
WORKSHOP

PROGRAMMING FOR ROBOTS AND MANIPULATORS

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@2023

CONTENT

■ Teoretical Part

- ROS (Robot Operating System)
- Used Cases
- Autonomous Platforms
- Alternative Software
- Useful links

■ Practical Part

- Host OS
- Instalation
- Creation of a catkin workspace
- Doosan Robotics
- Univeral Robots
- Own Control from package

Theoretical Part

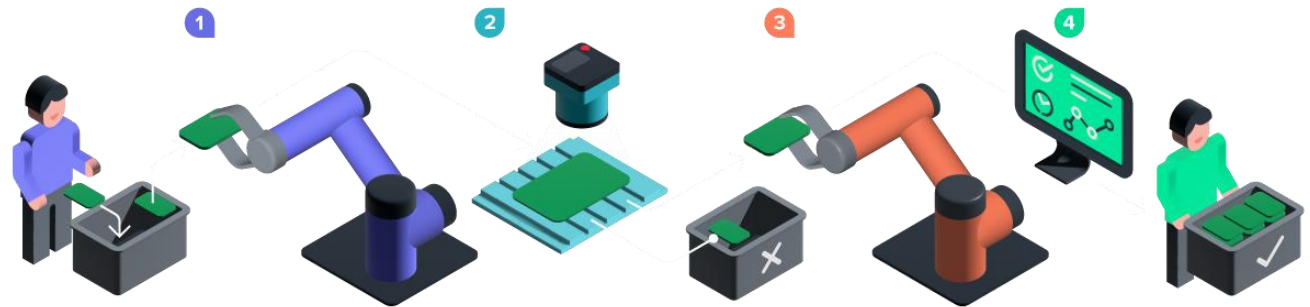
ROS (Robot Operating System)

- | | |
|----------------------------|-------------|
| • Willow Garage | 2007 |
| • ROS Box Turtle | 2010 |
| • Open Robotics | 2013 |
| • ROS2(Stable Release) | 2019 |
| • ROS Noetic / ROS2 Humble | 2025 / 2027 |



