Tips for Autodesk MotionBuilder Python API

- **Documentation**
  - **http://docs.autodesk.com/MOBPRO/2016/ENU/MotionBuilder-Developer-Help/index.html**
  - **Nice set of tutorials:** awforsythe.com/tutorials (currently out of service, look for a cached version of this site)
- **Shortcuts**
  - Autocomplete in MoBu python terminal: Ctrl+Space
- **Important actions**
  - Extract position (in global coordinate system) from an object called 'Marker01'

```
marker = FBFindModelByLabelName('Marker01')
m_pos = FBVector3d()
marker.GetVector(m_pos,FBModelTransformationType.kModelTranslation)
```

  - Extract rotation matrix (both in Local and Global Coordinate System) from 'Marker01':

```
marker = FBFindModelByLabelName('Marker01')
global_R = FBMatrix()
local_R = FBMatrix()
marker.GetMatrix(global_R,FBModelTransformationType.kModelRotation,True)
marker.GetMatrix(local_R,FBModelTransformationType.kModelRotation,False)
```

  - Rotate 'Marker01' 90 degrees around Y axis (in the local coordinate system)

```
# Define Rotation
target_rot = FBVector3d(0,90,0)
target_M = FBMatrix()
FBRotationToMatrix(target_M,target_rot) # Represent rotation as a matrix

# Take current marker orientation
marker = FBFindModelByLabelName('Marker01')
cur_Ori = FBMatrix()
marker.GetMatrix(cur_Ori,FBModelTransformationType.kModelRotation,False)

# Apply rotation ( combine trasformations )
final_Ori = target_M * cur_Ori
ori_vec = FBVector3d()
FBMatrixToRotation(ori_vec,final_Ori) # Go back to a vector representation
marker.Rotation = ori_vec
```

  - Children and Parent relation between objects

```
parentNode = node.Parent

childCount = len(node.Children)
firstChild = node.Children[0]
```

- **Important recommendations**
  - MotionBuilder scene evaluation system is multithreaded. No automatic evaluation is guaranteed once scene is modified. This may be a problem for iterative algorithms, such as the CCD. In this case, force a scene re-evaluation after performing, or before loading, recent changes, such as follows

```
# ...

# modify rotation
chain_node.Rotation = r
# Re-evaluate scene
FBSystem().Scene.Evaluate()

# ...
```