

Applying Design Patterns to 2D Graphics Application



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Abstract

- How the object-oriented paradigm can be applied to the construction of class libraries and reusable designs.
- We take the case of a small 2D graphics application.

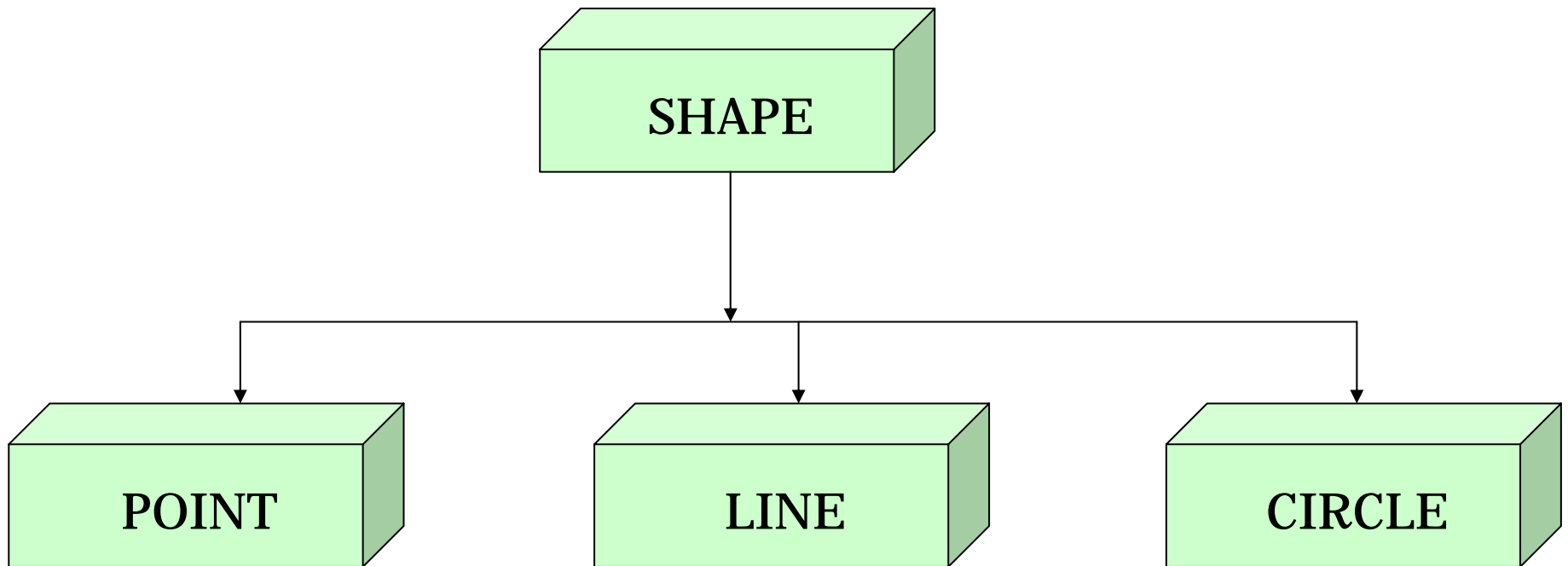
Statement of Problem

- In CAD softwares, not only simple geometries instead concepts and entities are also important.
- For Examples
 - Ability to dimension Objects and display them on Graphics screen.
 - Adding non graphical data to geometry.

Emphasis

- The main focus is on creating context independent class libraries.
- The advantages are
 - We can adapt the libraries to different environments without changing the original software.
 - Customers can create their own classes using inheritance.
 - Lead time is drastically reduced.

