

Diplomarbeit

***Issues in View Management for  
3D Objects on Multiple  
Displays***

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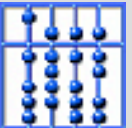
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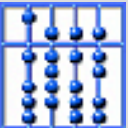


May 13, 2004



# Overview

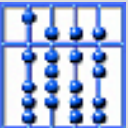
- Introduction
- System Behavior
- Technical Issues
- Proposed Solutions
- Viewer Integration
- Persistency
- Todo



# Introduction

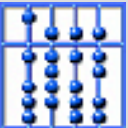
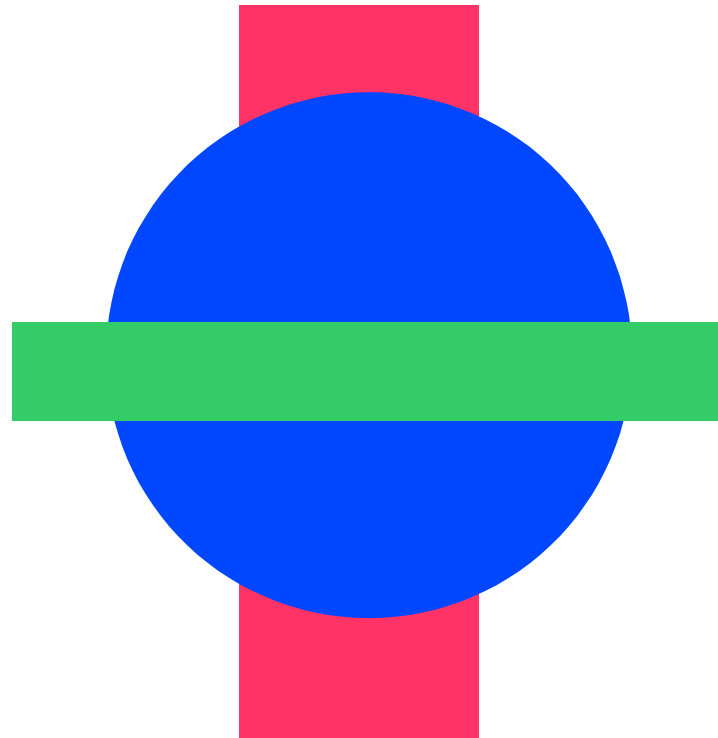
View Management for:

- Spatial Layout
- Maintaining Visual Constraints
- Manage Multiple Displays



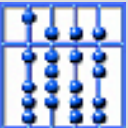
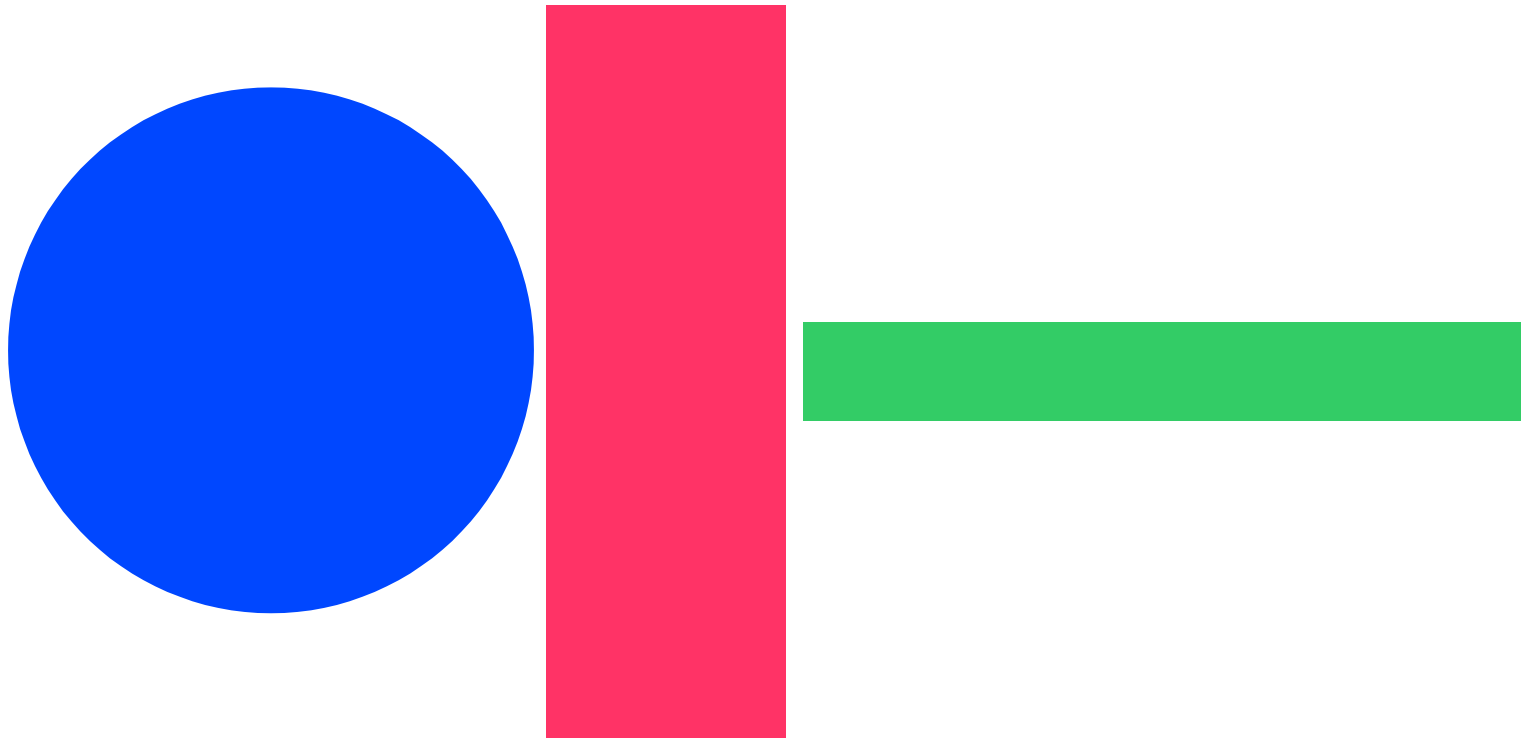
# *Introduction: Spatial Layout*

