A.5 Practice 08

A.5.1 macros2.urdf.xacro

```xml
<?xml version="1.0" ?>
<robot xmlns:xacro="http://www.ros.org/wiki/xacro">

  <xacro:macro name="m_joint" params="name type axis_xyz origin_rpy
    origin_xyz parent child limit_e limit_l limit_u limit_v">
    <joint name="${name}" type="${type}">
      <axis xyz="${axis_xyz}" />
      <limit effort="${limit_e}" lower="${limit_l}" upper="${limit_u}"
    velocity="${limit_v}" />
      <origin rpy="${origin_rpy}" xyz="${origin_xyz}" />
      <parent link="${parent}" />
      <child link="${child}" />
    </joint>
  </xacro:macro>

  <xacro:macro name="m_link" params="name origin_xyz origin_rpy radius
    length mass ixx ixy ixz iyy iyz izz">
    <link name="${name}">
      <inertial>
        <mass value="${mass}" />
        <origin rpy="${origin_rpy}" xyz="${origin_xyz}" />
        <inertia ixx="${ixx}" ixy="${ixy}" ixz="${ixz}" iyy="${iyy}" iyz
    ="${iyz}" izz="${izz}" />
      </inertial>
      <collision>
        <origin rpy="${origin_rpy}" xyz="${origin_xyz}" />
        <geometry>
          <cylinder radius="${radius}" length="${length}"/>
        </geometry>
      </collision>
      <visual>
        <origin rpy="${origin_rpy}" xyz="${origin_xyz}" />
        <geometry>
          <cylinder radius="${radius}" length="${length}"/>
        </geometry>
      </visual>
    </link>
  </xacro:macro>

</robot>
```

A.5.2 robot2.urdf.xacro

```xml
<?xml version="1.0" ?>
<robot name="robot1" xmlns:xacro="http://www.ros.org/wiki/xacro">

  <!-- Start of Includes-->
```

```xml
  <xacro:include filename="$(find robot_modelling)/urdf/macros2.urdf.
    xacro" />
  <!-- End of Includes -->


<!-- Start of robot description -->
    <link name ="base_link">
        <inertial>
            <mass value="1024" />
            <origin rpy="0 0 0" xyz="0 0 0.25" />
            <inertia ixx="170.667" ixy="0" ixz="0" iyy="170.667" iyz="0"
    izz="170.667" />
        </inertial>
        <collision>
            <origin rpy="0 0 0" xyz="0 0 0.25" />
            <geometry>
                <box size="1 1 0.5" />
            </geometry>
        </collision>
        <visual>
            <origin rpy ="0 0 0 " xyz="0 0 0.25"/>
            <geometry>
                <box size="1 1 0.5"/>
            </geometry>
        </visual>
    </link>

    <xacro:m_joint name="J_0" type="revolute"
                   axis_xyz="0 0 1"
                   origin_rpy="0 0 0" origin_xyz="0 0 0.5"
                   parent="base_link" child="link_01"
                   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
    0.5" />

    <xacro:m_link name="link_01"
                    origin_rpy="0 0 0" origin_xyz="0 0 0.2"
                    radius="0.35" length="0.4"
                    mass="157.633" ixx="13.235" ixy="0" ixz="0" iyy="
    13.235" iyz="0" izz="9.655"/>


    <xacro:m_joint name="J_1" type="revolute"
                   axis_xyz="0 1 0"
                   origin_rpy="0 0 0" origin_xyz="0 0 0.4"
                   parent="link_01" child="link_02"
                   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
    0.5" />


    <xacro:m_link name="link_02"
                    origin_rpy="0 0 0" origin_xyz="0 0 0.4"
                    radius="0.15" length="0.8"
                    mass="57.906" ixx="12.679" ixy="0" ixz="0" iyy="
    12.679" iyz="0" izz="0.651"/>
```

```
   <xacro:m_joint name="J_2" type="revolute"
                  axis_xyz="0 1 0"
                  origin_rpy="0 0 0" origin_xyz="0 0 0.8"
                  parent="link_02" child="link_03"
                  limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
   0.5" />


   <xacro:m_link name="link_03"
                    origin_rpy="0 0 0" origin_xyz="0 0 0.4"
                    radius="0.15" length="0.8"
                    mass="57.906" ixx="12.679" ixy="0" ixz="0" iyy="
   12.679" iyz="0" izz="0.651"/>


   <xacro:m_joint name="J_3" type="revolute"
                  axis_xyz="0 1 0"
                  origin_rpy="0 0 0" origin_xyz="0 0 0.8"
                  parent="link_03" child="link_04"
                  limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
   0.5" />


   <xacro:m_link name="link_04"
                    origin_rpy="0 0 0" origin_xyz="0 0 0.4"
                    radius="0.15" length="0.8"
                    mass="57.906" ixx="12.679" ixy="0" ixz="0" iyy="
   12.679" iyz="0" izz="0.651"/>


   <xacro:m_joint name="J_4" type="revolute"
                  axis_xyz="0 0 1"
                  origin_rpy="0 0 0" origin_xyz="0 0 0.8"
                  parent="link_04" child="link_05"
                  limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
   0.5" />


   <xacro:m_link name="link_05"
                    origin_rpy="0 0 0" origin_xyz="0 0 0.125"
                    radius="0.15" length="0.25"
                    mass="18.056" ixx="0.479" ixy="0" ixz="0" iyy="0.479"
   iyz="0" izz="0.204"/>
<!-- End of robot description -->
</robot>
```