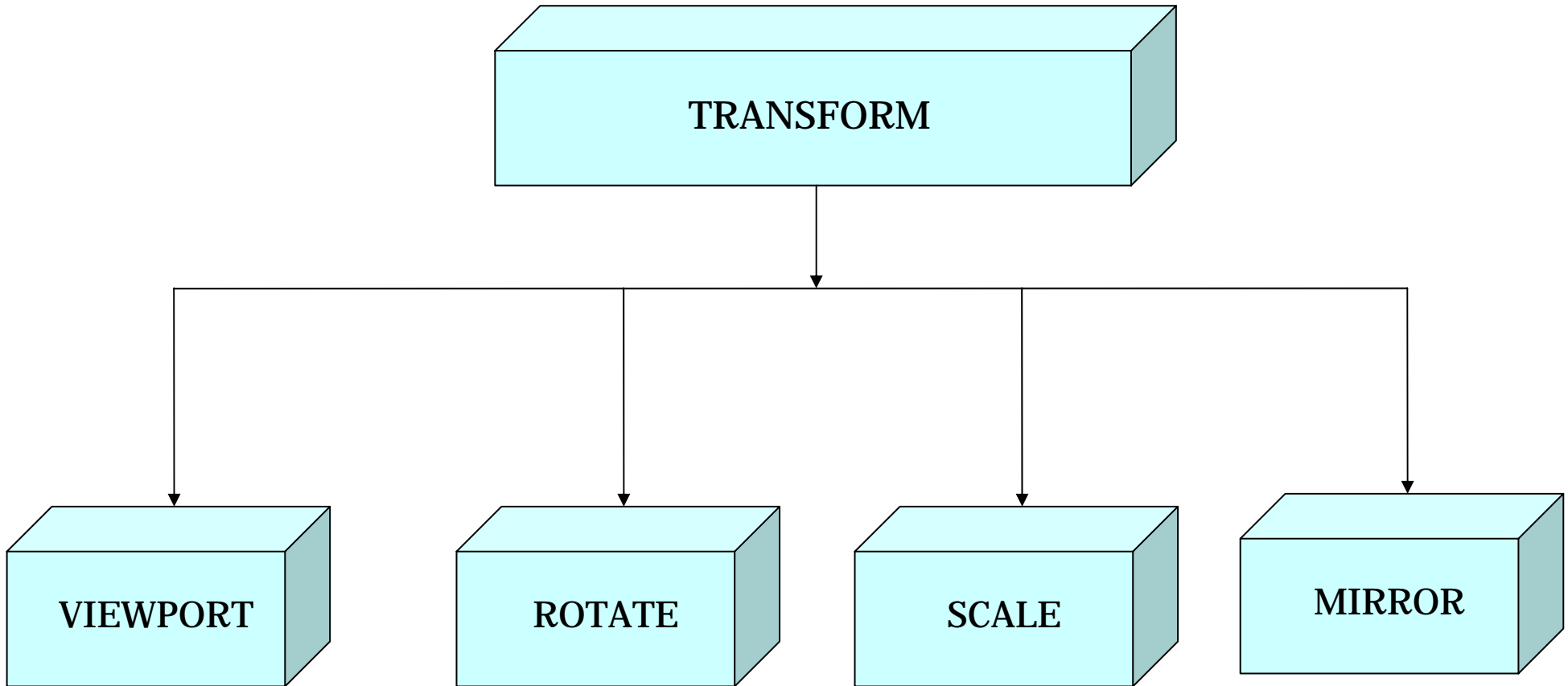
Basic Shape Class



Extending Object Functionality

- shape class library has only basic geometric functionalities.
- produce mechanisms which allow us to extend essential responsibilities. For example:
 - Geometric properties, such as area, bounding boxes and volumes.
 - Transformation operations, such as scaling, rotations and translations.
 - Defining extra 'grip' points for use in simulation and finite element analysis