No Layout



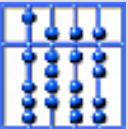
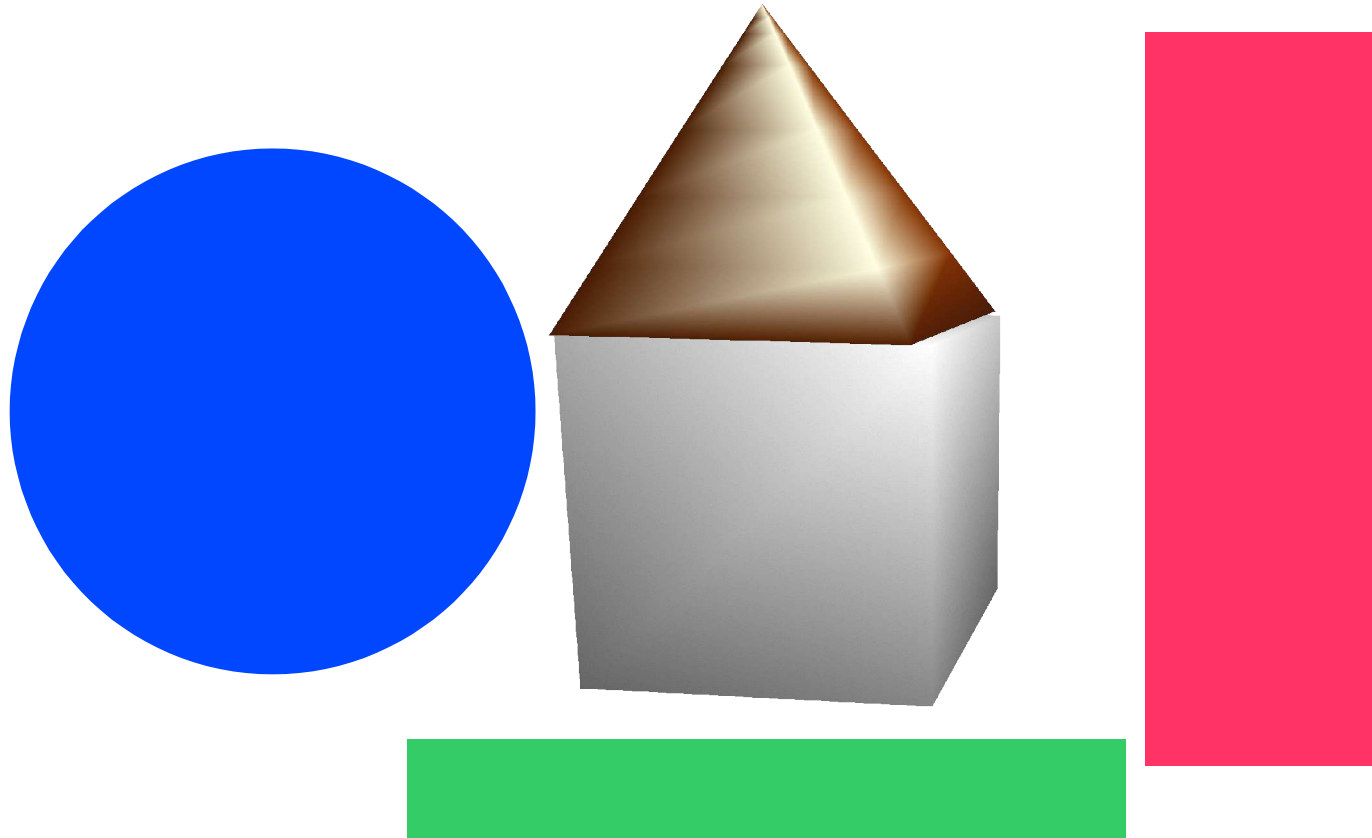
# *Introduction: Spatial Layout*

