

A.4 Practice 07 - Modelling with URDF

A.4.1 robot1.urdf

```
1 <?xml version="1.0"?>
2 <robot name="robotarm1">
3   <link name="base_link">
4     <visual>
5       <origin rpy ="0 0 0" xyz="0 0 0.25"/>
6       <geometry>
7         <box size="1 1 0.5"/>
8       </geometry>
9     </visual>
10  </link>
11
12  <joint name="J_0" type ="revolute">
13    <axis xyz="0 0 1"/>
14    <limit effort="1000.0" lower="-3.14" upper="3.14" velocity = "
15  0.5"/>
16    <origin rpy="0 0 0" xyz="0 0 0.5"/>
17    <parent link="base_link"/>
18    <child link="link_01"/>
19  </joint>
20
21  <link name = "link_01">
22    <visual>
23      <origin rpy = "0 0 0 " xyz="0 0 0.2"/>
24      <geometry>
25        <cylinder radius="0.35" length="0.4"/>
26      </geometry>
27    </visual>
28  </link>
29
30
31  <joint name="J_1" type ="revolute">
32    <axis xyz="0 1 0"/>
33    <limit effort="1000.0" lower="-3.14" upper="3.14" velocity = "
34  0.5"/>
35    <origin rpy="0 0 0" xyz="0 0 0.4"/>
36    <parent link="link_01"/>
37    <child link="link_02"/>
38  </joint>
39
40  <link name = "link_02">
41    <visual>
42      <origin rpy = "0 0 0 " xyz="0 0 0.4"/>
43      <geometry>
44        <cylinder radius="0.15" length="0.8"/>
45      </geometry>
46    </visual>
47  </link>
```

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48
49
50 <joint name="J_2" type ="revolute">
51     <axis xyz="0 1 0"/>
52     <limit effort="1000.0" lower="-3.14" upper="3.14" velocity = "
0.5"/>
53     <origin rpy="0 0 0" xyz="0 0 0.8"/>
54     <parent link="link_02"/>
55     <child link="link_03"/>
56 </joint>
57
58
59 <link name = "link_03">
60     <visual>
61         <origin rpy = "0 0 0 " xyz="0 0 0.4"/>
62         <geometry>
63             <cylinder radius="0.15" length="0.8"/>
64         </geometry>
65     </visual>
66 </link>
67
68
69 <joint name="J_3" type ="revolute">
70     <axis xyz="0 1 0"/>
71     <limit effort="1000.0" lower="-3.14" upper="3.14" velocity = "
0.5"/>
72     <origin rpy="0 0 0" xyz="0 0 0.8"/>
73     <parent link="link_03"/>
74     <child link="link_04"/>
75 </joint>
76
77
78 <link name = "link_04">
79     <visual>
80         <origin rpy = "0 0 0 " xyz="0 0 0.4"/>
81         <geometry>
82             <cylinder radius="0.15" length="0.8"/>
83         </geometry>
84     </visual>
85 </link>
86
87
88 <joint name="J_4" type ="revolute">
89     <axis xyz="0 0 1"/>
90     <limit effort="1000.0" lower="-3.14" upper="3.14" velocity = "
0.5"/>
91     <origin rpy="0 0 0" xyz="0 0 0.8"/>
92     <parent link="link_04"/>
93     <child link="link_05"/>
94 </joint>
95
96
97 <link name = "link_05">
98     <visual>

```

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99         <origin rpy = "0 0 0 " xyz="0 0 0.125"/>
100         <geometry>
101             <cylinder radius="0.15" length="0.25"/>
102         </geometry>
103     </visual>
104 </link>
105
106 </robot>

