Robot Assembly Exporting

Estimated time to completion: **10 minutes**

8.9 Step 7: ROS2 Launch

Now that the exported model is ready, let's see how we can start it using a ROS 2 launch file.

- Fill in the code for the `ROS2 launch files` .

▶ Execute in WebShell 1

In [ ]:
```
cd ~/ros2_ws/src/quadruped_description
touch launch/quadruped.launch.py
touch launch/start_rviz.launch.py
touch rviz/quadruped.rviz
```

quadruped.launch.py

In [ ]:

```python
import os

from ament_index_python.packages import get_package_share_directory
from launch import LaunchDescription
from launch.substitutions import Command
from launch_ros.actions import Node

# this is the function launch  system will look for
def generate_launch_description():

    ####### DATA INPUT ##########
    urdf_file = 'robot.urdf'
    #xacro_file = "urdfbot.xacro"
    package_description = "quadruped_description"

    ####### DATA INPUT END ##########
    print("Fetching URDF ==>")
    robot_desc_path = os.path.join(get_package_share_directory(package_description), "quadruped", urdf_file)

    # Robot State Publisher

    robot_state_publisher_node = Node(
        package='robot_state_publisher',
        executable='robot_state_publisher',
        name='robot_state_publisher_node',
        emulate_tty=True,
        parameters=[{'use_sim_time': True, 'robot_description': Command(['xacro ', robot_desc_path])}],
        output="screen"
    )


    # create and return launch description object
    return LaunchDescription(
        [
            robot_state_publisher_node,
        ]
    )
```

start_rviz.launch.py

In [ ]:

```python
import os

from ament_index_python.packages import get_package_share_directory
from launch import LaunchDescription
from launch.substitutions import Command
from launch_ros.actions import Node

# this is the function launch  system will look for
def generate_launch_description():

    package_description = "quadruped_description"

    # RVIZ Configuration
    rviz_config_dir = os.path.join(get_package_share_directory(package_description), 'rviz', 'quadruped.rviz')


    rviz_node = Node(
            package='rviz2',
            executable='rviz2',
            output='screen',
            name='rviz_node',
            parameters=[{'use_sim_time': True}],
            arguments=['-d', rviz_config_dir])

    # create and return launch description object
    return LaunchDescription(
        [
            rviz_node
        ]
    )
```

- CODE -

quadruped.rviz

In [ ]:

```
Panels:
  - Class: rviz_common/Displays
    Help Height: 78
    Name: Displays
    Property Tree Widget:
      Expanded:
        - /Global Options1
        - /RobotModel1
        - /RobotModel1/Description Topic1
        - /TF1
      Splitter Ratio: 0.5
    Tree Height: 553
  - Class: rviz_common/Selection
    Name: Selection
  - Class: rviz_common/Tool Properties
    Expanded:
      - /2D Goal Pose1
      - /Publish Point1
    Name: Tool Properties
    Splitter Ratio: 0.5886790156364441
  - Class: rviz_common/Views
    Expanded:
      - /Current View1
    Name: Views
    Splitter Ratio: 0.5
  - Class: rviz_common/Time
    Experimental: false
    Name: Time
    SyncMode: 0
    SyncSource: ""
Visualization Manager:
  Class: ""
  Displays:
    - Alpha: 0.5
      Cell Size: 1
      Class: rviz_default_plugins/Grid
      Color: 160; 160; 164
      Enabled: true
      Line Style:
        Line Width: 0.029999999329447746
        Value: Lines
      Name: Grid
      Normal Cell Count: 0
      Offset:
        X: 0
        Y: 0
        Z: 0
      Plane: XY
      Plane Cell Count: 10
      Reference Frame: <Fixed Frame>
      Value: true
    - Alpha: 1
      Class: rviz_default_plugins/RobotModel
      Collision Enabled: false
      Description File: ""
      Description Source: Topic
      Description Topic:
        Depth: 5
        Durability Policy: Transient Local
```

```
      History Policy: Keep Last
      Reliability Policy: Reliable
      Value: /robot_description
    Enabled: true
    Links:
      All Links Enabled: true
      Expand Joint Details: false
      Expand Link Details: false
      Expand Tree: false
      Link Tree Style: Links in Alphabetic Order
      lowerlimb:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      lowerlimb_2:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      lowerlimb_3:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      lowerlimb_4:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      shoulder:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      shoulder_2:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      shoulder_3:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      shoulder_4:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      torso_quadruped:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      upperlimb:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
```

```
      upperlimb_2:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      upperlimb_3:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
      upperlimb_4:
        Alpha: 1
        Show Axes: false
        Show Trail: false
        Value: true
    Name: RobotModel
    TF Prefix: ""
    Update Interval: 0
    Value: true
    Visual Enabled: true
  - Class: rviz_default_plugins/TF
    Enabled: true
    Frame Timeout: 15
    Frames:
      All Enabled: true
      lowerlimb:
        Value: true
      lowerlimb_2:
        Value: true
      lowerlimb_3:
        Value: true
      lowerlimb_4:
        Value: true
      shoulder:
        Value: true
      shoulder_2:
        Value: true
      shoulder_3:
        Value: true
      shoulder_4:
        Value: true
      torso_quadruped:
        Value: true
      upperlimb:
        Value: true
      upperlimb_2:
        Value: true
      upperlimb_3:
        Value: true
      upperlimb_4:
        Value: true
    Marker Scale: 0.30000001192092896
    Name: TF
    Show Arrows: true
    Show Axes: true
    Show Names: false
    Tree:
      torso_quadruped:
        shoulder:
          upperlimb:
```

```
            lowerlimb:
              {}
        shoulder_2:
          upperlimb_2:
            lowerlimb_2:
              {}
        shoulder_3:
          upperlimb_3:
            lowerlimb_3:
              {}
        shoulder_4:
          upperlimb_4:
            lowerlimb_4:
              {}
    Update Interval: 0
    Value: true
Enabled: true
Global Options:
  Background Color: 48; 48; 48
  Fixed Frame: torso_quadruped
  Frame Rate: 30
Name: root
Tools:
  - Class: rviz_default_plugins/Interact
    Hide Inactive Objects: true
  - Class: rviz_default_plugins/MoveCamera
  - Class: rviz_default_plugins/Select
  - Class: rviz_default_plugins/FocusCamera
  - Class: rviz_default_plugins/Measure
    Line color: 128; 128; 0
  - Class: rviz_default_plugins/SetInitialPose
    Covariance x: 0.25
    Covariance y: 0.25
    Covariance yaw: 0.06853891909122467
    Topic:
      Depth: 5
      Durability Policy: Volatile
      History Policy: Keep Last
      Reliability Policy: Reliable
      Value: /initialpose
  - Class: rviz_default_plugins/SetGoal
    Topic:
      Depth: 5
      Durability Policy: Volatile
      History Policy: Keep Last
      Reliability Policy: Reliable
      Value: /goal_pose
  - Class: rviz_default_plugins/PublishPoint
    Single click: true
    Topic:
      Depth: 5
      Durability Policy: Volatile
      History Policy: Keep Last
      Reliability Policy: Reliable
      Value: /clicked_point
Transformation:
  Current:
    Class: rviz_default_plugins/TF
Value: true
Views:
```

```
    Current:
      Class: rviz_default_plugins/Orbit
      Distance: 3.2610678672790527
      Enable Stereo Rendering:
        Stereo Eye Separation: 0.05999999865889549
        Stereo Focal Distance: 1
        Swap Stereo Eyes: false
        Value: false
      Focal Point:
        X: -0.13756126165390015
        Y: -0.17209546267986298
        Z: 0.1592952311038971
      Focal Shape Fixed Size: true
      Focal Shape Size: 0.05000000074505806
      Invert Z Axis: false
      Name: Current View
      Near Clip Distance: 0.009999999776482582
      Pitch: 0.330398291349411
      Target Frame: <Fixed Frame>
      Value: Orbit (rviz)
      Yaw: 5.758578300476074
    Saved: ~
Window Geometry:
  Displays:
    collapsed: false
  Height: 851
  Hide Left Dock: false
  Hide Right Dock: true
  QMainWindow State: 000000ff00000000fd0000000400000000000001560000002b4fc0200000008fb0000001200530065006c00650063007400690006f006e00000001e10000009b0000005d00fffffffb0000001e0054006f006f006c00200050007200
  Selection:
    collapsed: false
  Time:
    collapsed: false
  Tool Properties:
    collapsed: false
  Views:
    collapsed: true
  Width: 1600
  X: 0
  Y: 0
```