With Layout



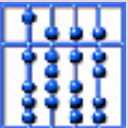
# *Introduction: Spatial Layout*

With Layout and Occlusion

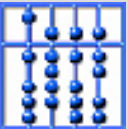
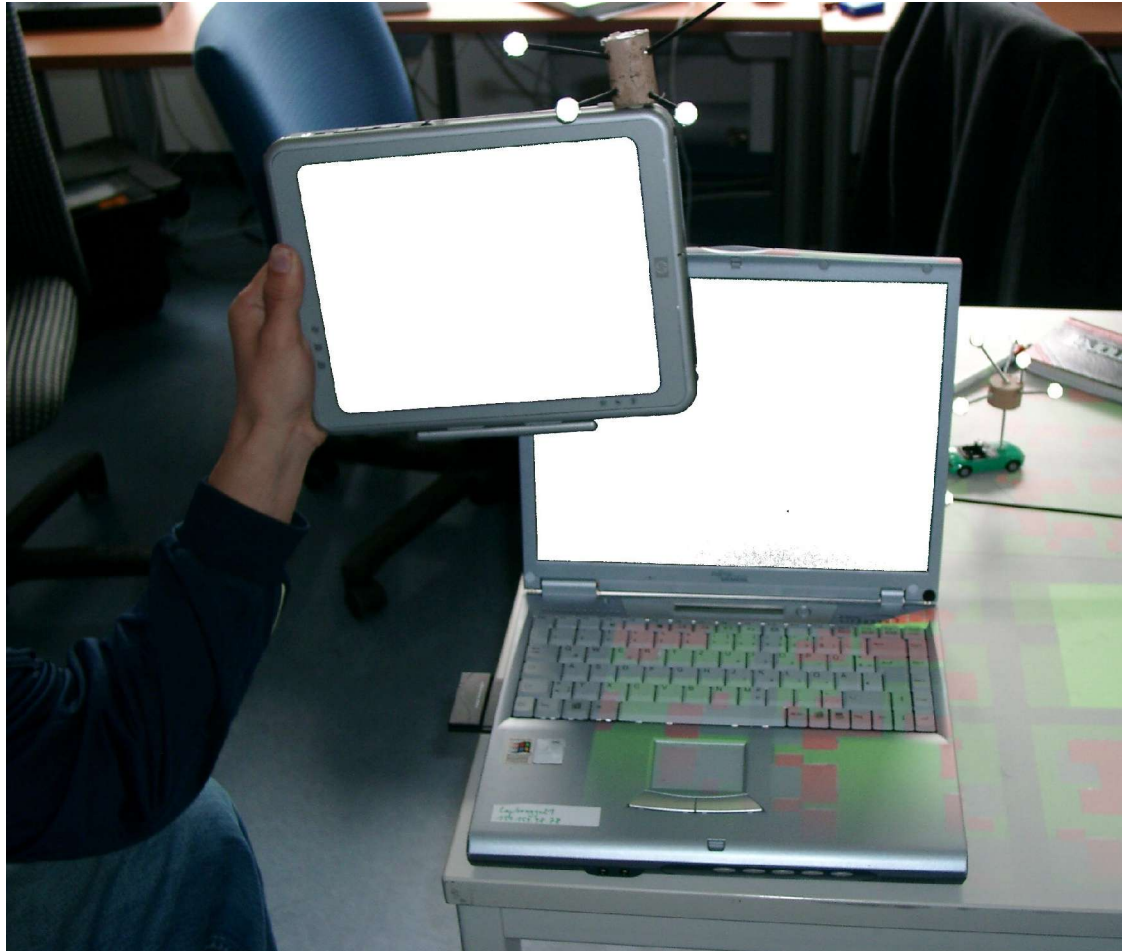


# *Introduction: Constraints*

- Object A left of Object B
- Only visible if distance  $< X$
- ...



