Program Template EXPLAINED

Surface Finishing Application

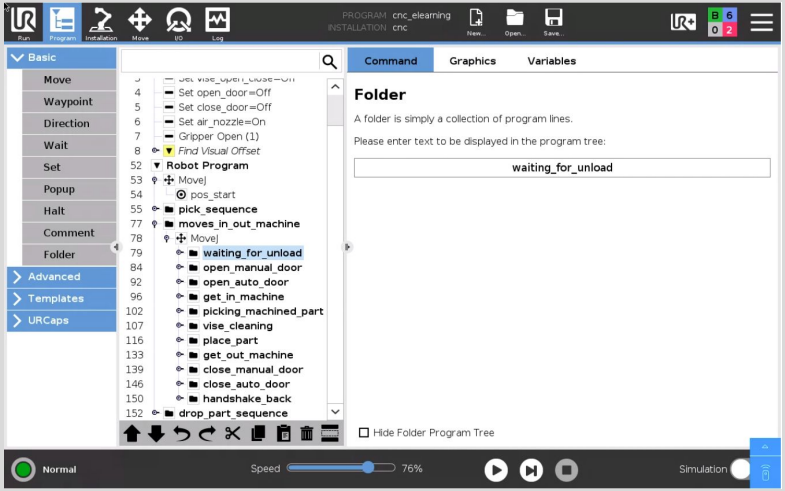
ROBOTIQ
eLearning

PROGRAM TEMPLATE
Surface Finishing Application

Description

Use this document to help you program your application using the template for the Finishing Application. You can learn more about the steps on how to program your Finishing application using the available videos for this course.

Visit elearning.robotiq.com for more details.



What you will need

- Robotiq Surface Finishing Kit
- Latest URcap - Finishing Copilot URCap
- Universal Robot UR5e, UR10e, or UR16e
- Program Template: **finishing_elearning.urp**

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Folders in UR Programs

To insert a folder in your program, go to **Basic** → **Folder**. Once the folder is in the program, you can add nodes in it to build your program. In order to run only a certain part of the program, you can suppress the folders you do not want to run by selecting the folder and pressing on  .

Folders in UR Programs

In the UR program tree, it is possible to insert a **folder** node in the program. This allows to separate your program into smaller sections and is very useful for:

- Making the program clearer and easier to understand
- Testing smaller sections of the program
- Reusing the same code throughout your program

We highly recommend you use this tool since it will make your life easier when building your application.

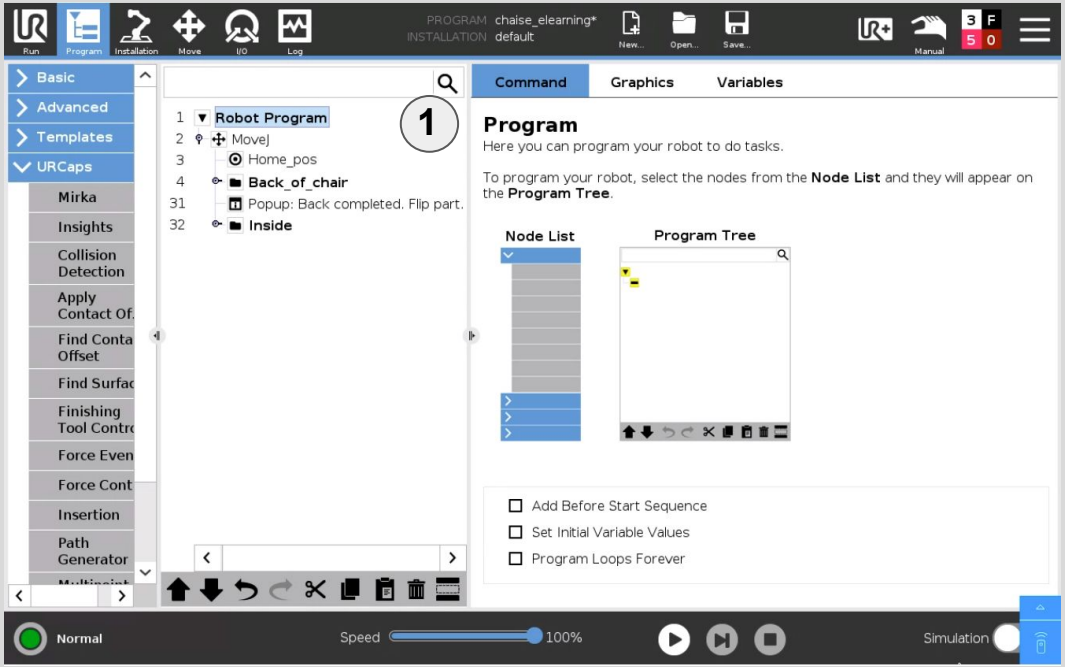
How to use the template

This template contains all the steps to process a basic part that has two set ups. The part used here is part of a wooden chair that is curved, but it can be used to process any other part.

This template is meant to be a guide for you to build your own application. You can use the whole program or only part of it. You will need to change the points and add some instructions, but the flow of the program should be similar and use the same functions.

