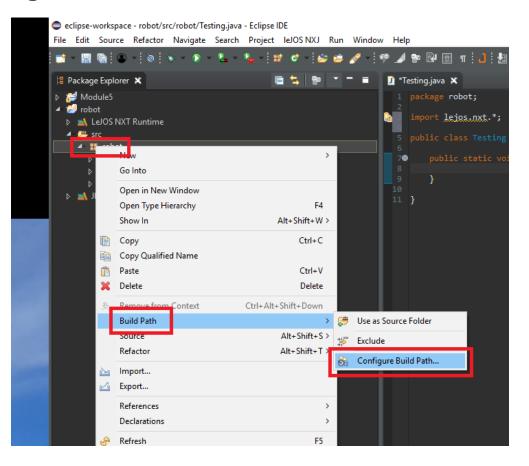
Use leJOS to access the robot!



Beep-beep on the robot → Success!

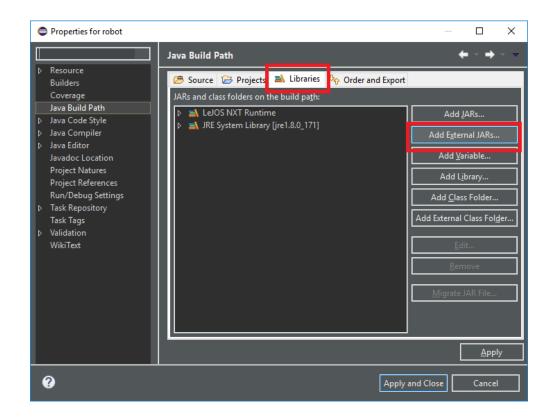








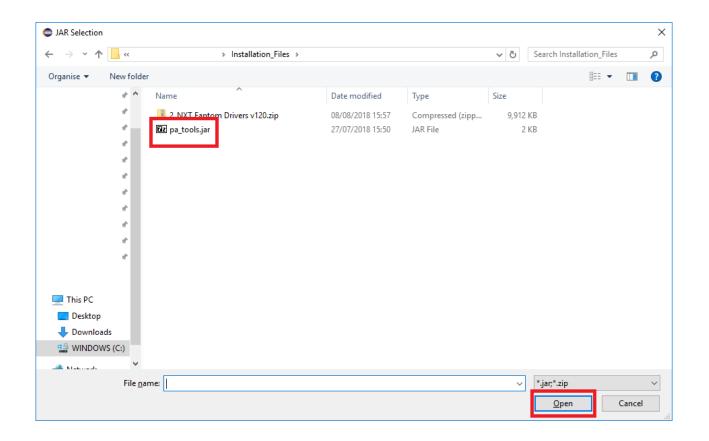
# **Final step: Settings**



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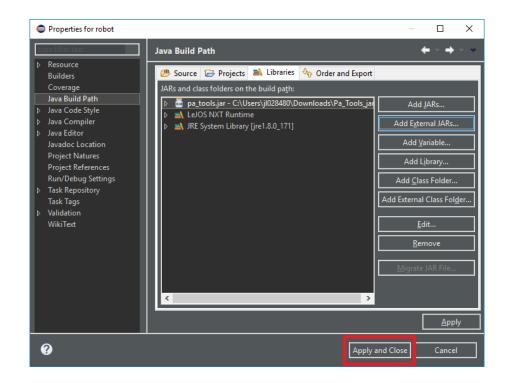