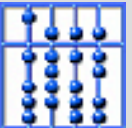
# *Introduction: Multiple Displays*





# Overview

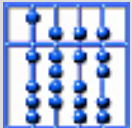
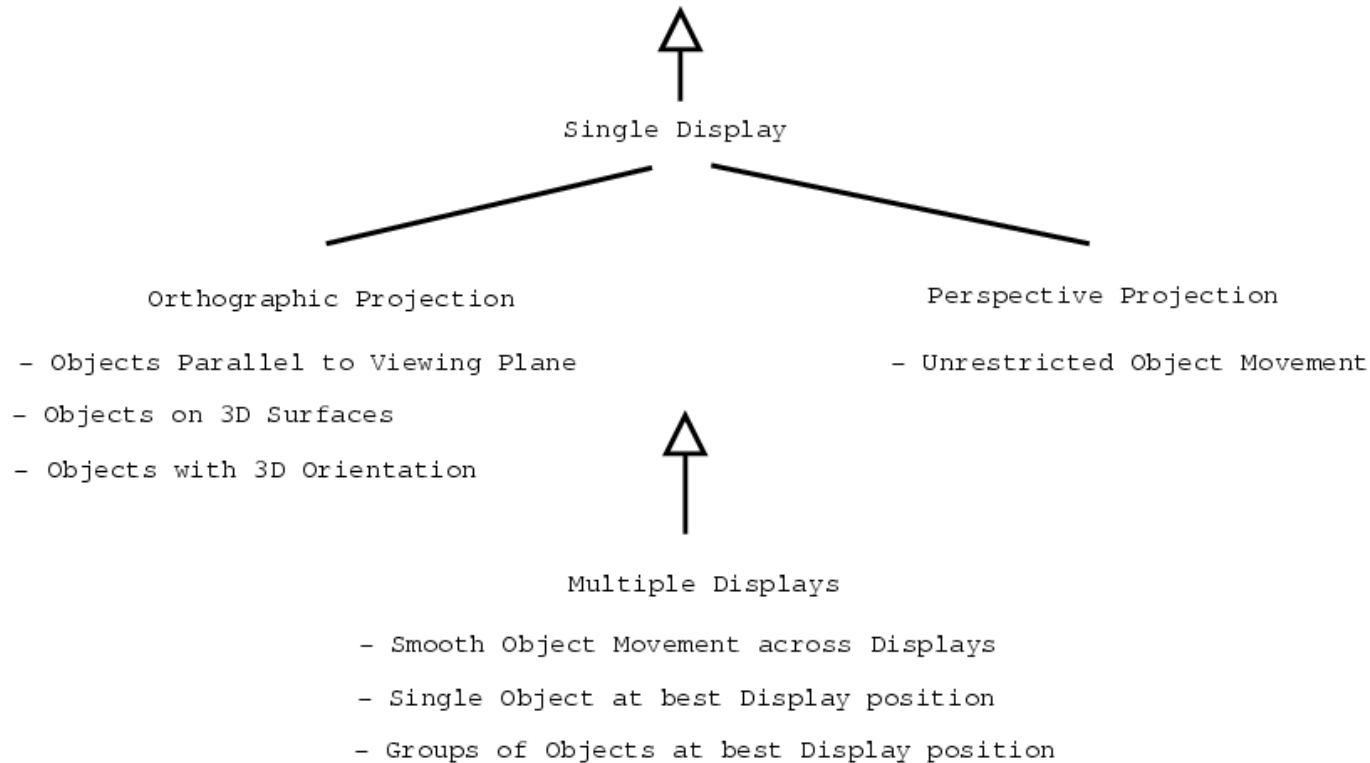
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# System Behavior. User side

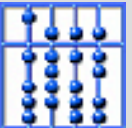
## General View Management Behavior

- Least possible overlap
- Good Visual Impression (objects dense or distributed)
- Smoothness of Object Movement
- Varying Object Size



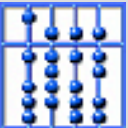
# *System Behavior: General*

- Least Possible Overlap
- Good Visual Impression
- Smoothness of Object Movement
- Varying Object Size

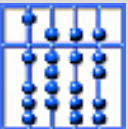


# System Behavior: Single Display

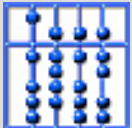
- Orthographic Projection
  - Objects Parallel to Viewing Plane (picture)
  - Objects on 3D Surfaces
  - Objects with 3D Orientation (picture)
- Perspective Projection
  - Unrestricted Object Movement