- END CODE -

- Finally, launch the needed launch files to see the URDF model and move the joints around in RVIZ:

▶ Execute in WebShell 1

- Compile first:

In [ ]:
```
cd ~/ros2_ws/
source install/setup.bash
colcon build --packages-select quadruped_description
source install/setup.bash
```

- And launch:

In [ ]:
```
cd ~/ros2_ws/
source install/setup.bash
ros2 launch quadruped_description quadruped.launch.py
```

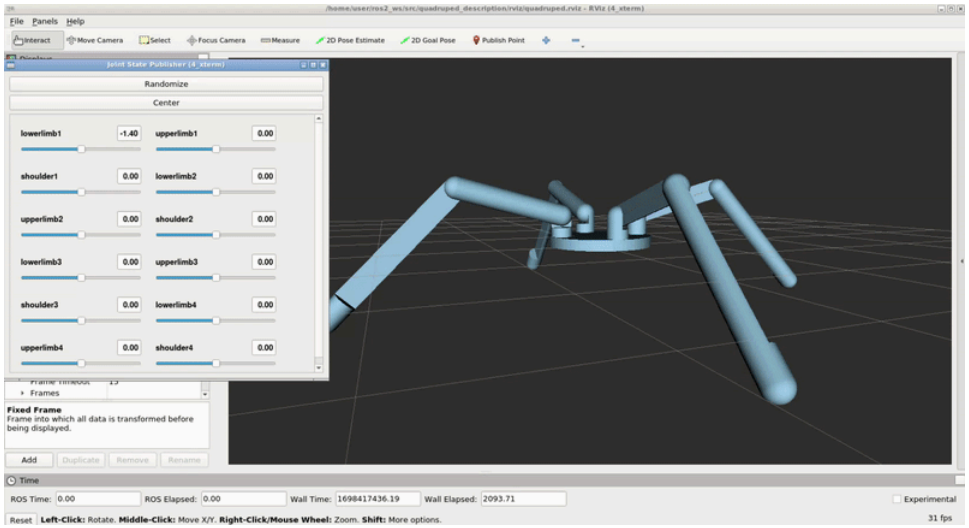
▶ Execute in WebShell 2

In [ ]:
```
cd ~/ros2_ws/
source install/setup.bash
ros2 launch quadruped_description start_rviz.launch.py
```

▶ Execute in WebShell 3

In [ ]:
```
cd ~/ros2_ws/
source install/setup.bash
ros2 run joint_state_publisher_gui joint_state_publisher_gui
```

- In RVIZ, you should see the following being able to move the joints around:



OFFICIAL DOCUMENTATION (https://onshape-to-robot.readthedocs.io/en/latest/)

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