Assignment 5

Scene management

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- Turn-in on November 29

Assignments

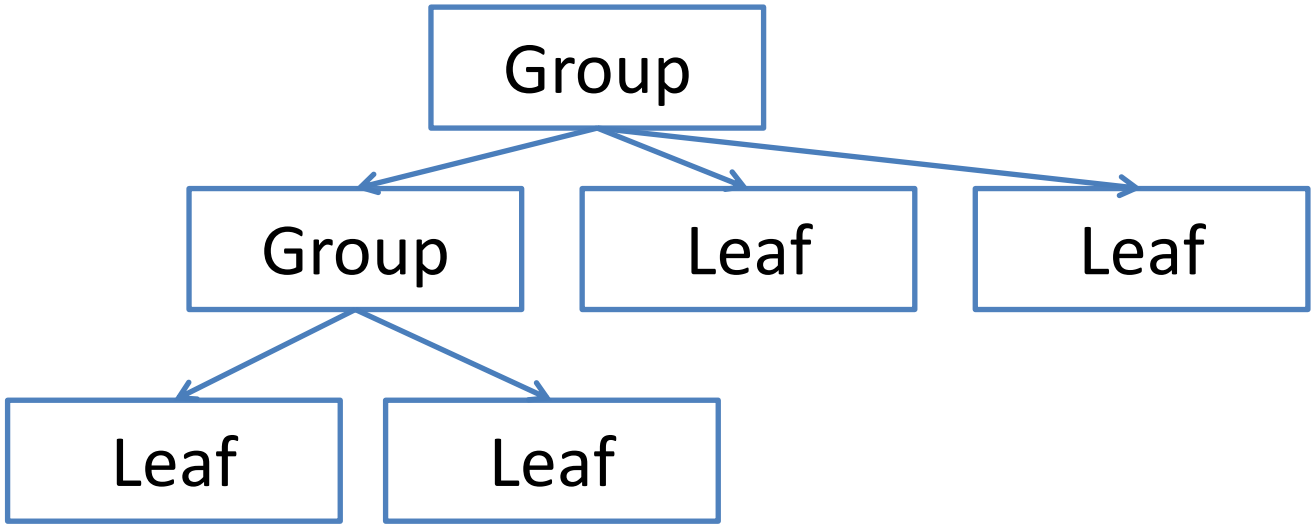
- Exercise 1: Replace the SimpleSceneManager with a GraphSceneManager
- Exercise 2: Object Level Culling with Bounding Spheres

Exercise 1

- Until now: SimpleSceneManager
- Shapes in list
- Access to shapes via SceneManager iterator