# Objects with 3D Orientation

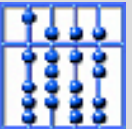


# Objects with 3D Orientation

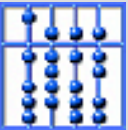
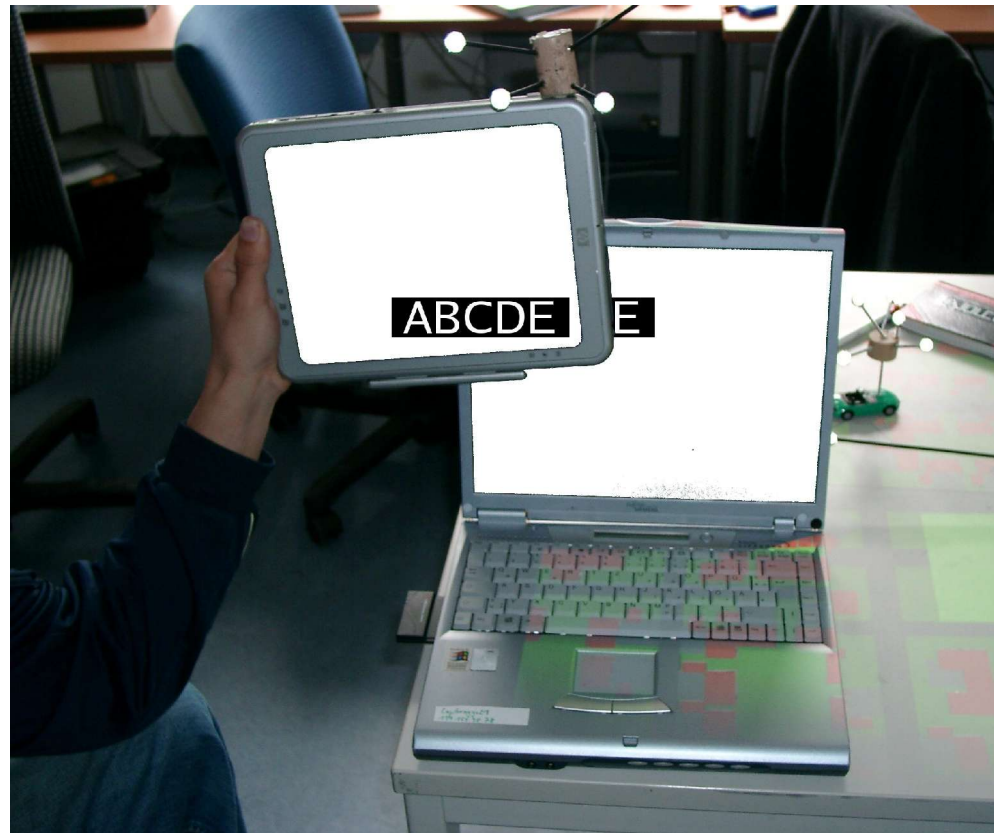
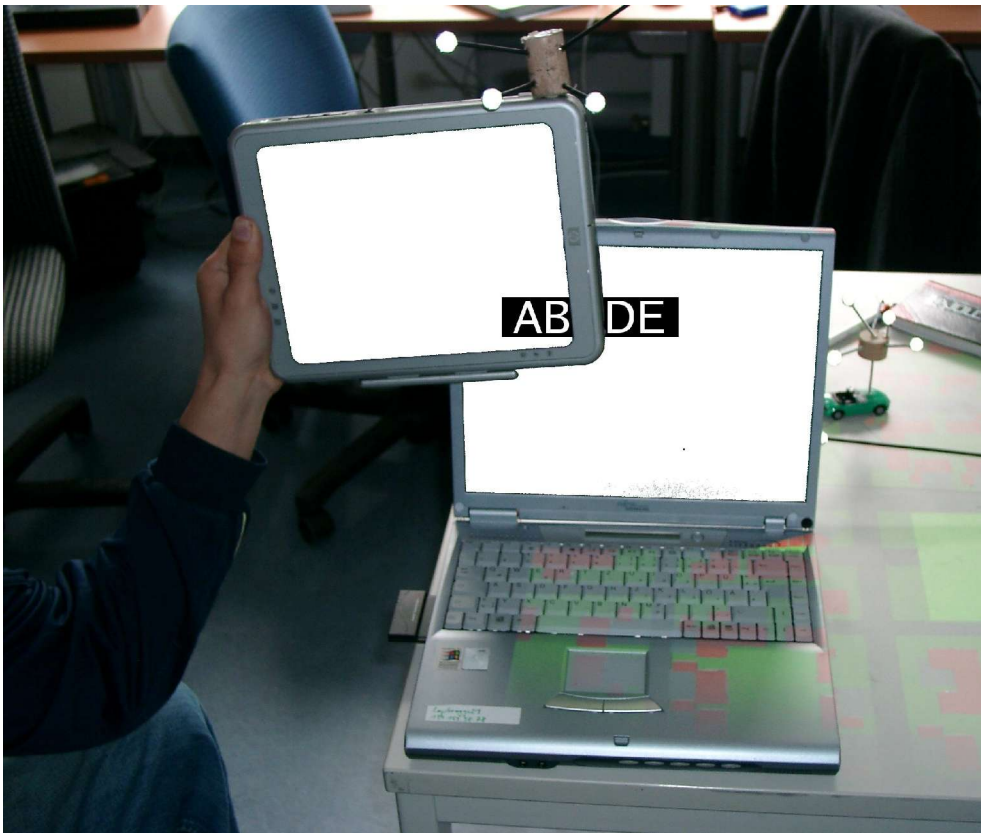


