WORKSHOP

PROGRAMMING FOR ROBOTS AND MANIPULATORS

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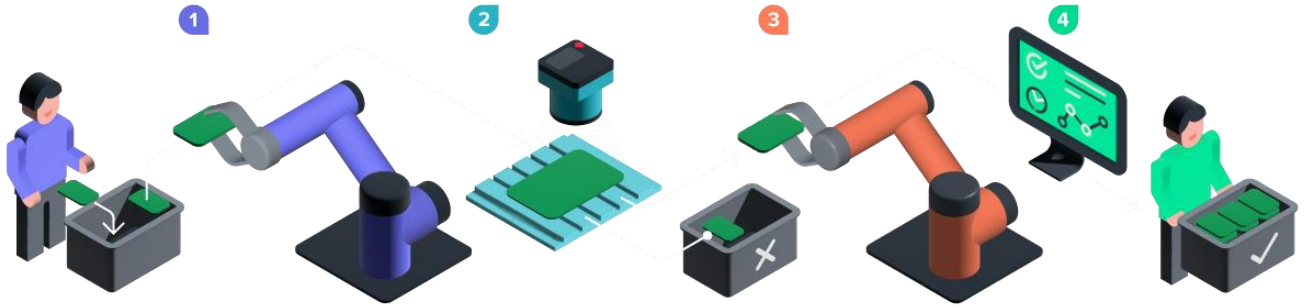
Teorical Part

