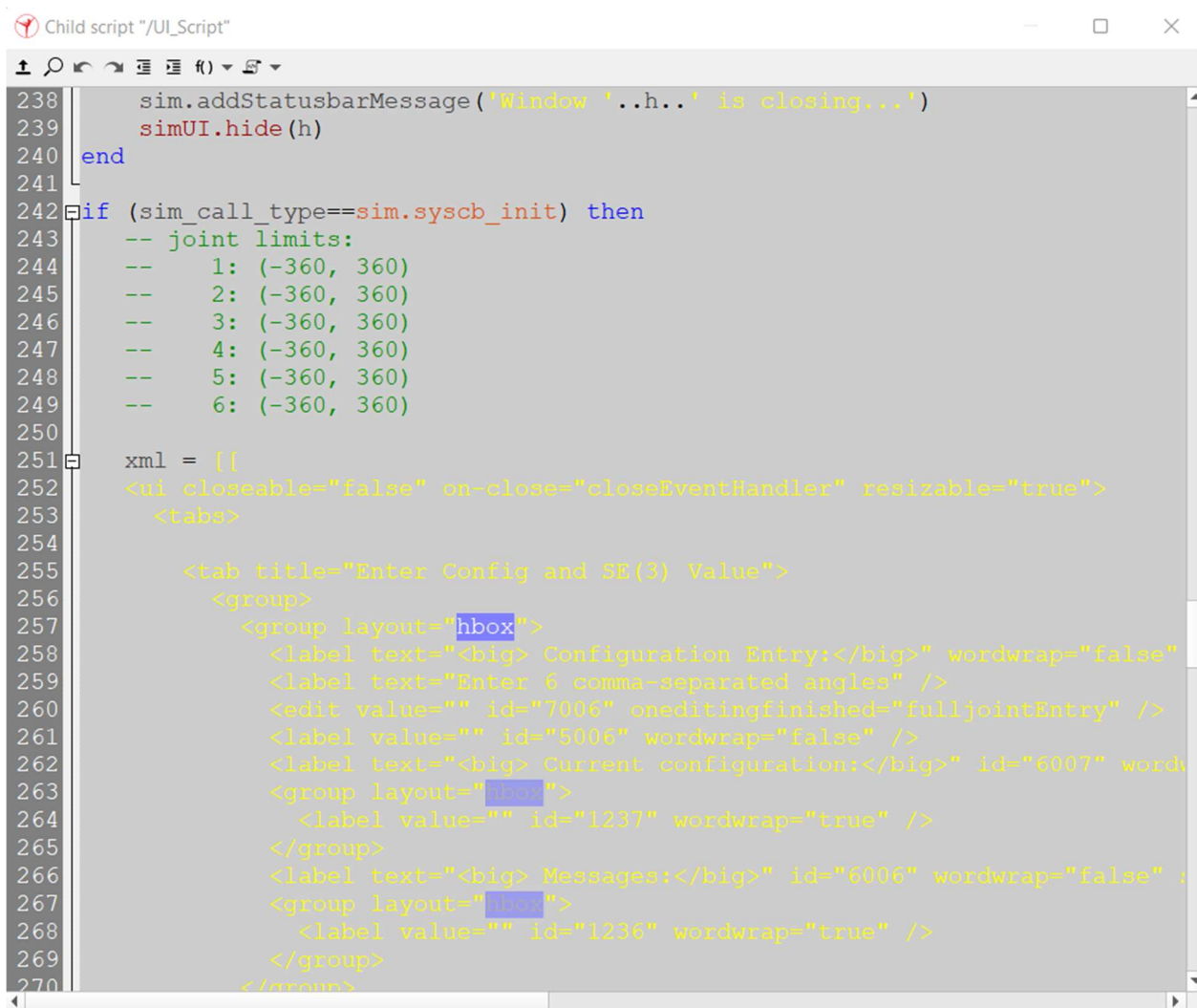


ME449 Homework 1

Sean Morton, 10/14/22

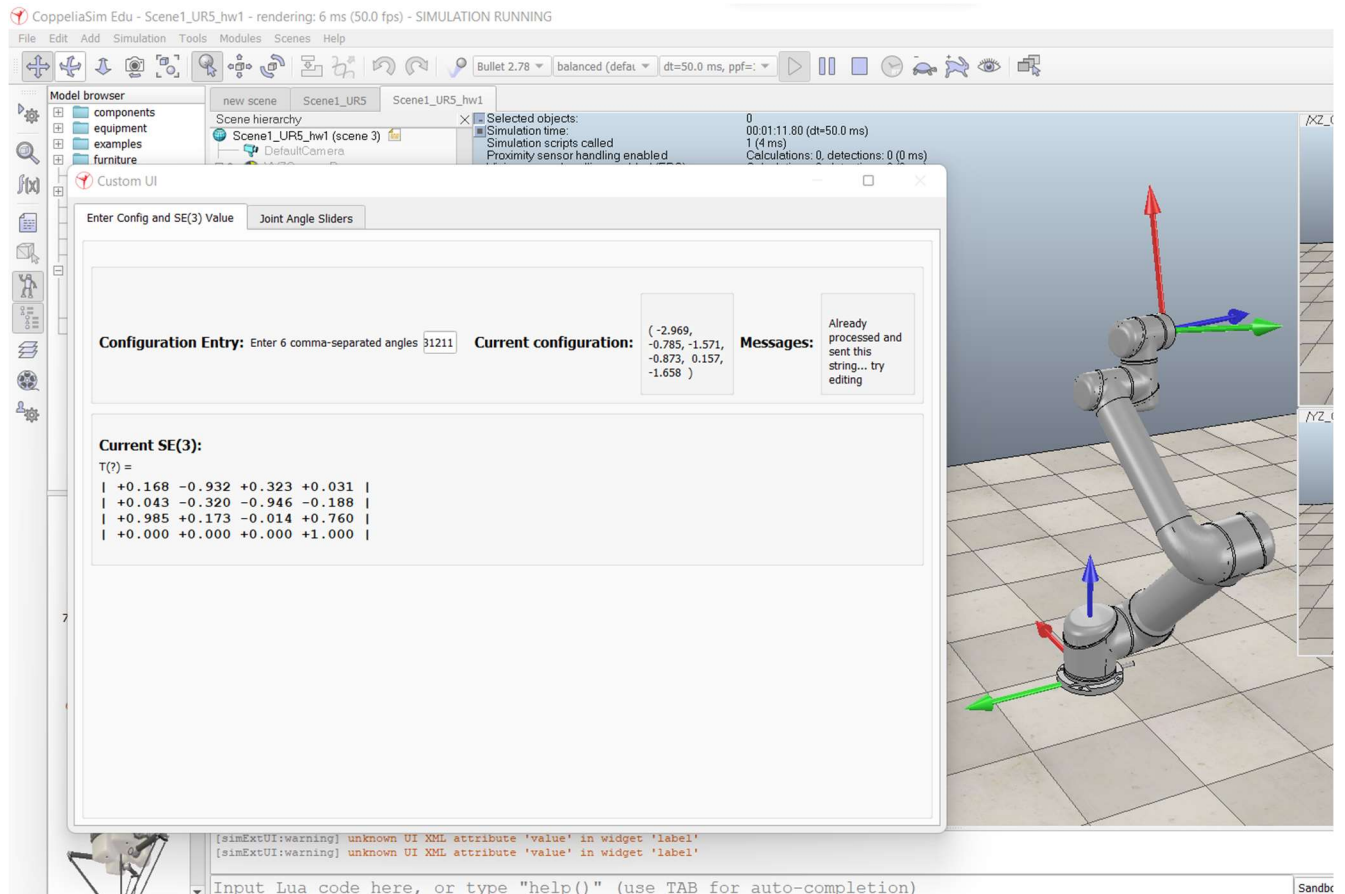
Part 1B



```
238     sim.addStatusbarMessage('Window '..h..' is closing...')
239     simUI.hide(h)
240 end
241
242 if (sim_call_type==sim.syscb_init) then
243     -- joint limits:
244     -- 1: (-360, 360)
245     -- 2: (-360, 360)
246     -- 3: (-360, 360)
247     -- 4: (-360, 360)
248     -- 5: (-360, 360)
249     -- 6: (-360, 360)
250
251     xml = [[
252     <ui closeable="false" on-close="closeEventHandler" resizable="true">
253         <tabs>
254
255             <tab title="Enter Config and SE(3) Value">
256                 <group>
257                     <group layout="hbox">
258                         <label text="<big> Configuration Entry:</big>" wordwrap="false"
259                         <label text="Enter 6 comma-separated angles" />
260                         <edit value="" id="7006" oneditingfinished="fullJointEntry" />
261                         <label value="" id="5006" wordwrap="false" />
262                         <label text="<big> Current configuration:</big>" id="6007" word
263                     <group layout="vbox">
264                         <label value="" id="1237" wordwrap="true" />
265                     </group>