```

A.4.2 macros.urdf.xacro

```

1 <?xml version="1.0" ?>
2 <robot xmlns:xacro="http://www.ros.org/wiki/xacro">
3
4     <xacro:macro name="m_joint" params="name type axis_xyz origin_rpy
5         origin_xyz parent child limit_e limit_l limit_u limit_v">
6         <joint name="${name}" type="${type}">
7             <axis xyz="${axis_xyz}" />
8             <limit effort="${limit_e}" lower="${limit_l}" upper="${limit_u}"
9                 velocity="${limit_v}" />
10             <origin rpy="${origin_rpy}" xyz="${origin_xyz}" />
11             <parent link="${parent}" />
12             <child link="${child}" />
13         </joint>
14     </xacro:macro>
15
16     <xacro:macro name="m_link" params="name origin_rpy origin_xyz radius
17         length">
18         <link name = "${name}">
19             <visual>
20                 <origin rpy = "${origin_rpy}" xyz="${origin_xyz}" />
21                 <geometry>
22                     <cylinder radius="${radius}" length="${length}" />
23                 </geometry>
24             </visual>
25         </link>
26     </xacro:macro>
27 </robot>

```

A.4.3 robot1.urdf.xacro

```

1 <?xml version="1.0" ?>
2 <robot name="robot1" xmlns:xacro="http://www.ros.org/wiki/xacro">
3
4     <!-- Start of Includes-->
5     <xacro:include filename="$(find robot_modelling)/urdf/macros.urdf.
6         xacro" />
7     <!-- End of Includes -->
8
9     <!-- Start of robot description -->

```

```

10 <link name = "base_link">
11   <visual>
12     <origin rpy = "0 0 0 " xyz="0 0 0.25"/>
13     <geometry>
14       <box size="1 1 0.5"/>
15     </geometry>
16   </visual>
17 </link>
18
19 <xacro:m_joint name="J_0" type="revolute"
20   axis_xyz="0 0 1"
21   origin_rpy="0 0 0" origin_xyz="0 0 0.5"
22   parent="base_link" child="link_01"
23   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
0.5" />
24
25 <xacro:m_link name="link_01"
26   origin_rpy="0 0 0" origin_xyz="0 0 0.2"
27   radius="0.35" length="0.4"/>
28
29
30 <xacro:m_joint name="J_1" type="revolute"
31   axis_xyz="0 1 0"
32   origin_rpy="0 0 0" origin_xyz="0 0 0.4"
33   parent="link_01" child="link_02"
34   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
0.5" />
35
36
37 <xacro:m_link name="link_02"
38   origin_rpy="0 0 0" origin_xyz="0 0 0.4"
39   radius="0.15" length="0.8"/>
40
41
42 <xacro:m_joint name="J_2" type="revolute"
43   axis_xyz="0 1 0"
44   origin_rpy="0 0 0" origin_xyz="0 0 0.8"
45   parent="link_02" child="link_03"
46   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
0.5" />
47
48
49 <xacro:m_link name="link_03"
50   origin_rpy="0 0 0" origin_xyz="0 0 0.4"
51   radius="0.15" length="0.8"/>
52
53
54 <xacro:m_joint name="J_3" type="revolute"
55   axis_xyz="0 1 0"
56   origin_rpy="0 0 0" origin_xyz="0 0 0.8"
57   parent="link_03" child="link_04"
58   limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
0.5" />
59

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```

60
61 <xacro:m_link name="link_04"
62     origin_rpy="0 0 0" origin_xyz="0 0 0.4"
63     radius="0.15" length="0.8"/>
64
65
66 <xacro:m_joint name="J_4" type="revolute"
67     axis_xyz="0 0 1"
68     origin_rpy="0 0 0" origin_xyz="0 0 0.8"
69     parent="link_04" child="link_05"
70     limit_e="1000" limit_l="-3.14" limit_u="3.14" limit_v="
0.5" />
71
72
73 <xacro:m_link name="link_05"
74     origin_rpy="0 0 0" origin_xyz="0 0 0.125"
75     radius="0.15" length="0.25"/>
76 <!-- End of robot description -->
77
78 </robot>

```