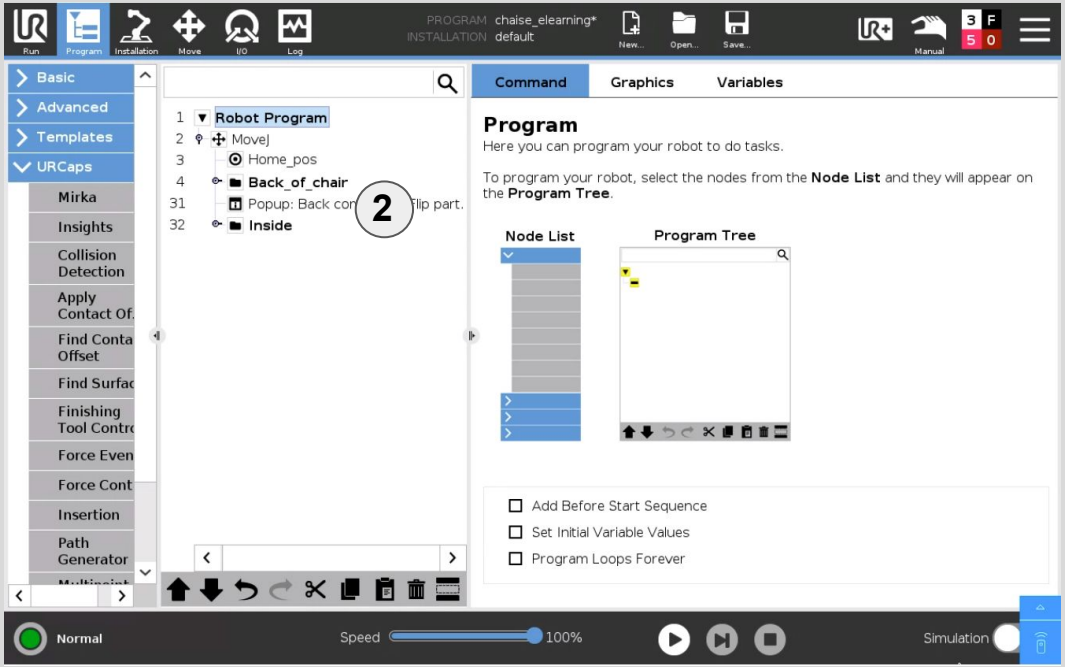
Remember, when building your program, split it in different sections for each section of the part. This will make it much easier to test and debug.

Robot Program



1 **Robot Program** is the section of the program where the main loop of the program is located. In our case, we are not using a **Before Start** sequence, but it may be useful if you have variables to set for instance.

Robot Program



2 **Folders** are used for the different sections of the part. Here we use one for the **Back** of the chair and another for the **Inside** of the chair.

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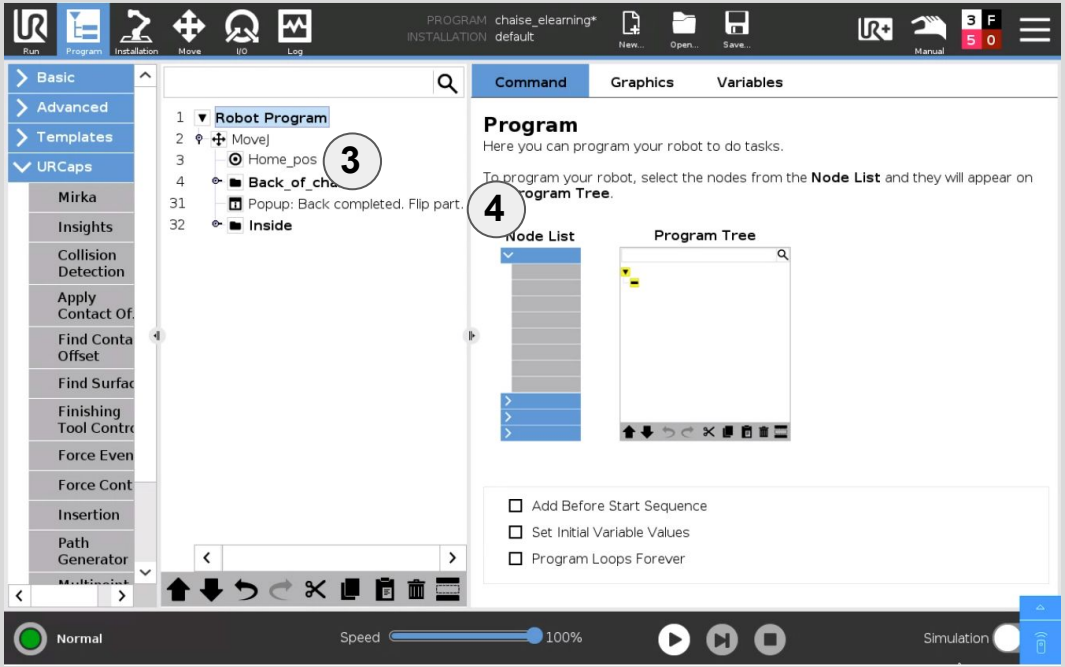
Robot Program



3 The robot start at a **home position** in order to make sure the robot is in a safe position before approaching the part.

4 This popup is used to let the operator know that the back of the part is done. It also stops the program to give time to the operator to flip the part.