266                     <label text="<big> Messages:</big>" id="6006" wordwrap="false"
267                     <group layout="hbox">
268                         <label value="" id="1236" wordwrap="true" />
269                     </group>
270                 </group>
271             </tab>
272         </tabs>
273     </ui>
274     ]]
```

This is the UI script for Scene 1 in CoppeliaSim. I changed the group layouts of the UI so that all the vertical boxes “vbox” were changed to horizontal boxes “hbox”.

Parts 1B + 2



This is a screenshot of my CoppeliaSim Scene, showing:

- The changes to the UI I made
- The position of the robot after moving to the joint angles calculated in my Python script
- The SE(3) matrix corresponding to the orientation of the robot. The rotation matrix within the SE(3) representation is approximately equal to the rotation matrix R_{sb} I calculated in Python, within 2 decimal places. Below: comparison between CoppeliaSim and Python output

Current SE(3):
 $T(?) =$

+	0.168	-0.932	+0.323	+0.031
+	0.043	-0.320	-0.946	-0.188
+	0.985	+0.173	-0.014	+0.760
+	0.000	+0.000	+0.000	+1.000

Rotation matrix R_{sb} :

[0.1676	-0.9308	0.3250]
[0.0434	-0.3224	-0.9456]
[0.9849	0.1726	-0.0136]

See attached for Python code + full outputs