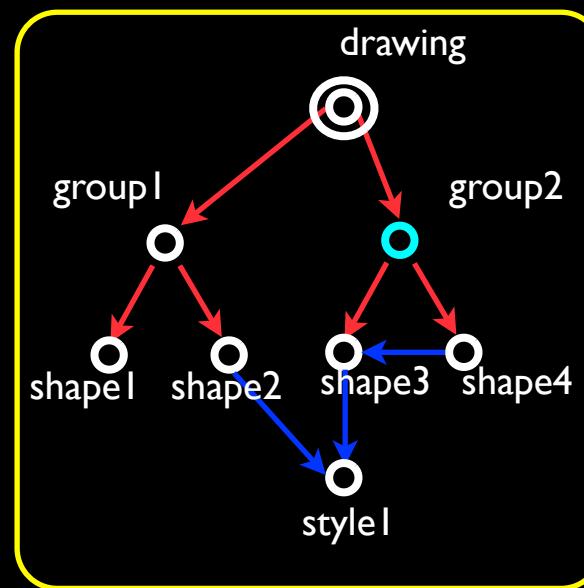


- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root\*

\*As far as copying is concerned, the distinction between a persistent root and a purely in-memory context is irrelevant. The yellow box indicates a context where all embedded object UUIDs must be unique.

## 1. copy group2



Copy algorithm is:

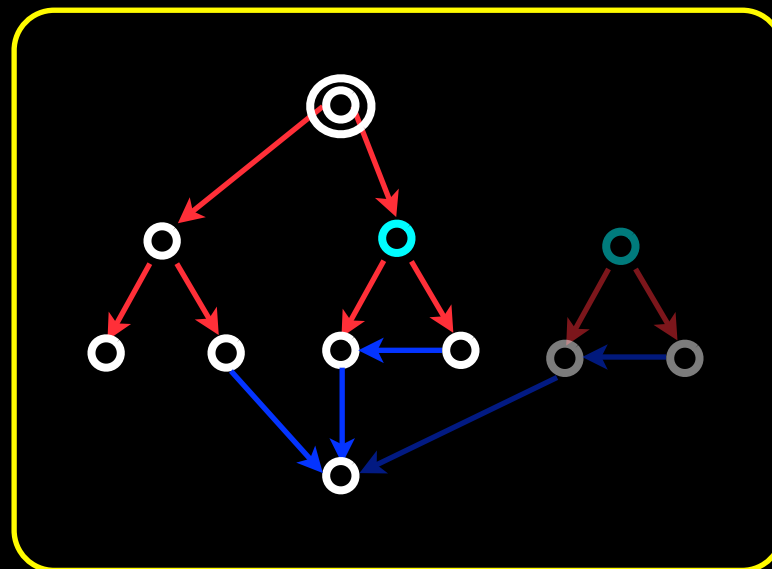
- gather the set of objects to copy by following all composite references from the root object to copy
- assign new UUIDs to each object in the copied objects set, and update references and composite references within the copied object set to use the new UUIDs. As a consequence, referenced objects that were not in the copied object set are aliased.

The spirit of it is that you control the copying process by your placement of composite relationships, and hopefully avoid writing any custom code to control copying.

- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

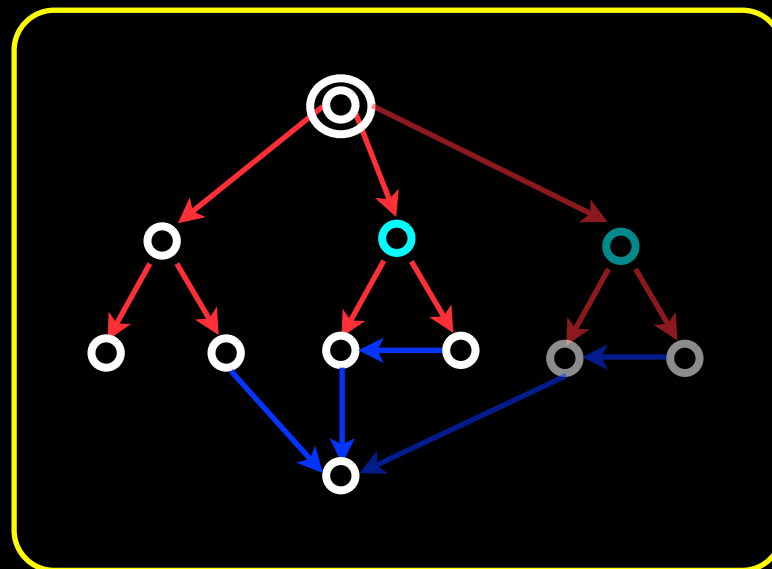
## 1. copy group2



- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

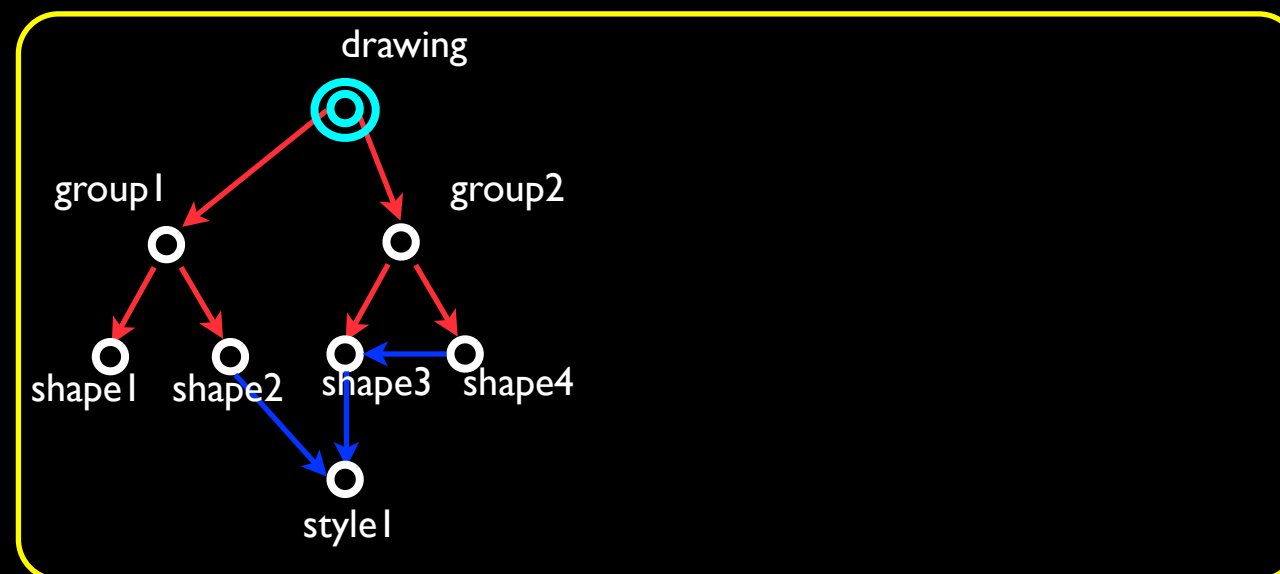
1. copy group2.. and  
insert into drawing



- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

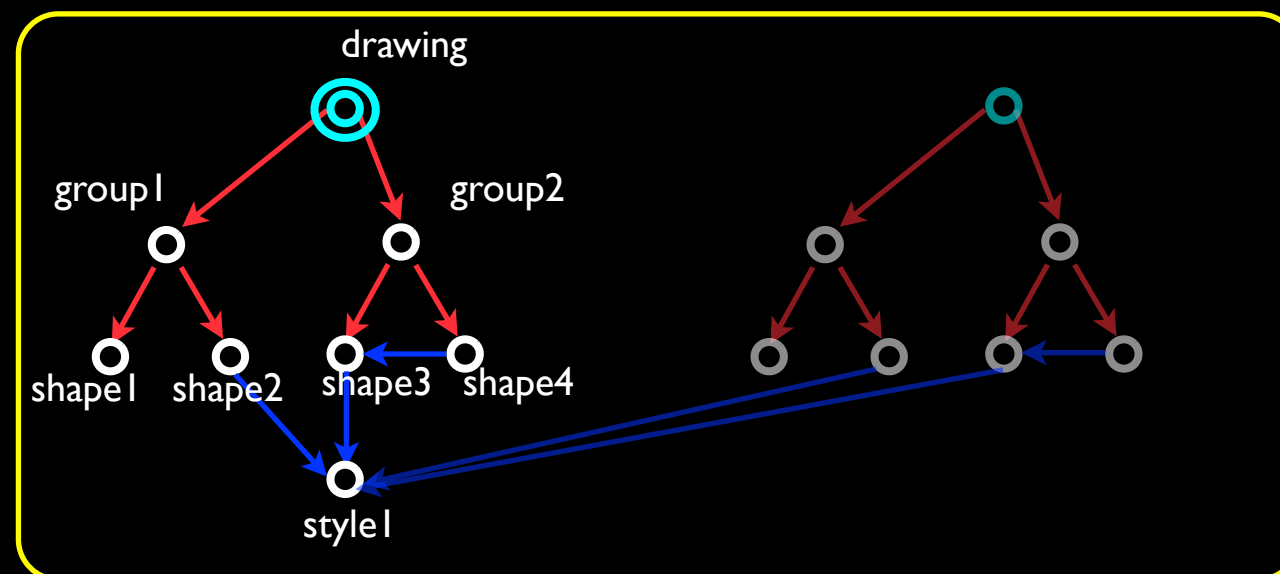
## 2. copy drawing



- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↪ Composite reference
- ↪ Reference
- Root object to copy