# *System Behavior: Multiple Displays*

- Smooth Object movement across Displays
- Single Object at best Position (pictures)
- Groups of Objects at best Position

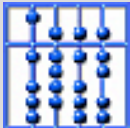


# Single Object at best Position



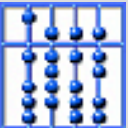


# Single Object at best Position



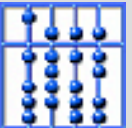
# *System Behavior: Developer Side*

- Easy Content Creation
- Easy Constraints Editing



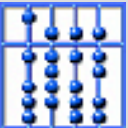
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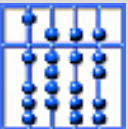
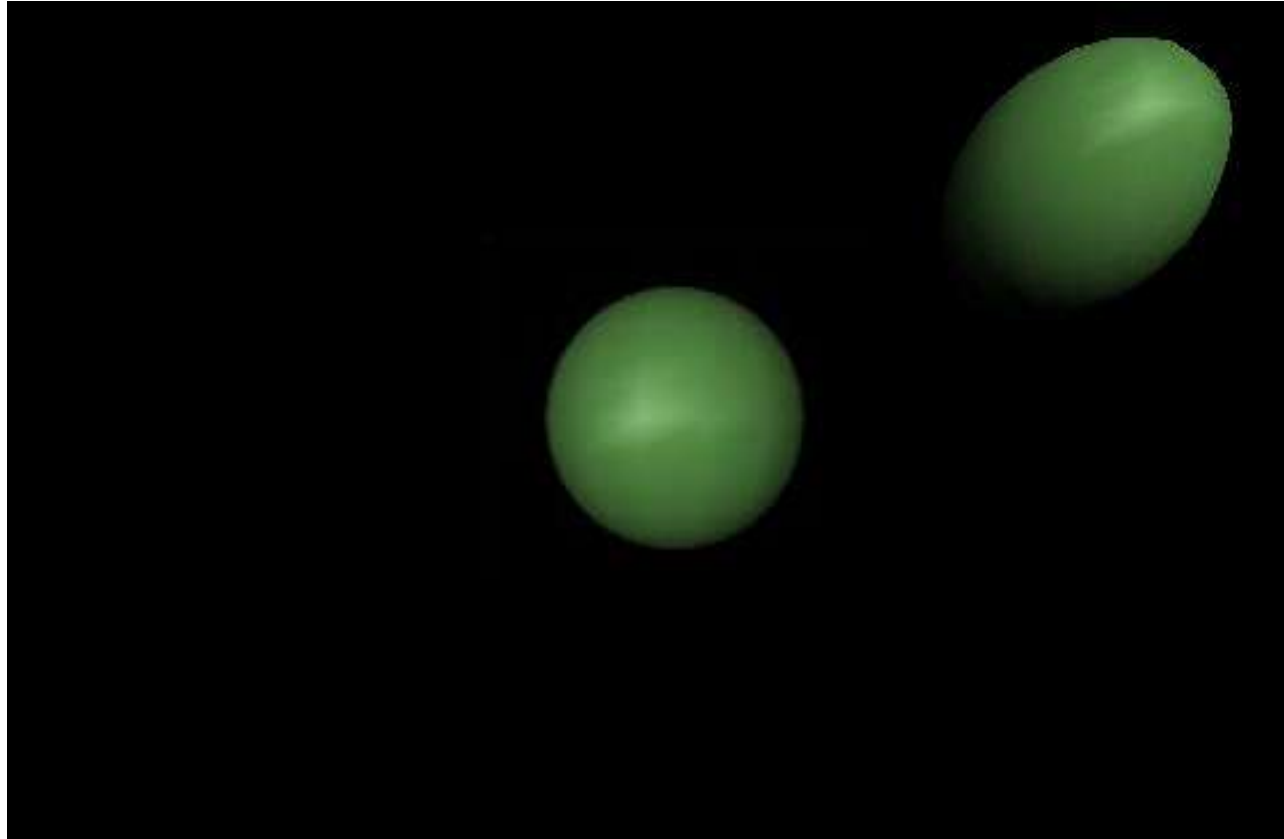