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**

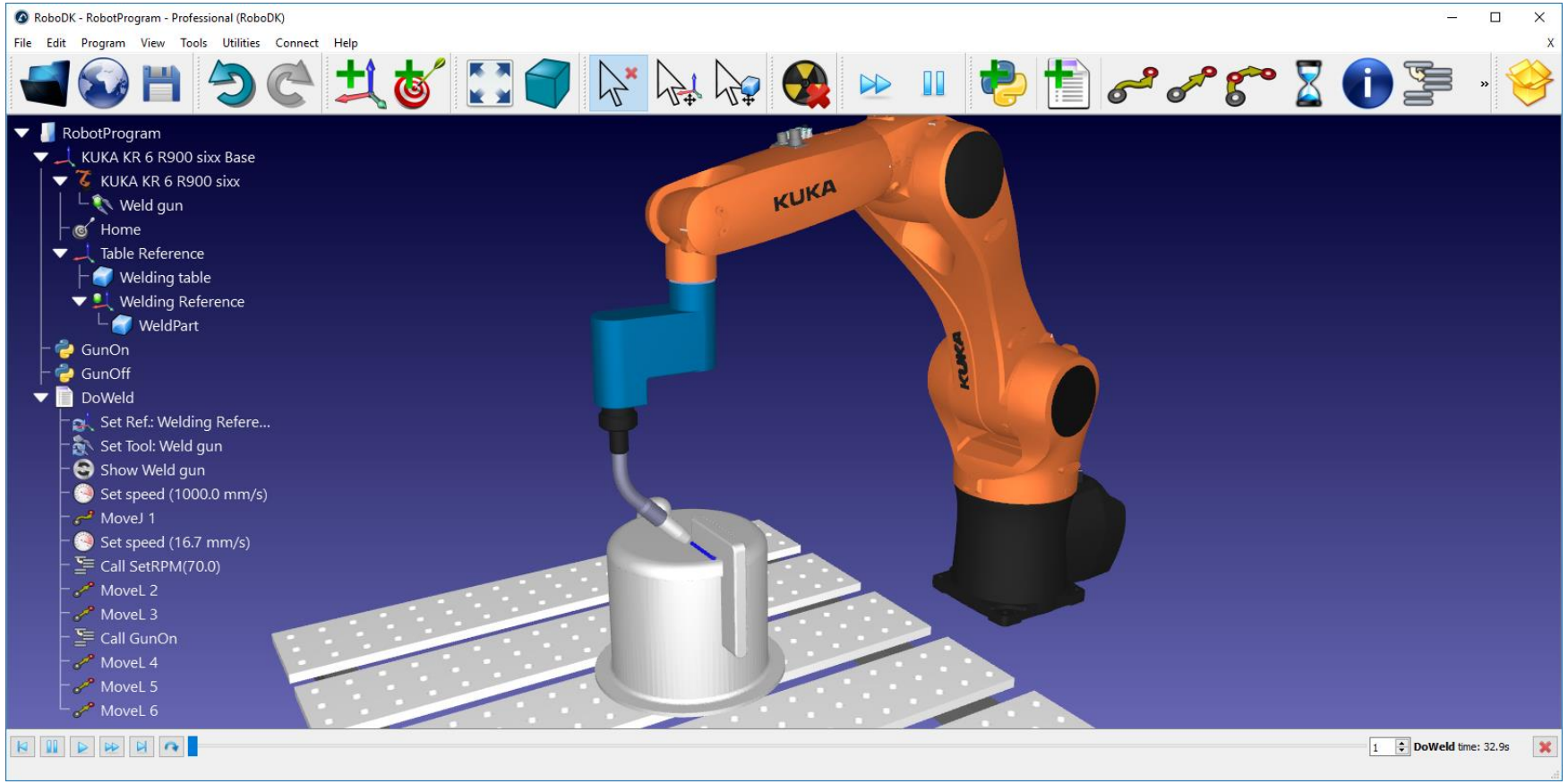


Used Cases - **FRAVEBOT**

Used Cases - **AMAZON ROBOTICS**

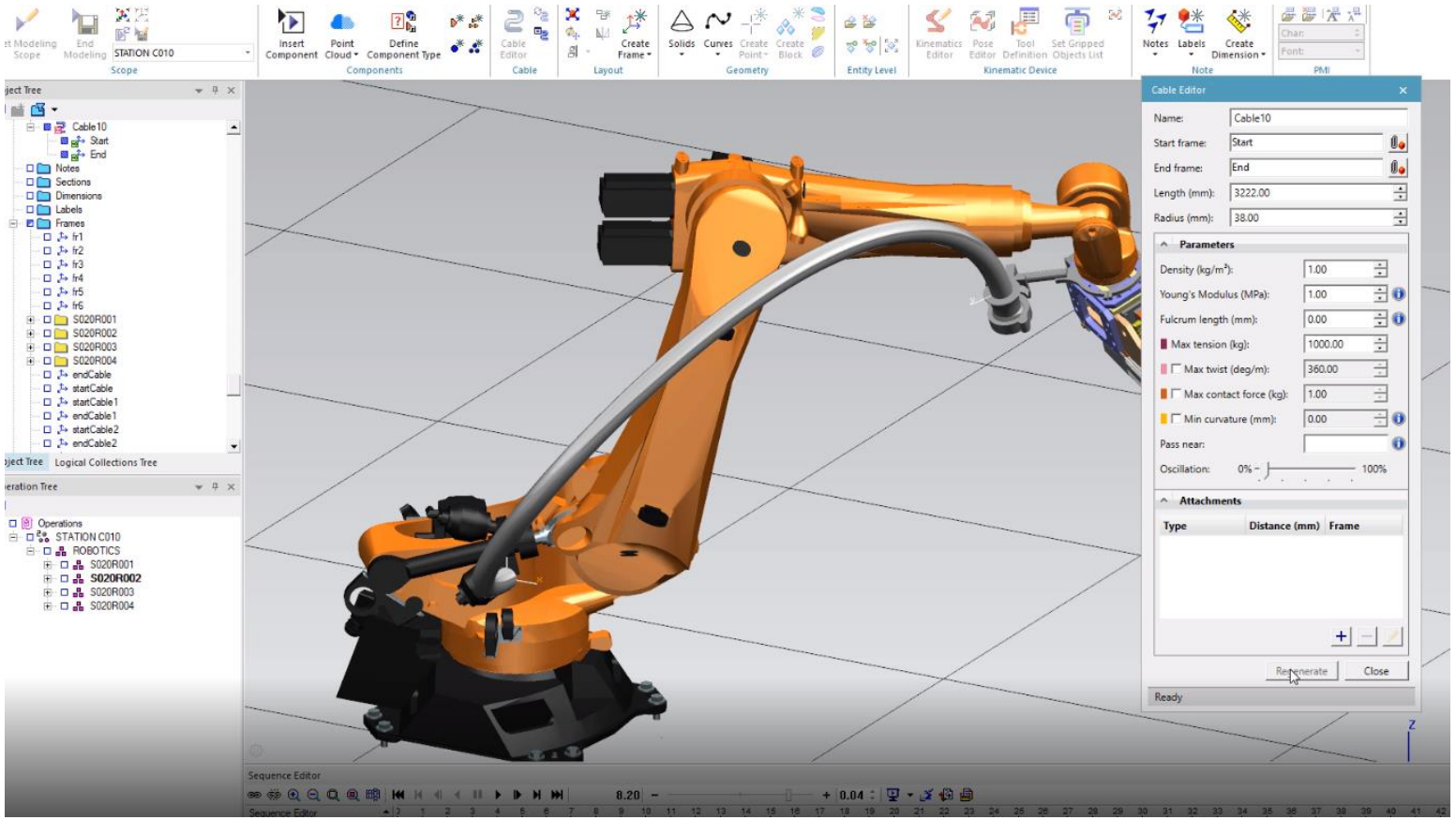
Autonomous Platforms

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

debian

Signle line installation (Ubuntu 20.04 – Noetic)

```
$ wget -c
https://raw.githubusercontent.com/qboticslabs/ros_install_noetic/mast
er/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
```

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

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
```

Univeral 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)

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Pathfinder - Vyvíjajú autonómny mobilný robot, vlani ho vyskúšali v košickej nemocnici. *Denník N - Nezávislý denník* [online]. Copyright © N Press s.r.o. [cit. 25.02.2023]. Dostupné z: https://dennikn.sk/1433088/vyvijaju-autonomny-mobilny-robot-minuly-rok-ho-vyskusali-v-kosickej-nemocnici/

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