# Copying within a context/ persistent root

## 2. copy drawing



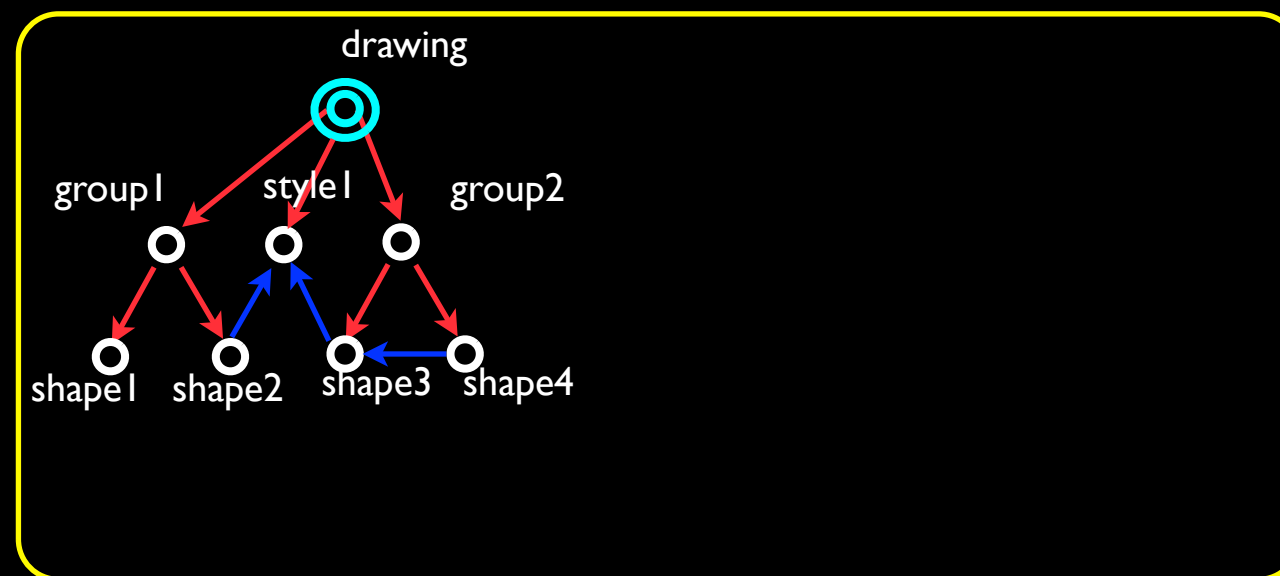
**style1** is aliased in the copy of drawing.

This may seem counterintuitive, but if we want it to be copied, we need something in drawing to have a composite reference to it.

- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

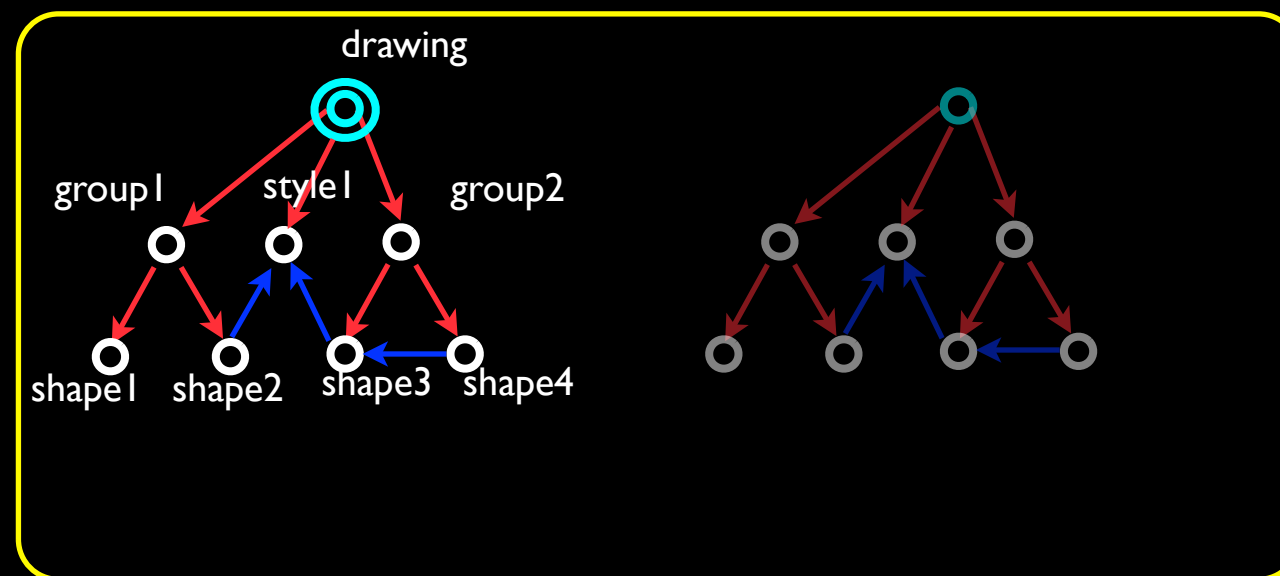
## 2. copy drawing, including style1



- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

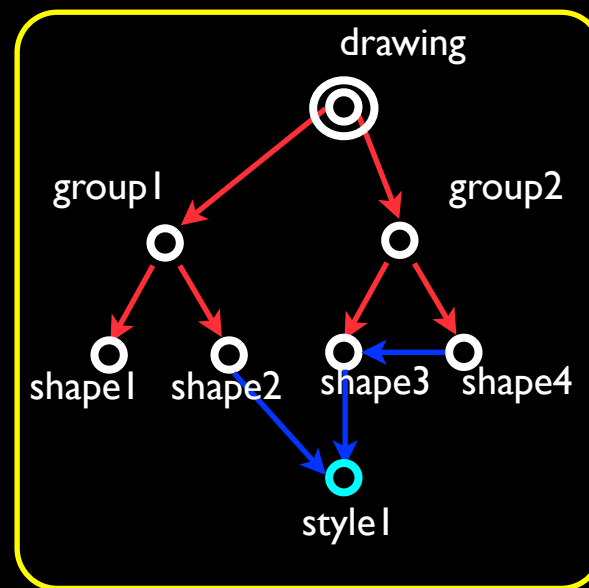
## 2. copy drawing, including style1



- ⊙ Root embedded object
- Embedded object
- ◯ Persistent root
- ↪ Composite reference
- ↪ Reference
- ◯ Root object to copy

# Copying within a context/ persistent root

## 3. copy style I

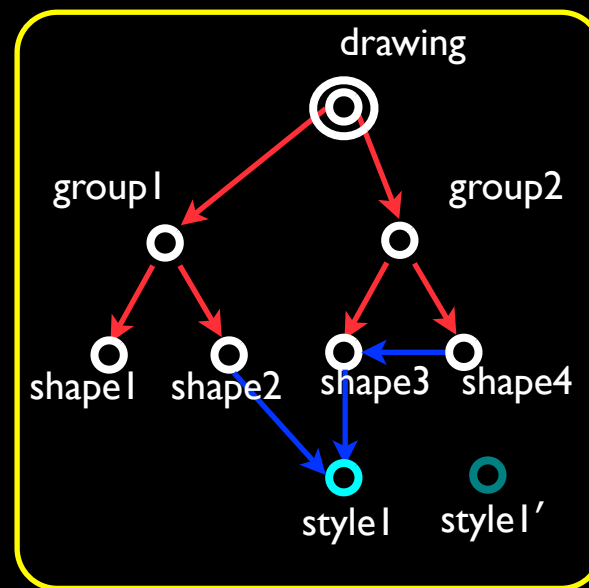




- ⊙ Root embedded object
- Embedded object
- ◯ Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

## 3. copy style I



References to style I are not affected by copying it

- ⊙ Root embedded object
- Embedded object
- ◯ Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying within a context/ persistent root

