**Assignment Task on Rviz**

**1. Create a Simple Single Link Object**

**Task:** Create a single link (e.g. a cube) and visualize it in RViz.

* **Objective:** Learn how to define a basic link with a specific shape, size, and color in a URDF file.
* **Steps:**
  1. Define a <robot> element in the URDF.
  2. Add a <link> with a <visual> tag that contains a <box> geometry.
  3. Set the size of the box and assign a color using the <material> tag.
  4. Launch RViz and load the URDF to visualize the single link.

**Expected Output in RViz:** A colored cube displayed at the origin.

**2. Create a Two-Link Robot Arm**

**Task:** Define a simple robot arm with two links connected by a joint.

* **Objective:** Learn how to connect links using joints and understand parent-child relationships in URDF.
* **Steps:**
  1. Define a base link and a second link in the URDF.
  2. Connect them using a <joint> element (e.g., revolute joint).
  3. Set the <origin> for the joint and define its axis of rotation.
  4. Visualize the robot arm in RViz.

**Expected Output in RViz:** A robot arm with two connected links where the second link rotates relative to the base link.

**3. Add a Wheel to a Base**

**Task:** Create a robot base with a single cylindrical wheel.

* **Objective:** Learn how to add a cylindrical link and attach it to the base using a revolute joint.
* **Steps:**
  1. Define a rectangular base link.
  2. Add a cylindrical link representing the wheel.
  3. Connect the wheel to the base using a <joint> (revolute joint).
  4. Set the axis of rotation for the wheel.
  5. Visualize the robot base with the wheel in RViz.

**Expected Output in RViz:** A base with a wheel that rotates along the defined axis.

**4. Create a Four-Wheeled Robot**

**Task:** Design a robot with a rectangular base and four cylindrical wheels.

* **Objective:** Understand multiple joints and symmetrical component placement in URDF.
* **Steps:**
  1. Define the base link as a rectangular box.
  2. Add four cylindrical wheels as links.
  3. Connect each wheel to the base using revolute joints.
  4. Position the wheels symmetrically around the base.
  5. Visualize the four-wheeled robot in RViz.

**Expected Output in RViz:** A robot with four wheels attached to the base.

**5. Design a Simple Robotic Arm with Three Links**

**Task:** Build a robotic arm with three links and visualize joint motion.

* **Objective:** Understand hierarchical link and joint structures in URDF.
* **Steps:**
  1. Define a base link as a cube or cylinder.
  2. Add three links as elongated boxes representing the arm segments.
  3. Connect the links with revolute joints.
  4. Set appropriate axes of rotation and relative positions for each joint.
  5. Visualize the arm in RViz and simulate joint movement using ROS plugins (e.g., joint\_state\_publisher\_gui).

**Expected Output in RViz:** A three-link arm where each link rotates around its joint.

**Instructions to upload assignment**

**1. Write code**

**2. Attach Output which you visualize in Rviz**

**3.Upload checked assignment on LMS under MSPA Activity.**