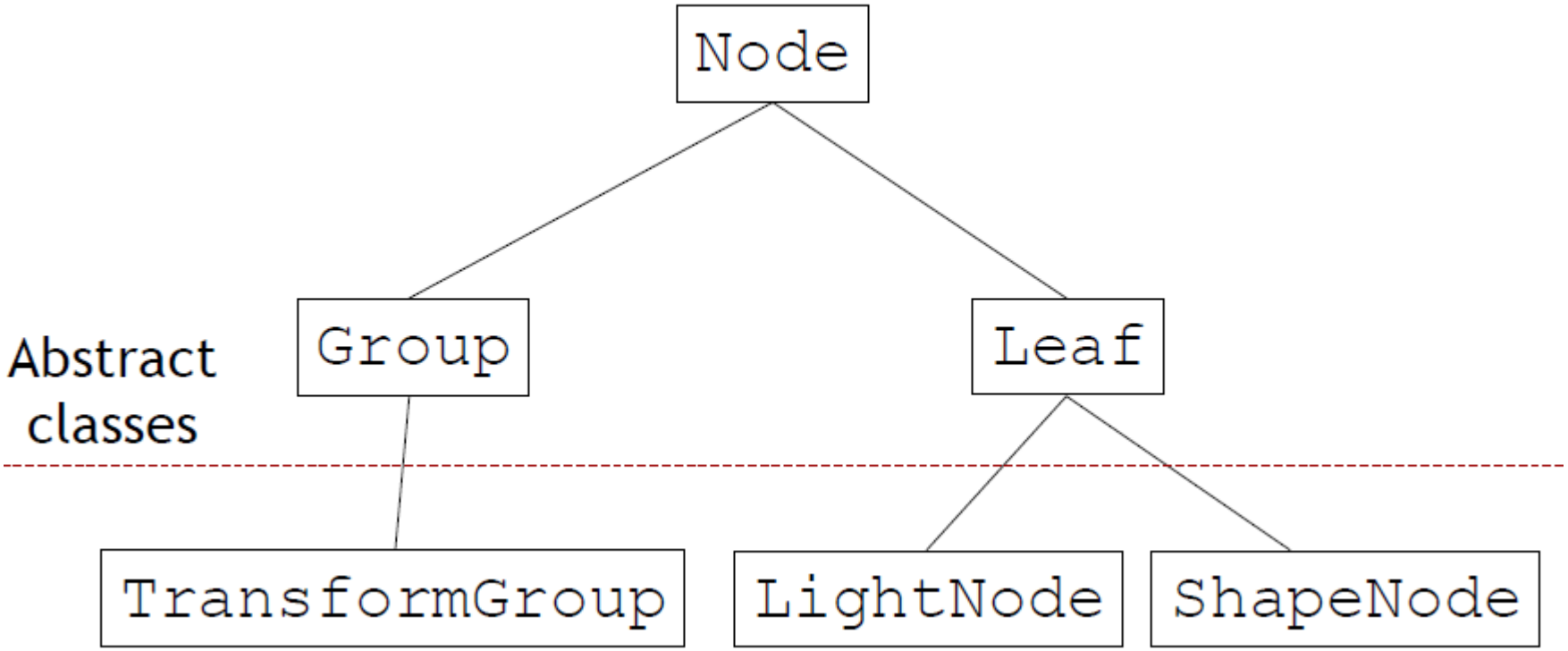
Exercise 1

- New: GraphSceneManager
- Store objects in tree data structure
- Access by your own iterator



