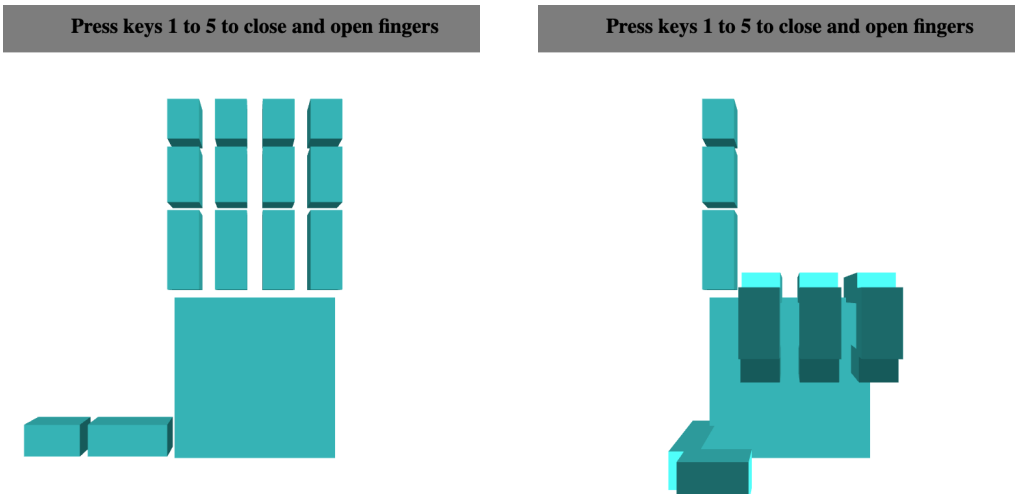
A16 – Scene

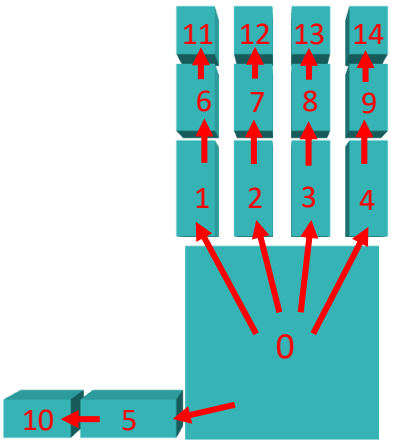
The goal of the application contained in `index.html`, is to allow the user to control a robotic hand, allowing to open and close fingers with keys 1 to 5:



In file `Scene.js` there is a procedure `DrawSceneTree(S)` which receives as parameters an encoding of the scene graph. In particular, `S` is an array of eight component tuples, each one representing the positioning of one object. Element in position *0* (the first element of the array) is the root node. The components of the tuples represents respectively:

- The first three elements (indices *0*, *1*, and *2*) are the *x*, *y* and *z* coordinates of the object, used to define the translation of the object.
- The next three elements (indices *3*, *4*, and *5*) are the rotations around the *x*, *y* and *z* axes, and are used to define the rotation of the object. Euler angles are used in the *zxy* order.
- The seventh element (index *6*) is the index of the first child of the considered node, and the eight element (index *7*) is the index of the last child. If the considered element is a leaf of the tree (i.e. it does not have any children), both elements are set to -1.

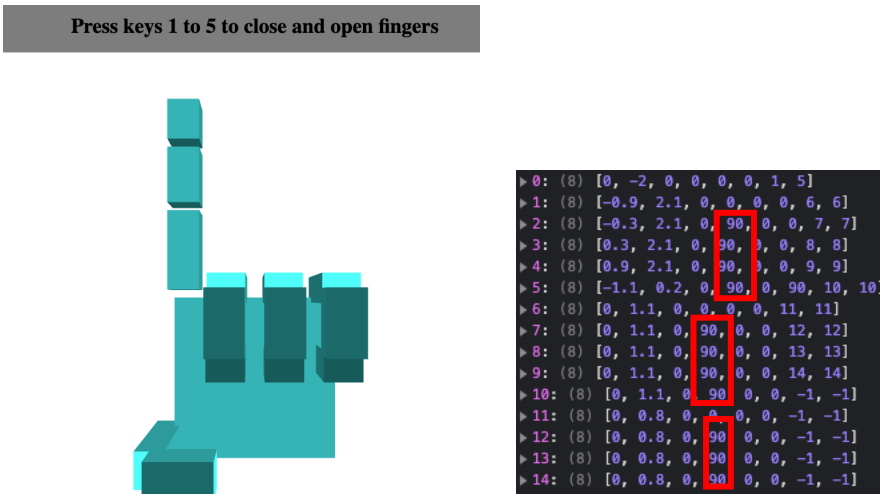
The hierarchy used by the hand is the following:



And the initial definition is shown below:

```
▸ 0: (8) [0, -2, 0, 0, 0, 0, 1, 5]
▸ 1: (8) [-0.9, 2.1, 0, 0, 0, 0, 6, 6]
▸ 2: (8) [-0.3, 2.1, 0, 0, 0, 0, 7, 7]
▸ 3: (8) [0.3, 2.1, 0, 0, 0, 0, 8, 8]
▸ 4: (8) [0.9, 2.1, 0, 0, 0, 0, 9, 9]
▸ 5: (8) [-1.1, 0.2, 0, 0, 0, 90, 10, 10]
▸ 6: (8) [0, 1.1, 0, 0, 0, 0, 11, 11]
▸ 7: (8) [0, 1.1, 0, 0, 0, 0, 12, 12]
▸ 8: (8) [0, 1.1, 0, 0, 0, 0, 13, 13]
▸ 9: (8) [0, 1.1, 0, 0, 0, 0, 14, 14]
▸ 10: (8) [0, 1.1, 0, 0, 0, 0, -1, -1]
▸ 11: (8) [0, 0.8, 0, 0, 0, 0, -1, -1]
▸ 12: (8) [0, 0.8, 0, 0, 0, 0, -1, -1]
▸ 13: (8) [0, 0.8, 0, 0, 0, 0, -1, -1]
▸ 14: (8) [0, 0.8, 0, 0, 0, 0, -1, -1]
```

When the user presses keys, rotations of the parts of the fingers changes. For example, the following figure shows the changes caused by pressing keys 2 to 5, to obtain the pointing finger shown in the figure:



The `DrawSceneTree(S)` procedure uses function `draw(i, mat)` that receives as parameter the index of the mesh to draw (`i`, an integer between *0* and *14*), and the world matrix to transform the considered object (`mat`). The current version of the procedure expects a flat data-structure, ignoring the hierarchy of the scene. The purpose of the assignment is to correct the procedure, using the information stored in elements in position *6* and *7* of the array, to correctly support the hierarchy.