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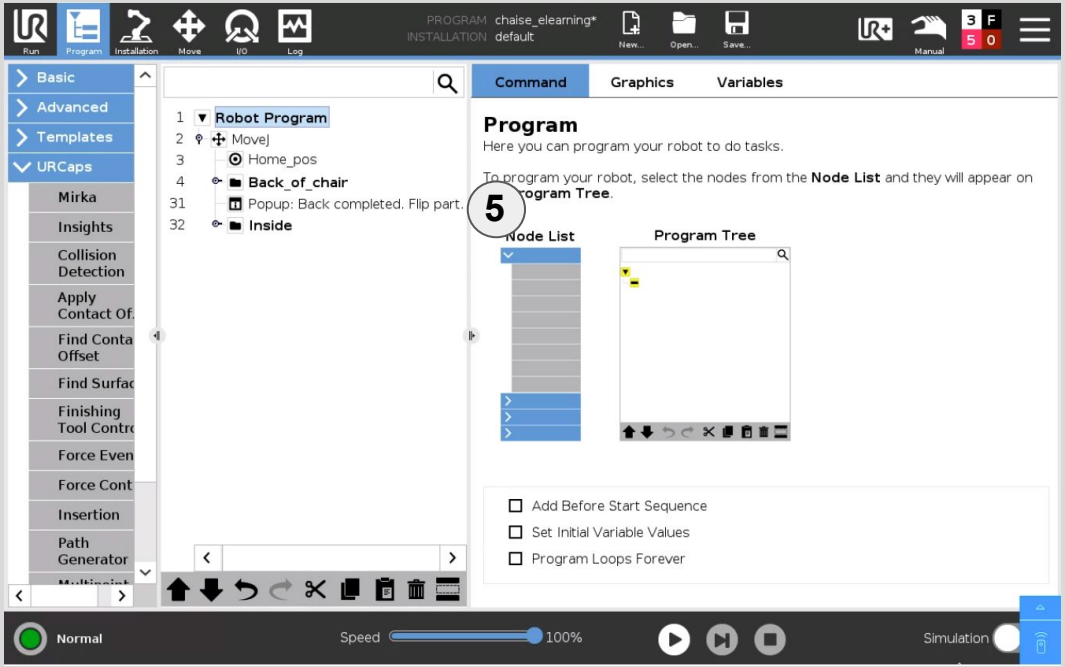
Robot Program



5 If you are using a tower light or another type of information display, you can use it between the sections of the part to let the operator know that the process is finished.

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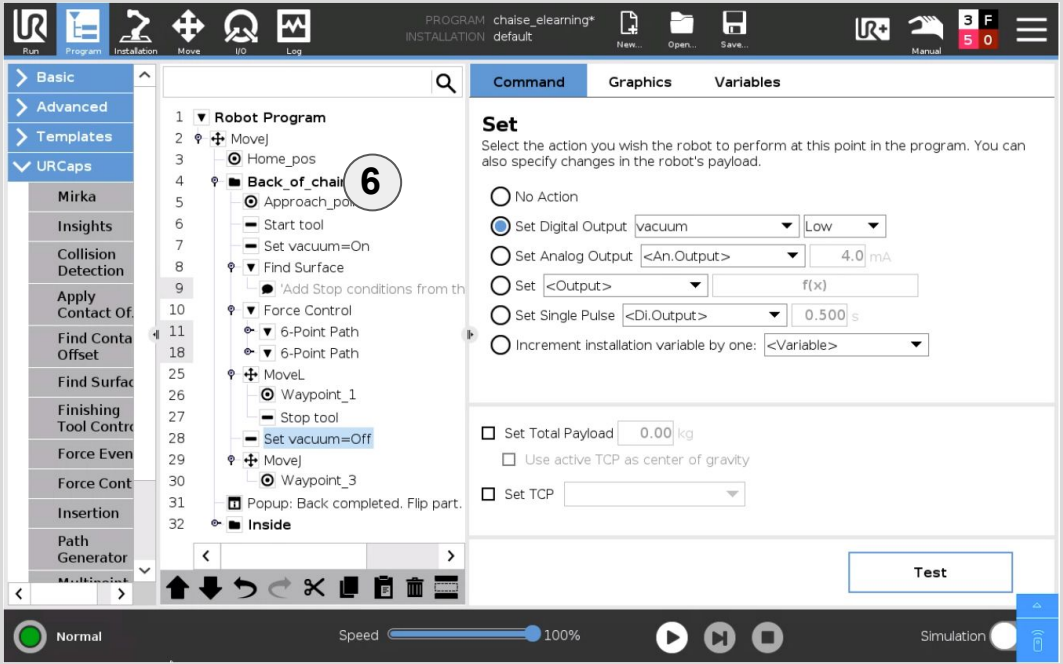
Back of the chair



6 The back of the chair is processed like this:

- Approach the point above the starting point of the path generator.
- Start the tool and vacuum.
- Find surface.
- Path.
- Relative linear move.
- Move back to home position.