Exercise 1

- Class hierarchy

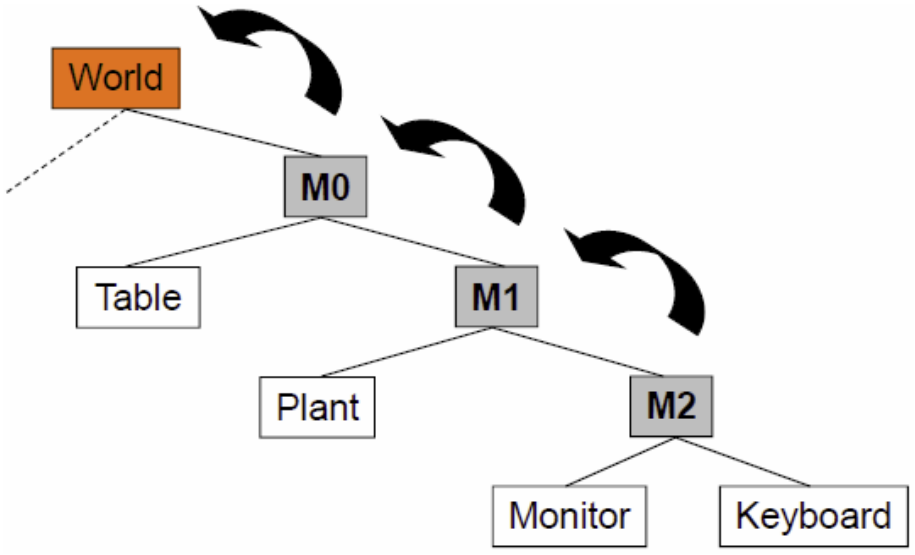


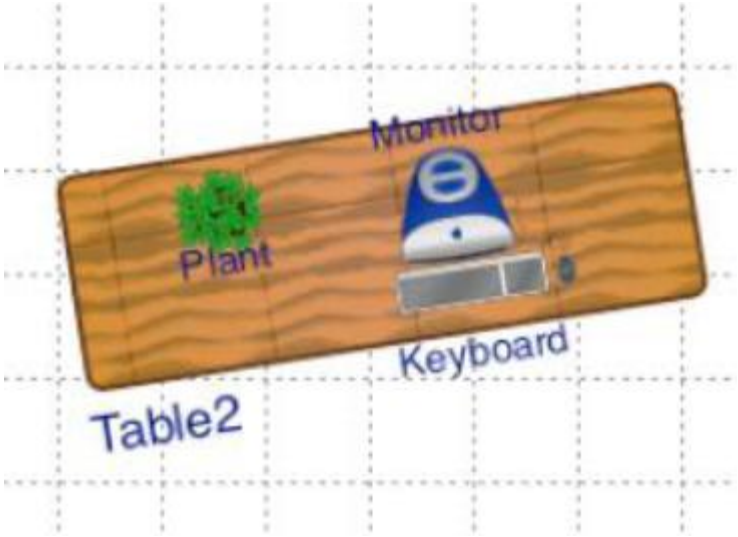
Exercise 1

- Node
  - Access to coordinate transformation
- Group
  - List of child nodes
  - Get, add, remove child
- Leaf
  - Node without children

Exercise 1

- TransformGroup
  - has transformation **Mi**
  - **Mi** applies to whole subtree
  - keyboard-to-world transform: M0*M1*M2