# Technical Issues

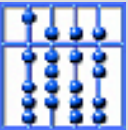
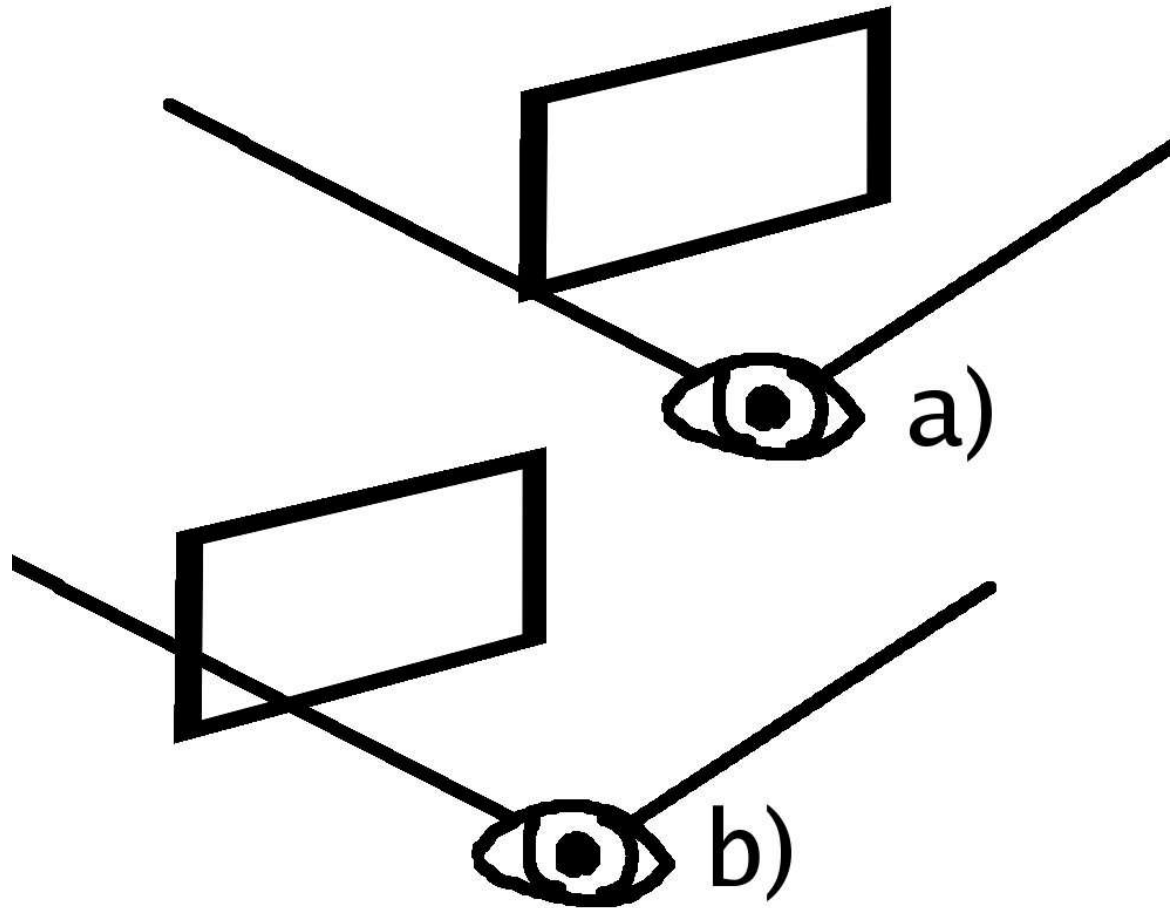
- Simplification to rectangular Bbox
- Non-uniform space distribution
- Relative object movement
- Bounding Box deformation (picture)
- Combining Multiple Displays (picture)
- Constraints Authoring



# *Technical Issues: Bbox deformation*

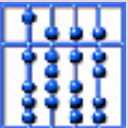


# Technical Issues: Combining Displays



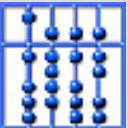
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# Proposed Solutions

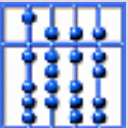
- Non Rectangular Bboxes
  - New Data structures then e.g. SpaceMgr
  - Adaptive Algorithm, e.g. Graph Alg. or Physical simulation Alg.