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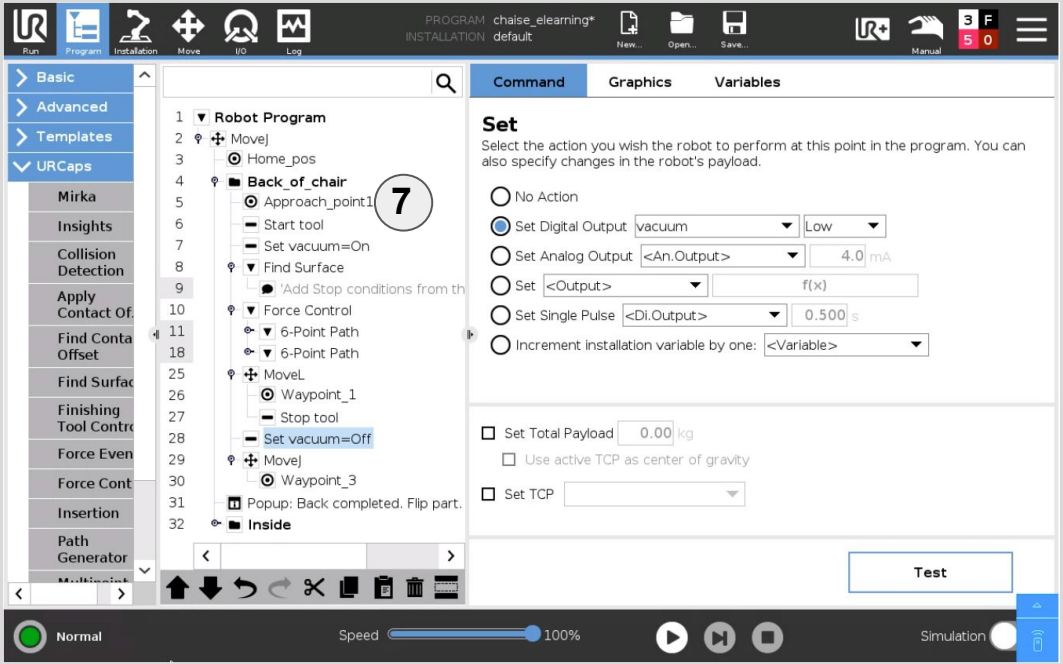
Back of the chair



7 The **Approach Point** is set over the first point of the **Path Generator**.

To set it, simply go to the first point of the **Path Generator** and move in the -Z direction in the tool frame of reference.

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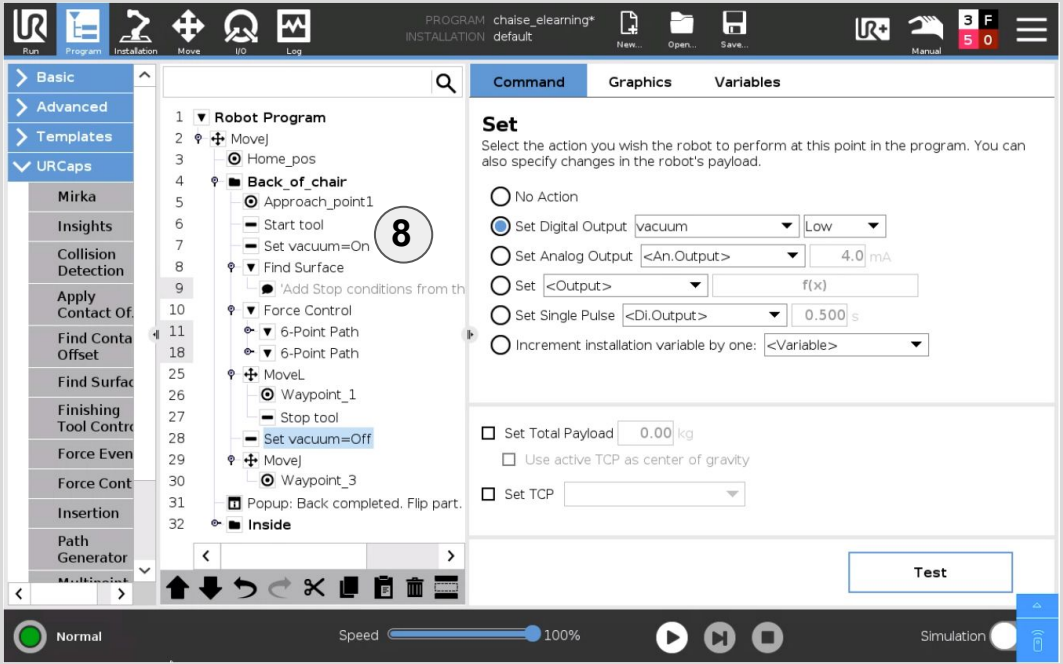
Back of the chair



