

KAIST

CS 482 Lab Session

Interactive Computer Graphics

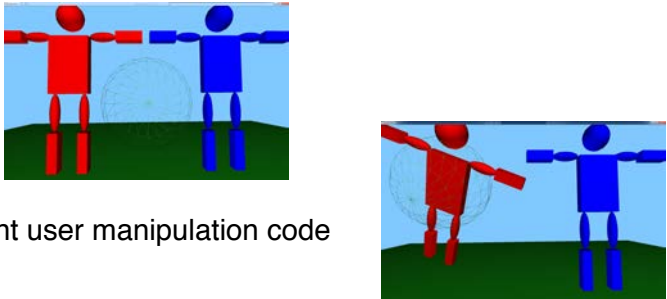
2016.10.05

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Goals

- Scene graph
 - Build a structure for dealing with objects in a smart way
- Picking
 - Implement user manipulation code
- Note that you have to read the description file (pdf) and the detailed description in the code thoroughly



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Preliminaries

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- You would be better to get familiar with the following concepts to complete this assignment:
 - Class
 - Vector
- There are many classes and functions in this homework, **so please read the description (pdf and code) in advance, and start to do some coding.**

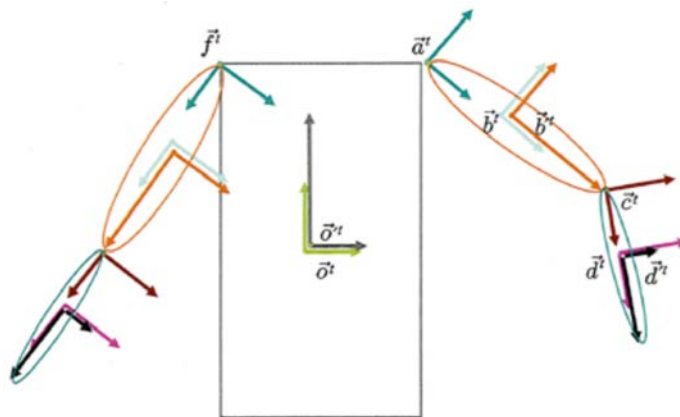
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Scene graph

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- If we move the body of the robot, the connected components should be modified automatically.

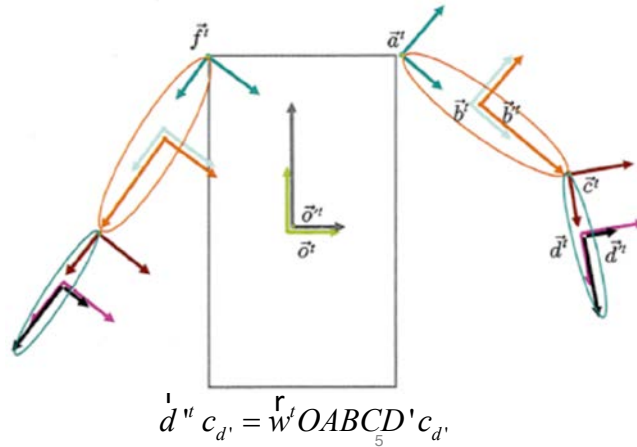


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Scene graph

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- In order to build it, we describe an object frame with the previous object frame, not the world frame.



$$\begin{aligned} \vec{o}^t &= \vec{w}^t O \\ \vec{o}^{t'} &= \vec{o}^t O' \\ \vec{a}^t &= \vec{o}^t A \\ \vec{b}^t &= \vec{a}^t B \\ \vec{b}^{t'} &= \vec{b}^t B' \\ \vec{c}^t &= \vec{b}^t C \\ \vec{d}^t &= \vec{c}^t D \\ \vec{d}^{t'} &= \vec{d}^t D' \\ \vec{f}^t &= \vec{o}^t F \end{aligned}$$

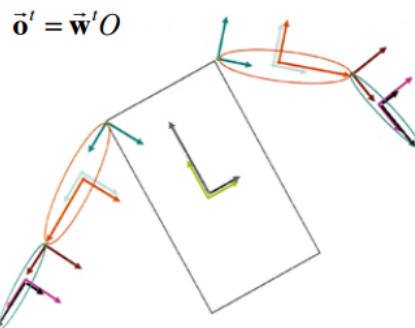
$${}^1 d^t c_{d'} = {}^r w^t O A B C D' c_{d'}$$

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Scene graph

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- Other parts would be changed following the scene graph when we modify the object frame $\vec{o}^t = \vec{w}^t O$.



$$\vec{o}^t = \vec{w}^t O$$

$$\begin{aligned} \vec{o}^t &= \vec{w}^t O \\ \vec{o}^{t'} &= \vec{o}^t O' \\ \vec{a}^t &= \vec{o}^t A \\ \vec{b}^t &= \vec{a}^t B \\ \vec{b}^{t'} &= \vec{b}^t B' \\ \vec{c}^t &= \vec{b}^t C \\ \vec{d}^t &= \vec{c}^t D \\ \vec{d}^{t'} &= \vec{d}^t D' \\ \vec{f}^t &= \vec{o}^t F \end{aligned}$$

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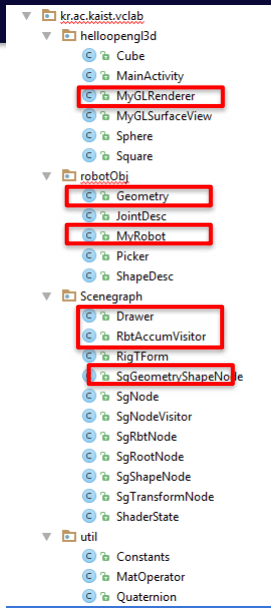
Scene graph

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- Tree
 - Parent and child: objects and sub-objects
- Nodes (refer to the pdf file)
 - Transform nodes
 - RBT with respect to its parent frame
 - Shape nodes
 - Geometry to be drawn

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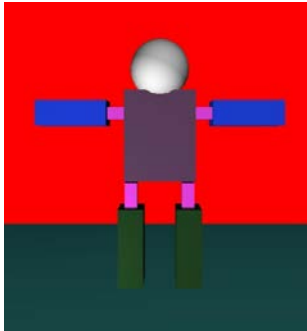
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SEARCHING

“//problem” comment and fill out the blanks on skeleton code

Finally, you should construct your own Robot



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