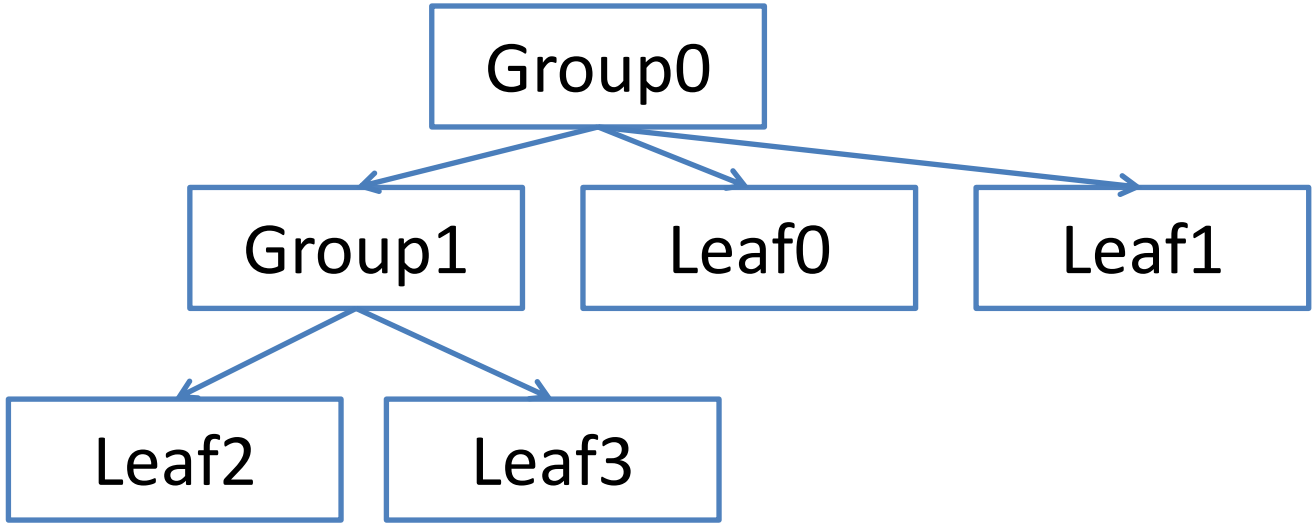
Exercise 1

- Matrix Mi: *relative* node coordinates with respect to parent node

- Example: PC to table coordinates, table to world coordinates

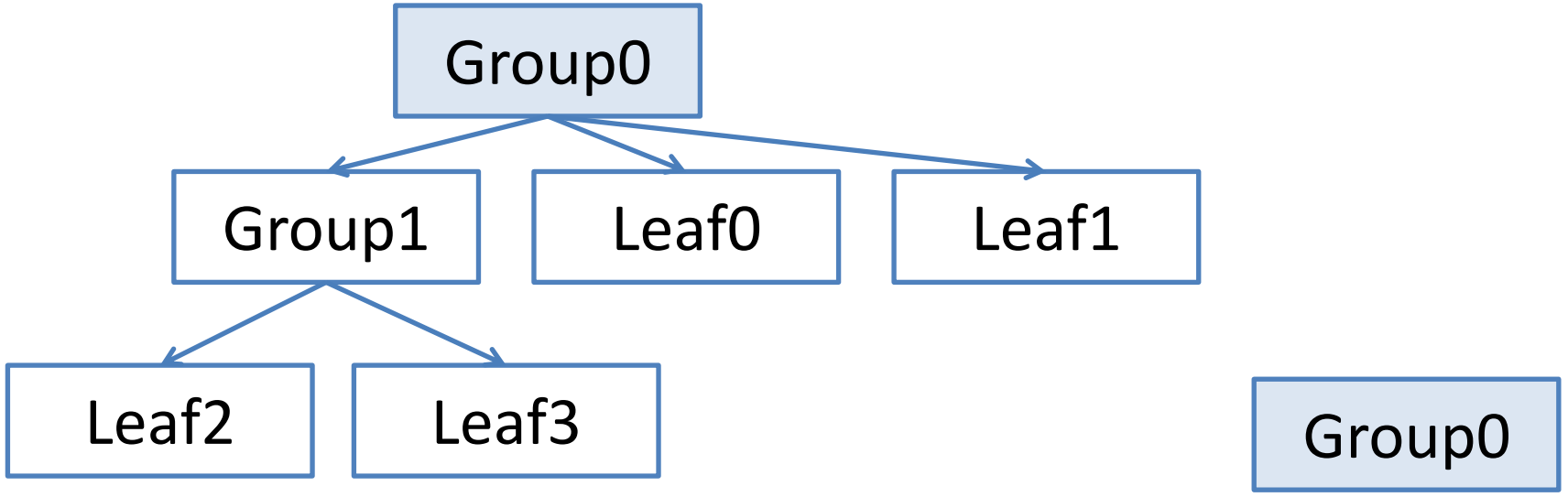
Exercise 1

- Iterator for traversing the tree
  - implement hasNext(), getNext()
  - stack, initialized with root of the tree