8 The **Start tool** and **Set vacuum** commands are used before touching the surface.

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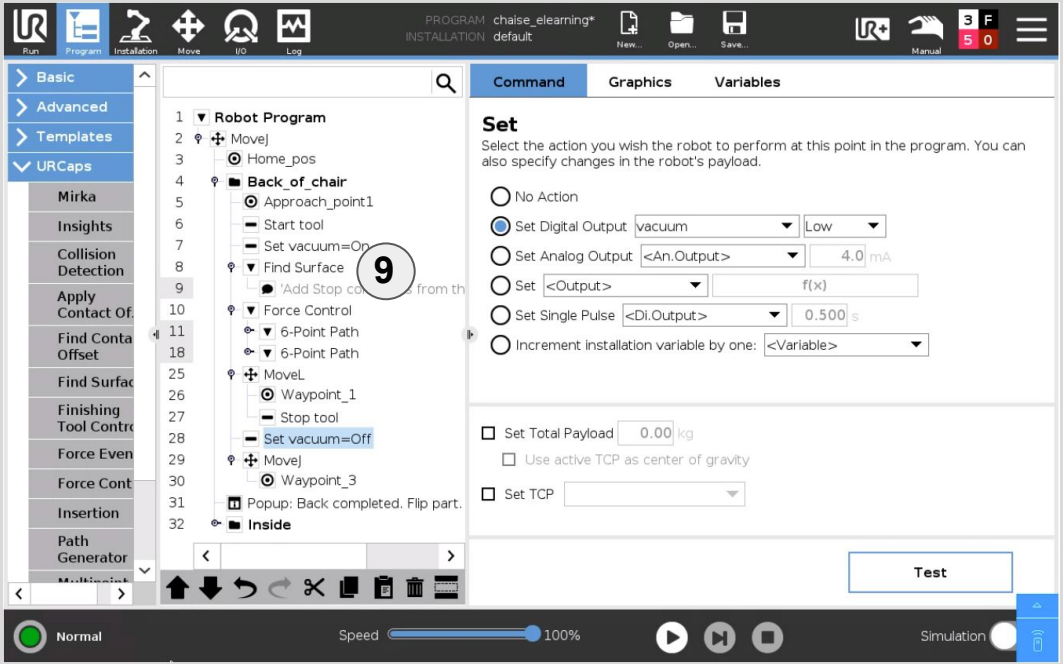
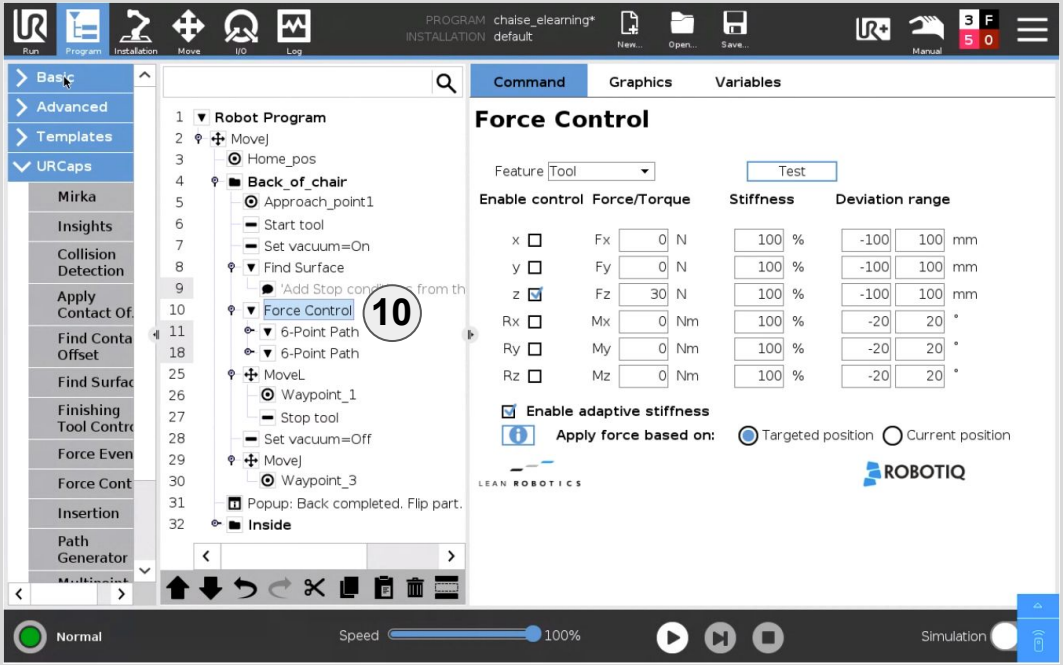
Back of the chair



9 The **Find Surface** node is used to contact the surface before the **Path Generator**.

The **Find Surface** force threshold should be set at the force used to process the surface in the **Force Control** node.

Back of the chair



10 The **Force Control** node is used to apply the proper force when processing the surface. Most of the time, the force will be in the +Z direction of the tool reference frame.

If your path is precise enough, you can use the **Targeted Position** option of the force control. This offers a better control of the force and trajectory.

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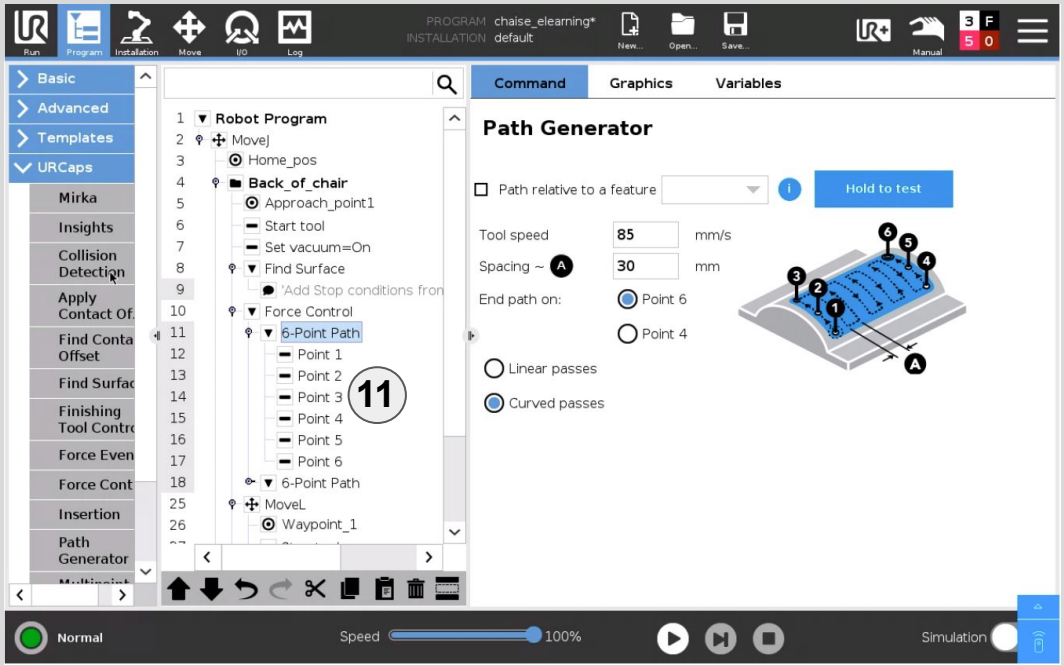
Back of the chair