1. Filesystem level
2. Computation graph level
3. Community level

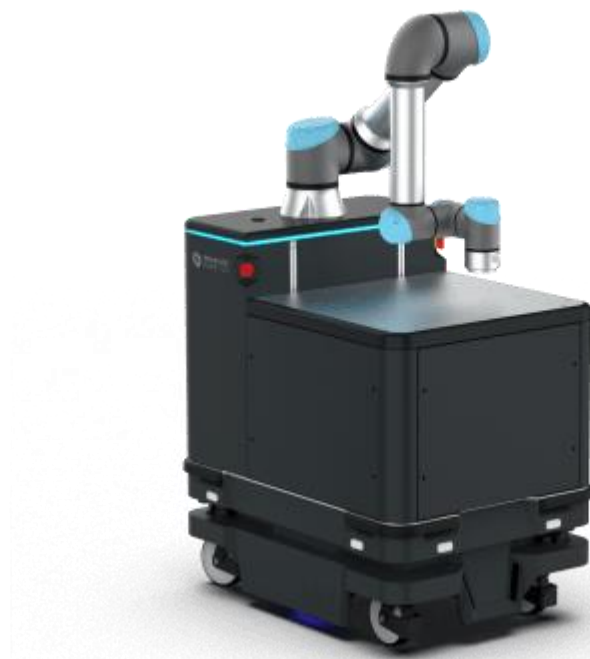
Used Cases – Kinali TEST-IT-OFF



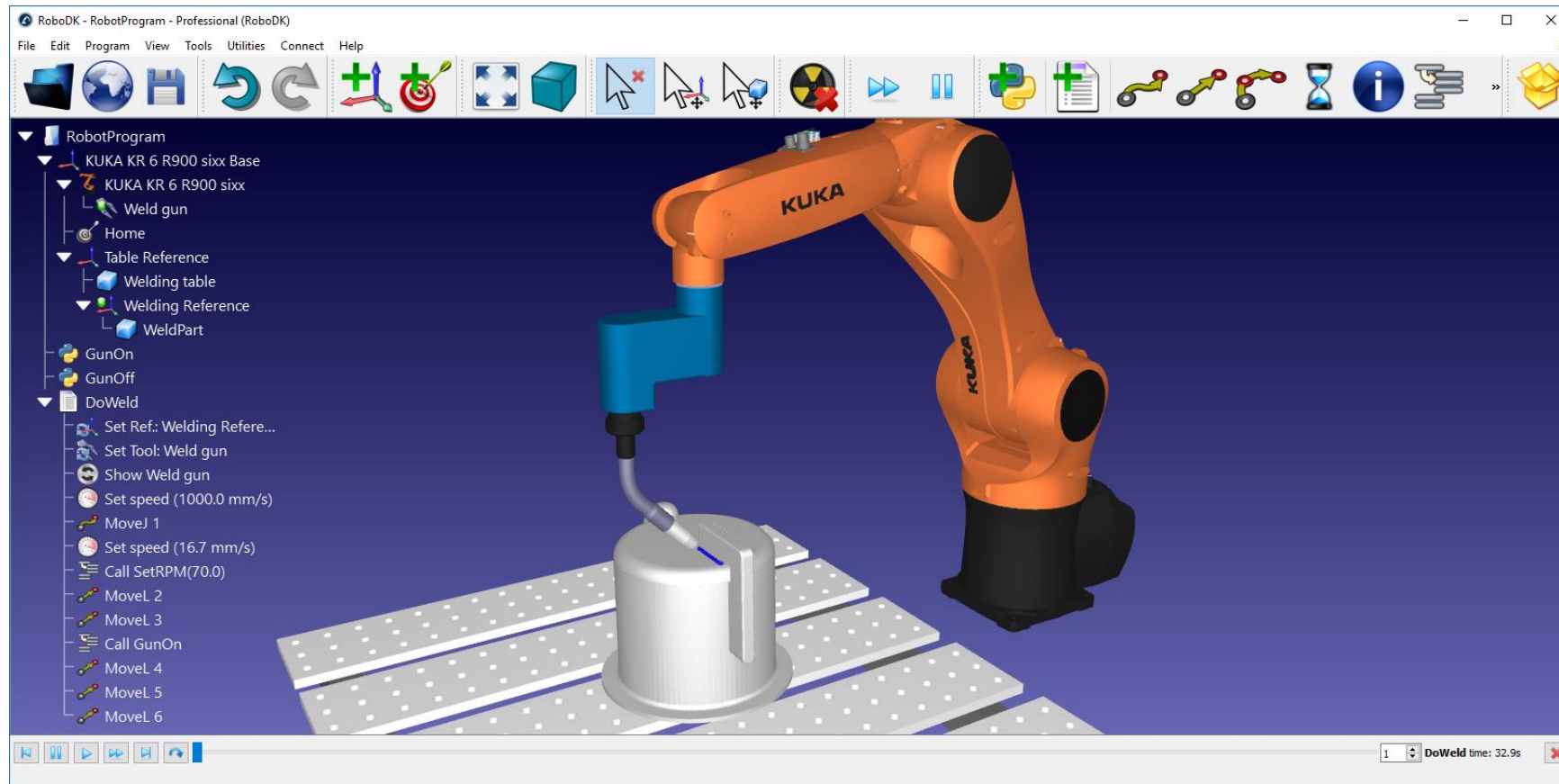
Used Cases - **AMAZON ROBOTICS**



Autonomous Platforms



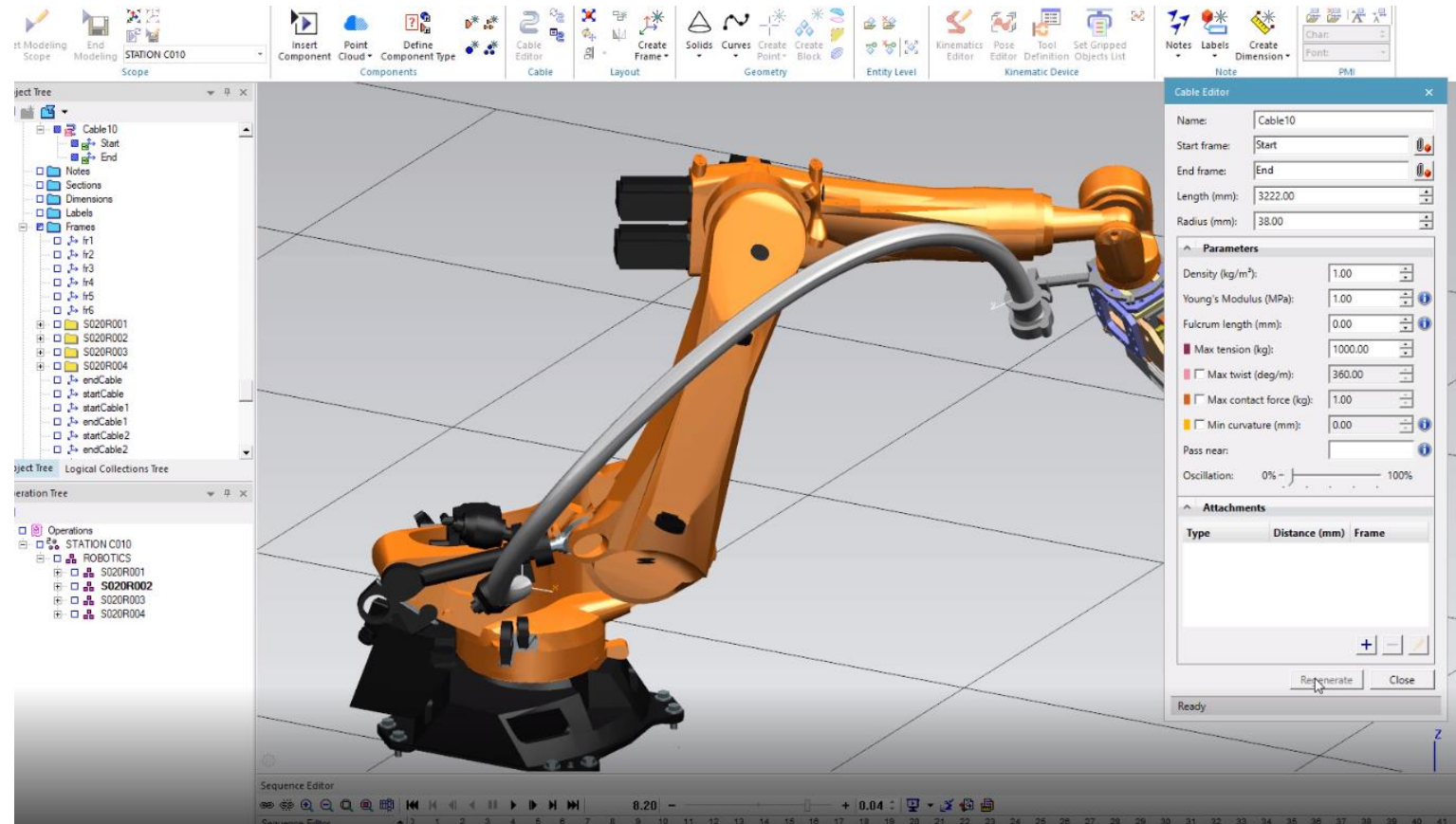
Alternative Software - RoboDK



Alternative Software – Visual Components



Alternative Software – Siemens TECNOMATIX



Useful links

VMware - [VMware - Delivering a Digital Foundation For Businesses](#)

ROS wiki - [Documentation - ROS Wiki](#)

ROS2 docs - [ROS 2 Documentation — ROS 2 Documentation: Foxy documentation](#)

ROS Noetic Instalation Ubuntu - [noetic/Installation/Ubuntu - ROS Wiki](#)

Dossan robotics repo - [doosan-robotics/doosan-robot: ROS for Doosan Robot \(github.com\)](#)

Universal robots repo - [UniversalRobots/Universal_Robots_ROS_Driver: Universal Robots ROS driver supporting CB3 and e-Series \(github.com\)](#)

Practical Part

Host OS

ubuntu 



Signle line installation (Ubuntu 20.04 – Noetic)

```
$ wget -c
https://raw.githubusercontent.com/qboticslabs/ros_install_noetic/master/ros_install_noetic.sh && chmod +x ./ros_install_noetic.sh &&
./ros_install_noetic.sh
$ source ~/.bashrc
$ rosversion -d
Noetic
$ sudo apt install python3-rosdep python3-rosinstall python3-
rosinstall-generator python3-wstool build-essential
$ sudo rosdep init
$ rosdep update
```

Do not copy \$ to terminal!
Ensure you have installed git!

Creation of a catkin workspace

```
$ mkdir catkin_ws/src  
$ cd catkin_ws  
$ catkin_make
