

Collision-free motion planner

RoboDK includes tools that allow you to create collision-free programs to **Collision-free motion planner**. This tool allows you to automatically generate a program between 2 points avoiding collisions.

Follow these steps to use RoboDK's **Collision-free motion planner**:

1. Double click the following file to start RoboDK with this feature activated (In the near future it will be included by default):
C:/RoboDK/RoboDK-Allow-CollisionFreePlanner.bat
2. Select **Utilities**→**Collision-free motion planner**→**Create collision-free map**, or select the corresponding icon from the toolbar (as shown in the following image).
3. Select **Update Map**. RoboDK will start generating random points in the space (samples) and connect them with other points that can be reached without any issues. These connections are called edges. This operation can take a long time depending on the setup.

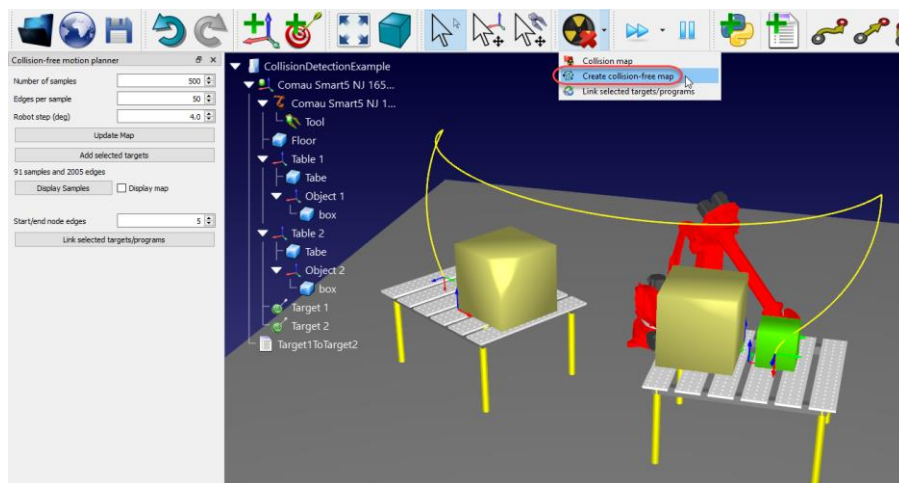
Tip: You can start with the default number of samples and stop anytime. RoboDK will retain the generated information.

Note: Make sure to properly model your setup in RoboDK before starting this procedure.

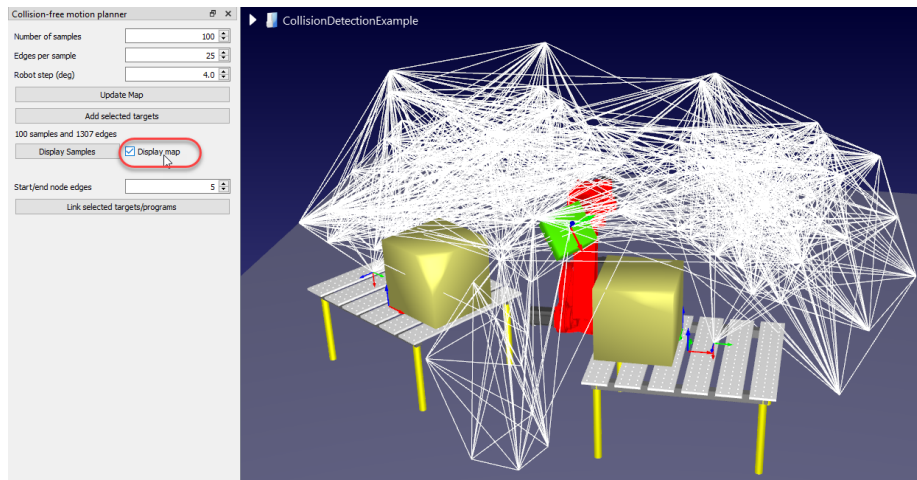
Tip: Constrain the joint space within limits, this will help narrowing the samples inside the required joint space.

Tip: Make sure to remove irrelevant interactions that are checked for collisions in the Collision Map Settings.

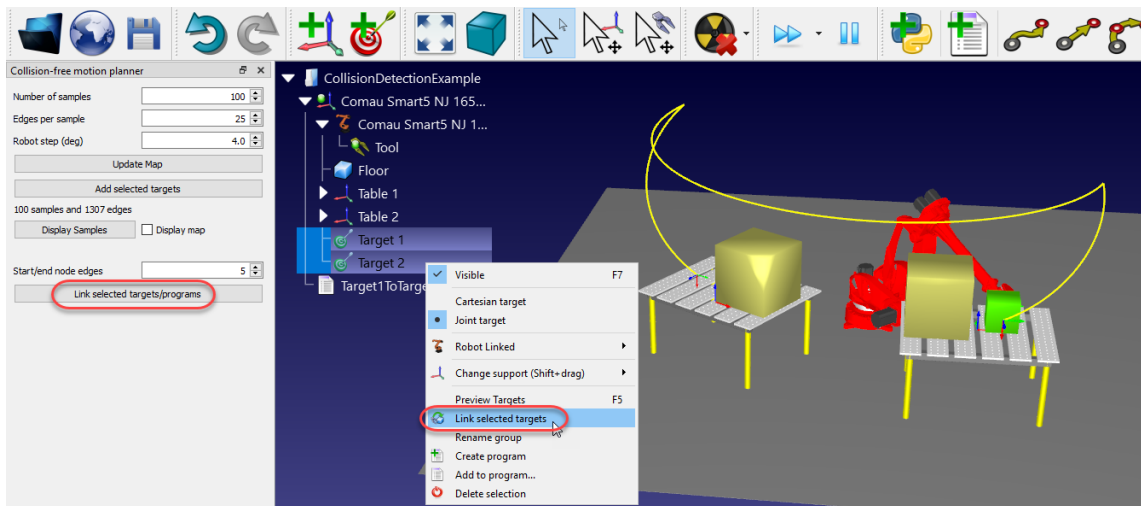
Tip: Reduce the **robot step (deg)** to improve the accuracy of the calculation. Alternatively, increasing the **robot step** will be less accurate but faster. Collisions will be checked by moving each joint at most 4 deg.



Once we generate some samples (points) we can display the map of connections between points by checking **Display map**. We can also select **Display Samples** and the robot will move through the collected samples.



Having calculated a map, we can then select 2 targets in the station and select **Link selected targets/programs**. This will create a program that moves from the first target to the second target without any collisions.



You can also select 2 or more programs and select Link selected targets/programs. This will connect all the selected programs, in order, and create a main program that runs each subprogram automatically.

If this operation fails, we can add one or more nearby targets and select **Add selected targets** to add these targets to the map. This will make it easier for the algorithm to find a path connecting the start and end targets. If we don't select any targets it will include the current robot position.

Important: This algorithm does not take the effect of wrist joint coupling into account. Some robots may have a small joint coupling in the wrist.