11 The **6-Point Path** is used to generate the trajectory required to process the surface.

Here we use the 6 points because the surface is curved in one direction.

Since the grain of the wood is in the direction of the curve, we use the **curved passes** option.

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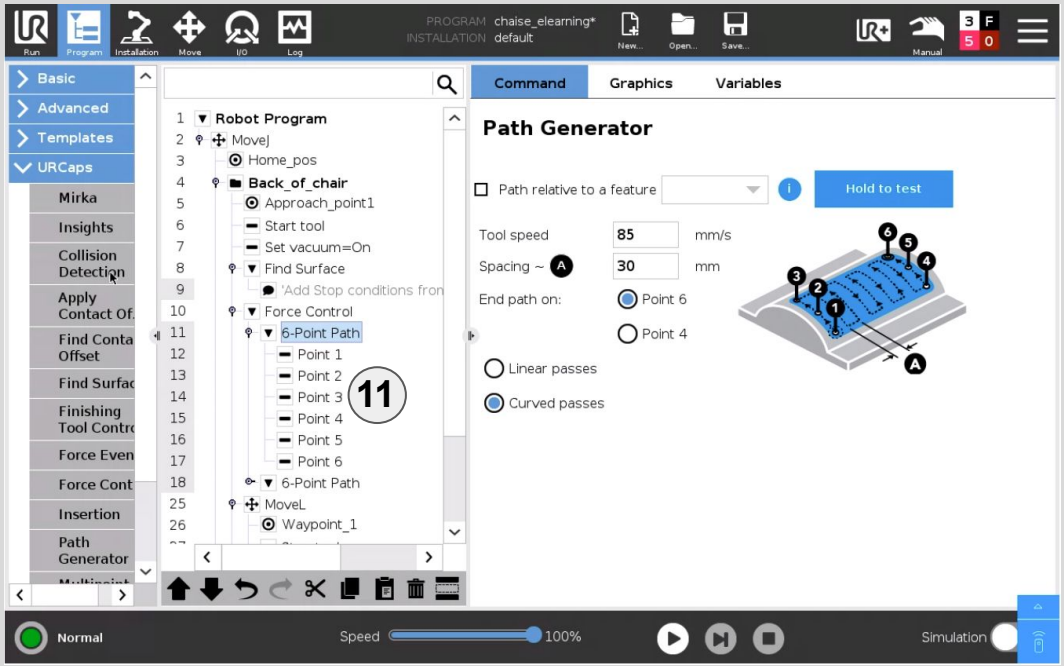
Back of the chair



11 The final point is point 6 since it will be the closest to the first point of the next path generator.

Doing that reduces the cycle time and can let you continue seamlessly on the other path generator without leaving the surface of the part.