```

Doosan Robotics package integration

```
$ cd ~/catkin_ws/src
$ git clone https://github.com/doosan-robotics/doosan-robot
$ rosdep install --from-paths doosan-robot --ignore-src --rosdistro
noetic -r -y

$ cd ~/catkin_ws/src
$ git clone https://github.com/wjwwood/serial.git
$ cd ~/catkin_ws
$ catkin_make
$ source ./devel/setup.bash
$ roslaunch dsr_launcher dsr_moveit_gazebo.launch model:=m1013
$ rosrun dsr_example_py dance_m1013.py
```

[doosan-robotics/doosan-robot: ROS for Doosan Robot \(github.com\)](https://github.com/doosan-robotics/doosan-robot)

Universal Robots package integration

```
$ git clone  
https://github.com/UniversalRobots/Universal_Robots_ROS_Driver.git  
  
$ git clone -b melodic-devel https://github.com/ros-  
industrial/universal_robot.git  
  
$ sudo apt update -qq  
$ rosdep update  
$ rosdep install --from-paths src --ignore-src -y  
$ catkin_make  
$ source devel/setup.bash
```

[UniversalRobots/Universal_Robots_ROS_Driver: Universal Robots ROS driver supporting CB3 and e-Series \(github.com\)](https://github.com/UniversalRobots/Universal_Robots_ROS_Driver)

Own Control from package

```
# catkin_create_pkg <package_name> [depend1] [depend2] [depend3]
$ catkin_create_pkg robot_control std_msgs rospy
$ cd ~/catkin_ws/src/robot_control/src
$ wget -L https://raw.githubusercontent.com/Steigner/ROS-Workshops/main/VRM/test.py
$ chmod +x test.py
$ cd ~/catkin_ws
$ catkin_make
$ source devel/setup.bash
$ rosrun robot_control test.py
```

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