#### **Final step: Settings**



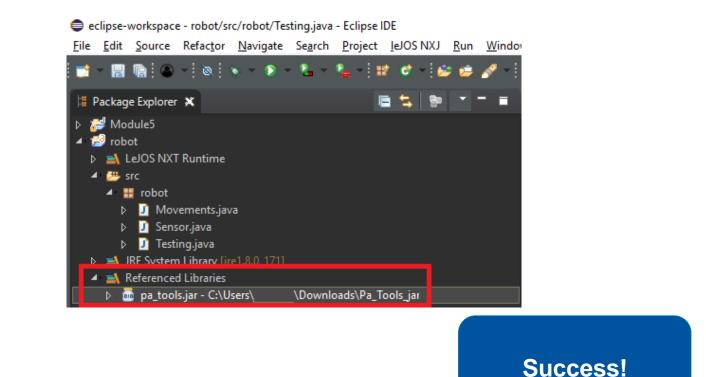
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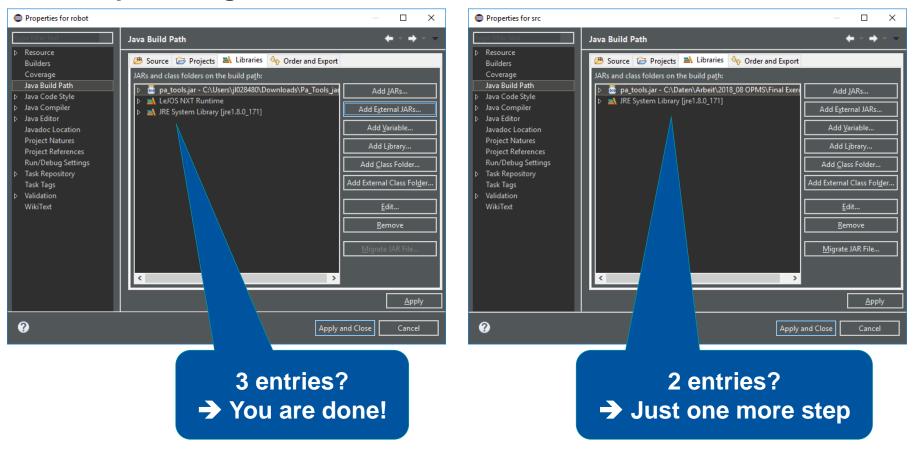
# **Final step: Settings**



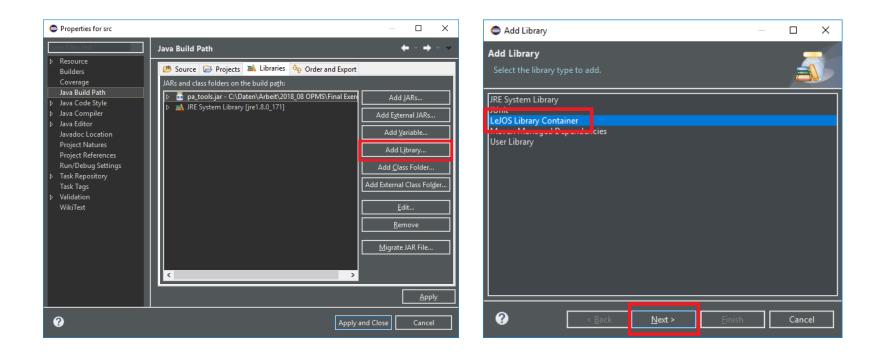
IfU

IMA

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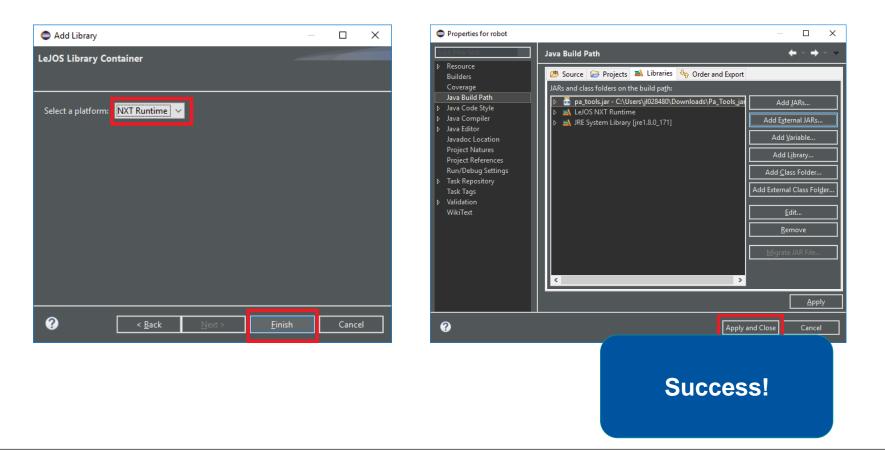








# **Final step: Settings**



RNTHA

IMA

IfU



# Thank you very much!