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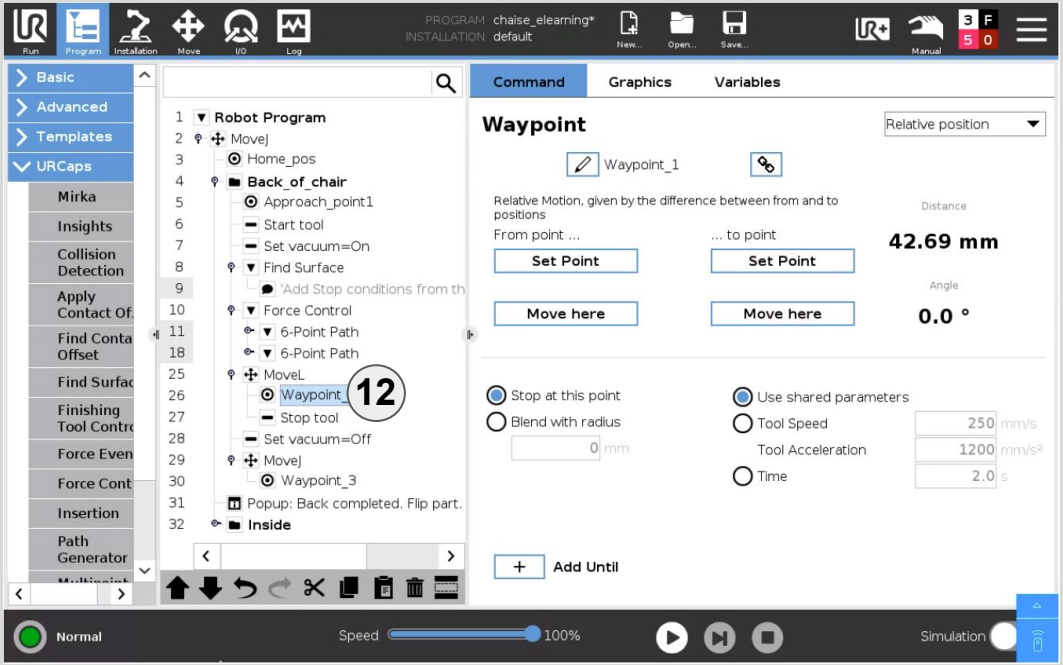
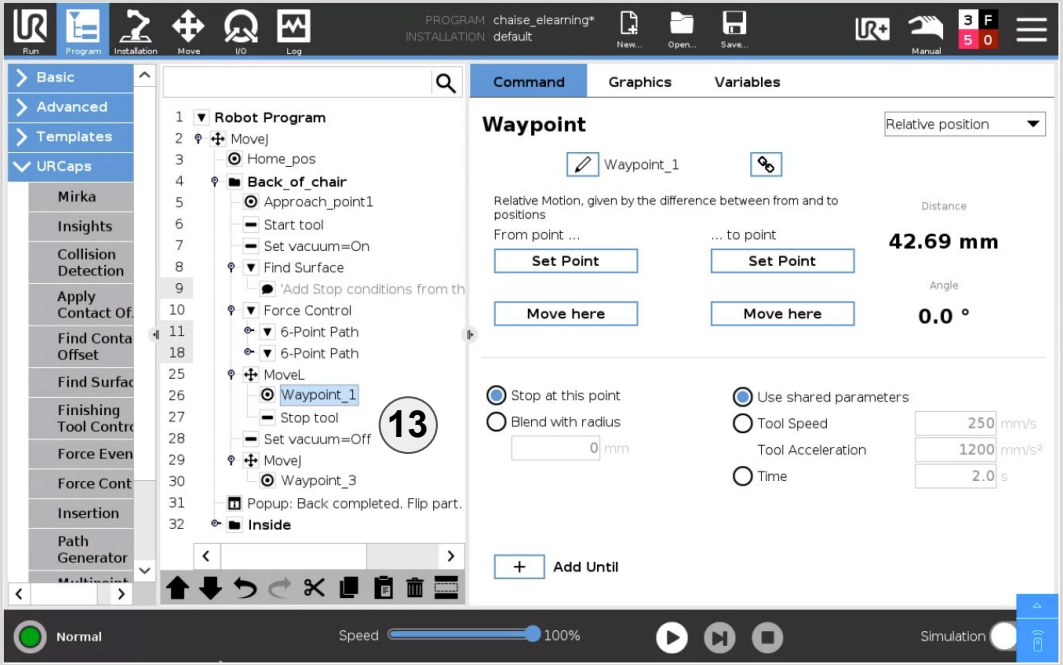
Back of the chair



12 A linear relative move is added after the **Force Control** node. It moves in the -Z direction in the tool frame of reference.

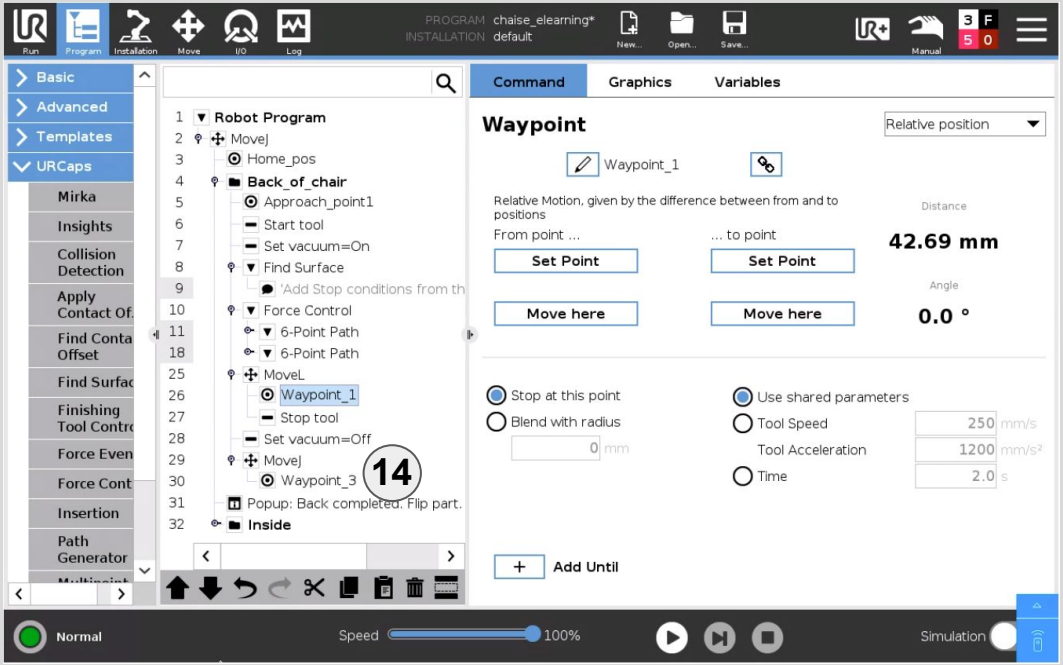
This ensure that the robot will move away of the surface once the operation on the surface is done.