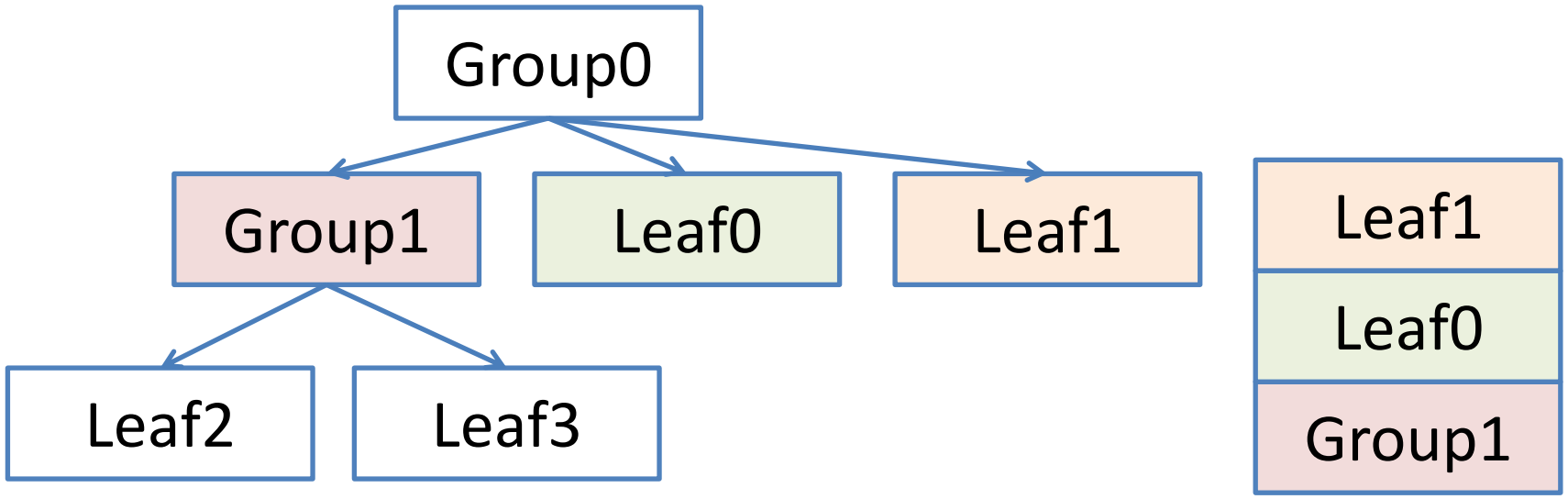
Exercise 1

- getNext()
  - Top stack element is a group => pop and multiply transf.matrix then push its children onto the stack



Exercise 1

- getNext()
  - Top stack element is a leaf => pop it and multiply its transformation matrix and then return it!



Exercise 1

- Iterator should return local-to-world transformation!

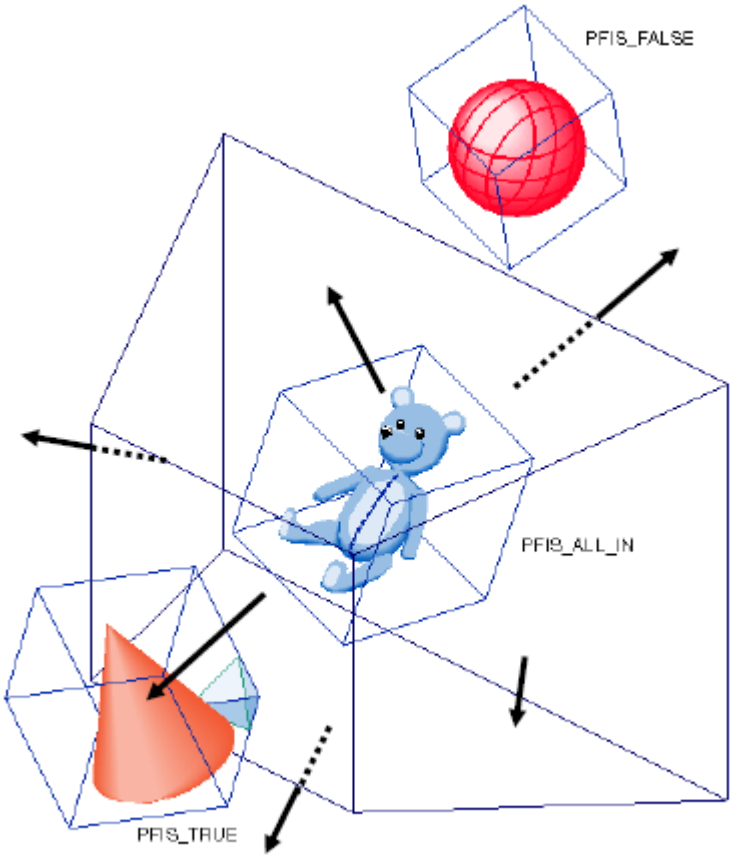
Exercise 1

- Walking animation: Movement of arms and legs

Exercise 2

- Szenengraph with Object Level Culling
  - Compute Bounding Sphere for each object
  - Test if Bounding Sphere is entirely outside of the viewing frustum

Exercise 2



(we use spheres and not boxes!)

Questions