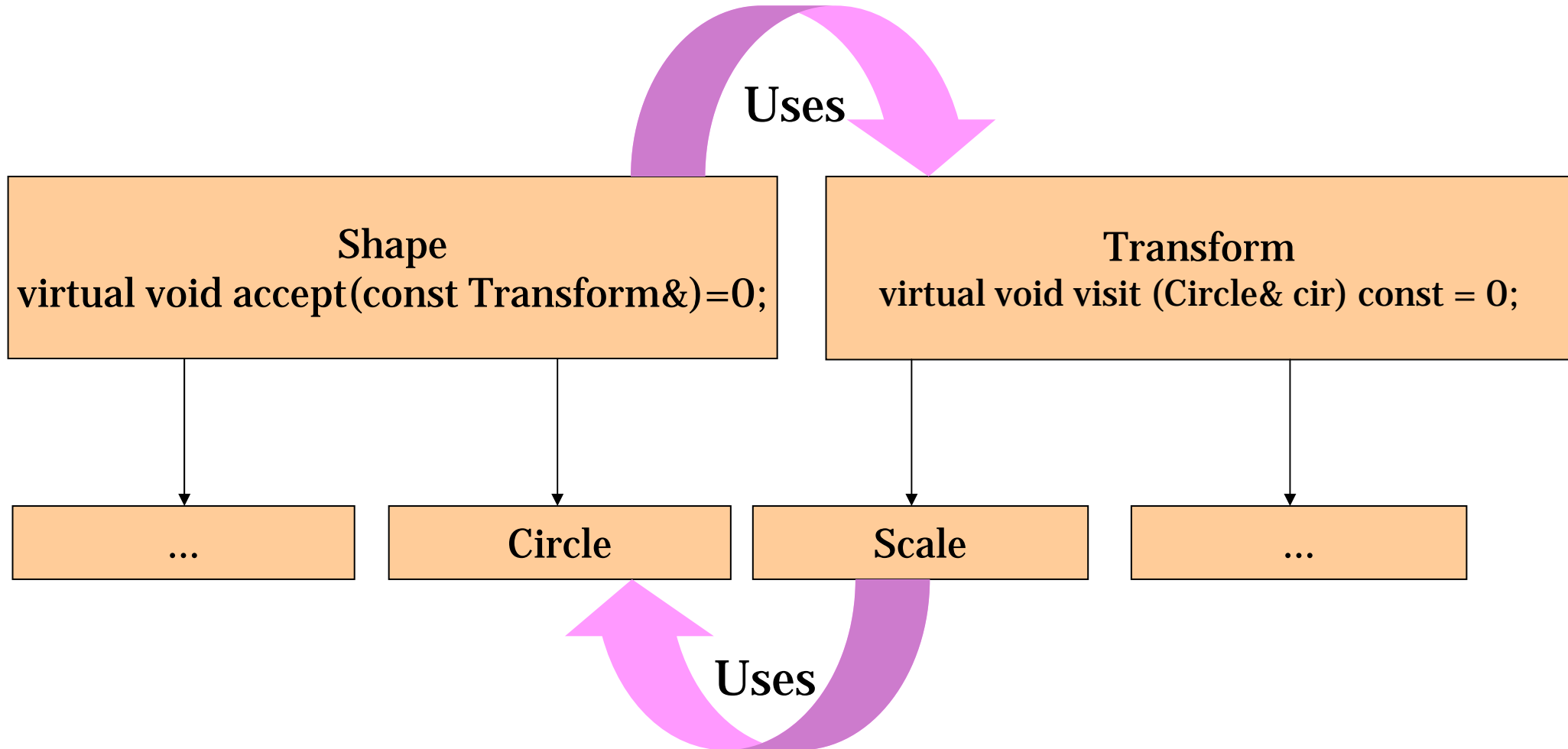
Transform Class



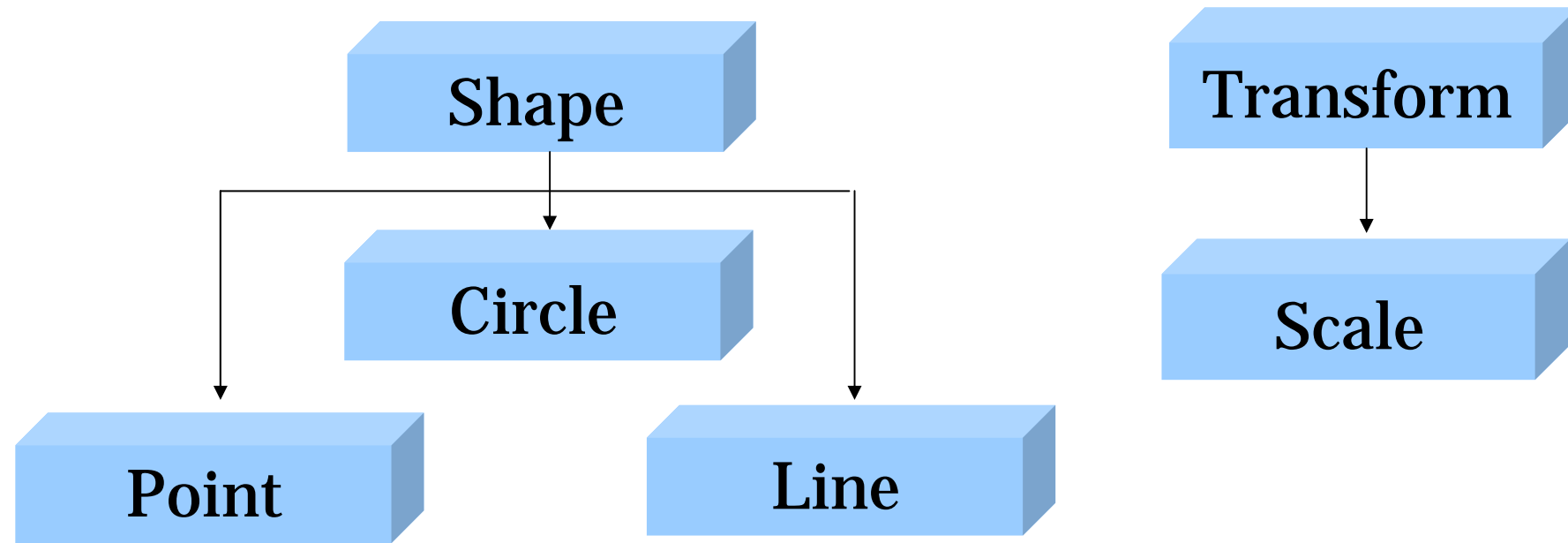
Applying the Design Pattern

- **Visitor Pattern**
 - Intent :Visitor lets you define a new operation without changing the classes of the elements on which it operates.
- In order to show how the Visitor works in this context, we consider the problem of adding functionality for geometric transformations

Interface Design



Code Snippet



//Create CAD drawing Object

```
Shape* sarr[3];  
sarr[0] = new Point(1.0, 3.0);  
sarr[1] = new Line (Point(), Point(100.0, 100.0));  
sarr[2] = new Circle (Point(1.0, 1.0), 1.412);  
Scale sc(0.5);  
for (int j = 0; j < 3; j++)  
{  
sarr[j] -> accept(sc);  
}
```

// Create scaling object

Conclusion

when there are some segregated class hierarchies (shape, transform etc) and communication between them is required (transforming the shape) then visitor pattern is one of the several design pattern that is helpful.

Thank You



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