Back of the chair



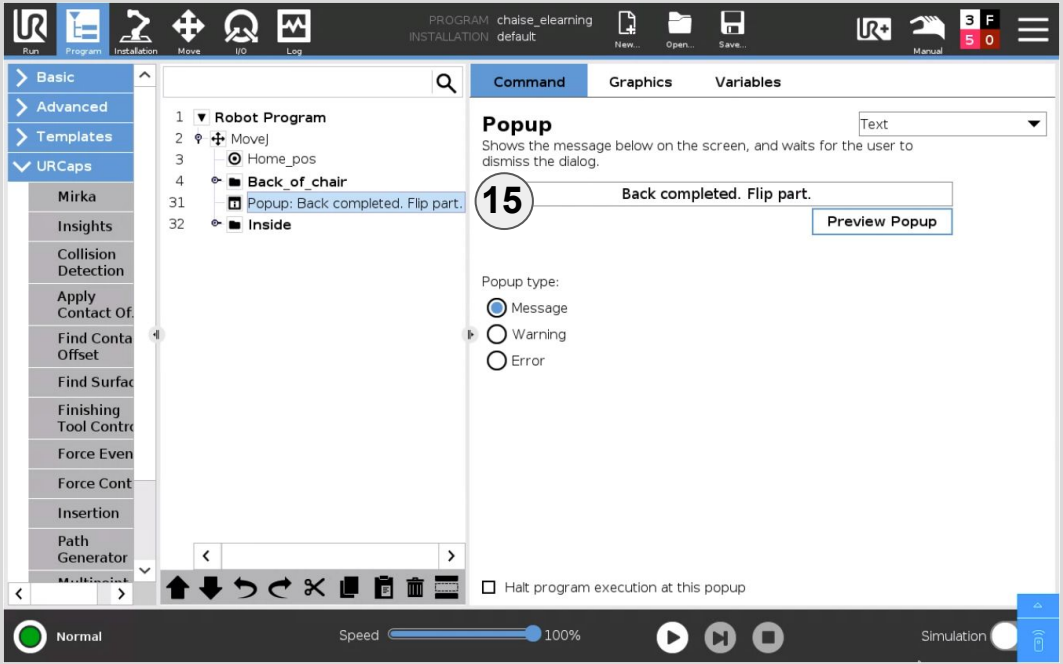
13 Once the tool is no longer on the surface, we turn it off and stop the dust collector.

Back of the chair



14 Finally we move back to the home position to clear the part.

Back of the chair



15 In this example, a **Popup** is used to let the operator know that the back of the chair is done. Once the setup is changed, the operator can continue the program through the teach pendant.

For your application, this is where you would put something like a tower light or other system to inform the operator that the process is over. Many options are available, simply find the one best suited for your application.

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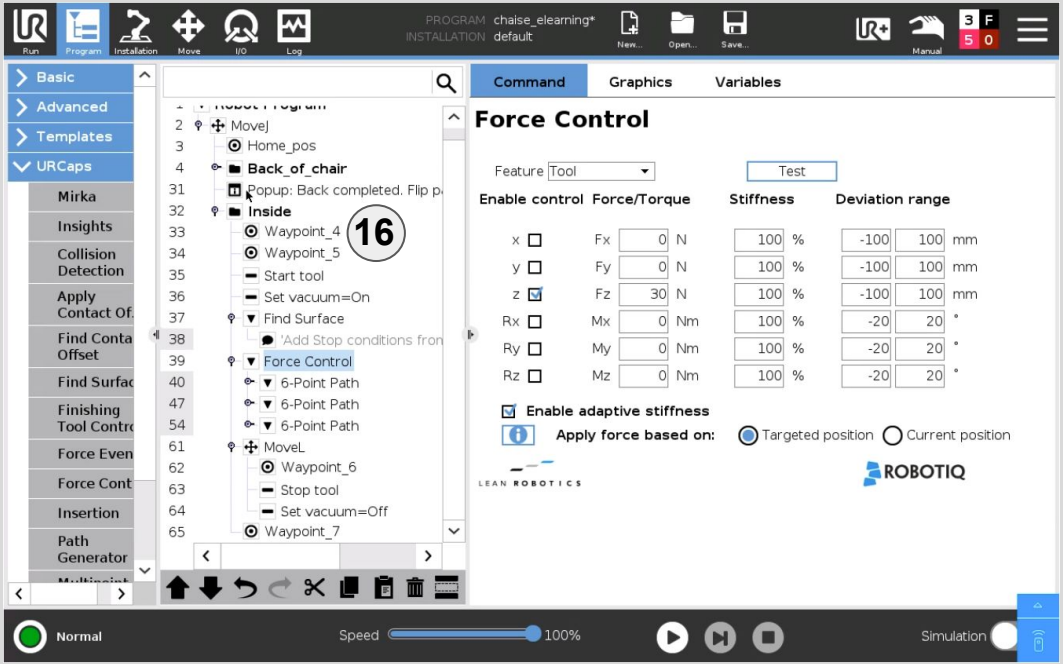
Back of the chair



16 The **Inside** folder processes the inside of the chair. The whole process is exactly like the back of the chair, but with 3 **6-Point Path** nodes instead of 2.

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