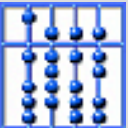
# *Proposed Solutions*

- Non-uniform space distribution
  - Iterative Algorithm



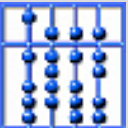
# Proposed Solutions

- Bounding Box deformation
  - Fixed maximum Bbox
  - Using projection info in Alg.



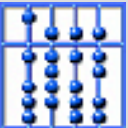
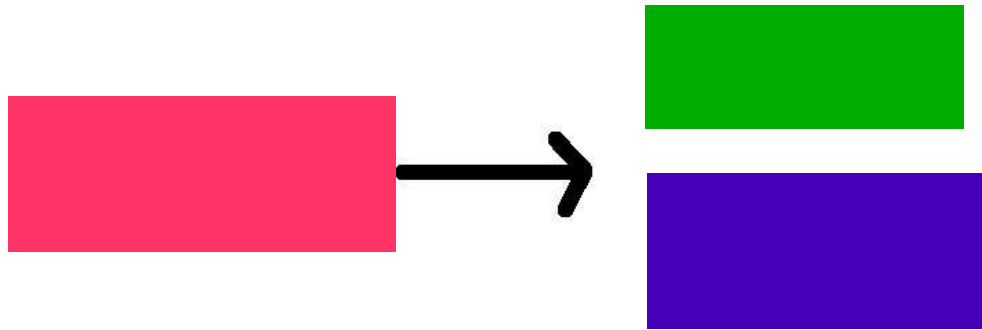
# Proposed Solutions

- Combining Multiple Displays
  - Use Viewpoint of Viewer
  - Only combine Displays with max distance and about same orientation

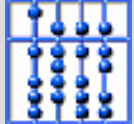
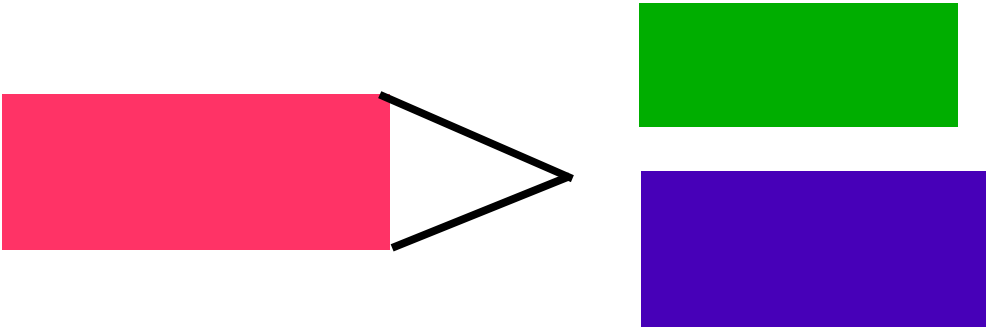


# Proposed Solutions

- Movement

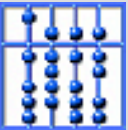
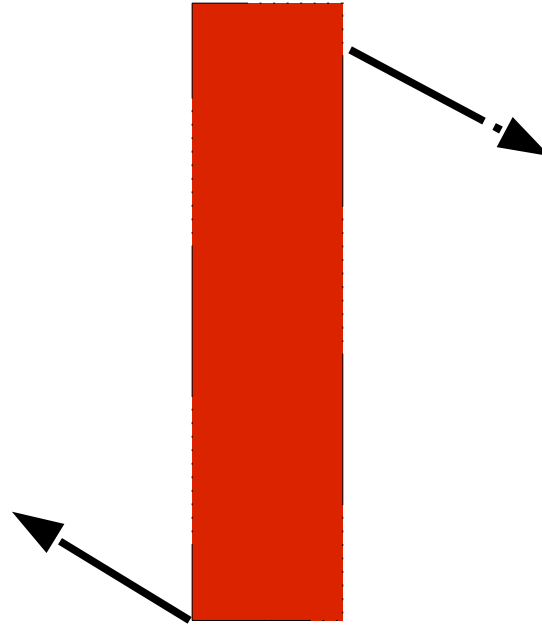


# *Proposed Solutions: Movement*



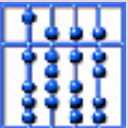
# *Proposed Solution*

Rotation is harder to calculate!



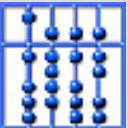
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# Todo

- Implement the proposed solutions
- Verify the partitioning
- Make speed comparisons





Thanks for listening,  
Questions?