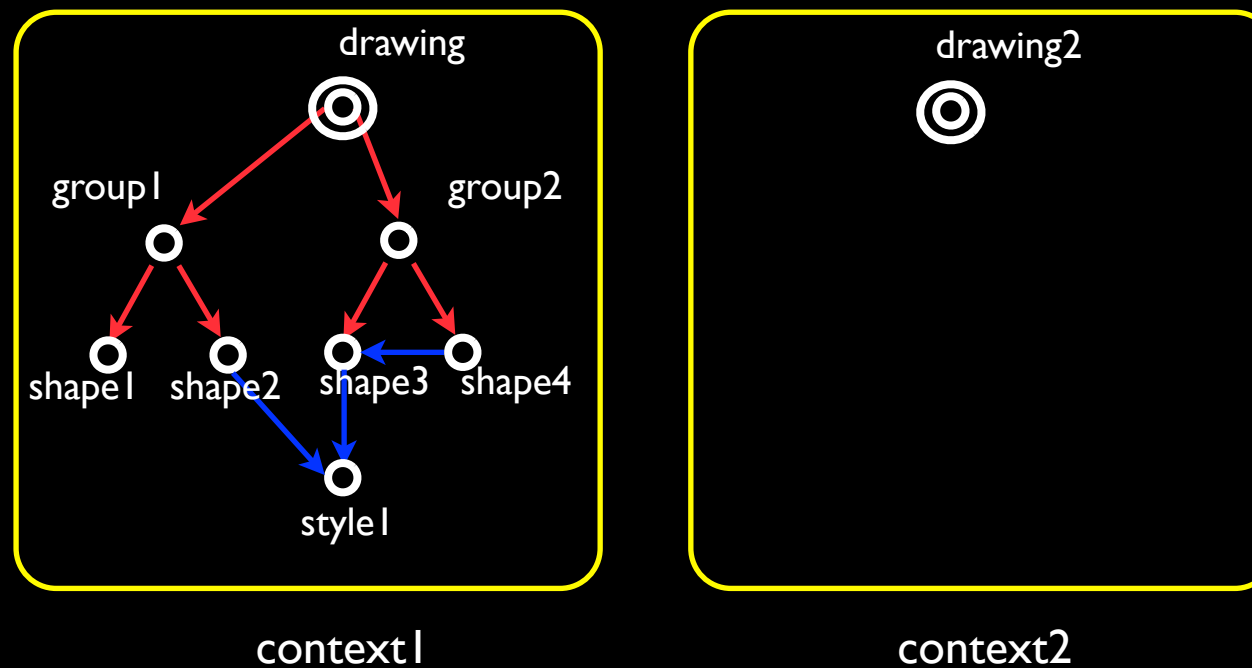
As far as I can see, this copy algorithm is optimal for copying within an editing context/persistent root - it's as simple as possible but also handles every case I can think of.

However, copying between contexts is not as straightforward and a more complex procedure may be needed with custom copy code.

- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying across contexts

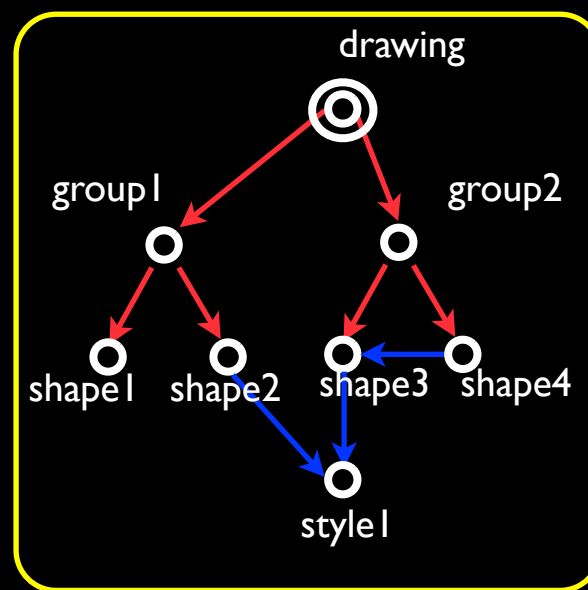
## 4. copy group2 into context2



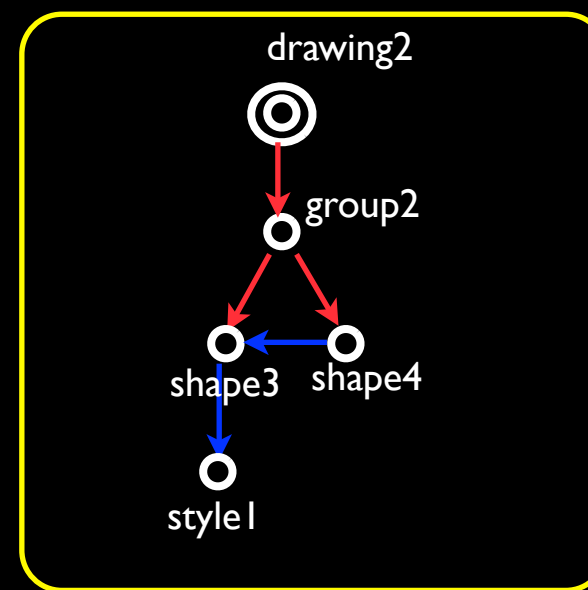
- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying across contexts

## 4. copy group2 into context2



context1



context2

(desired result?)

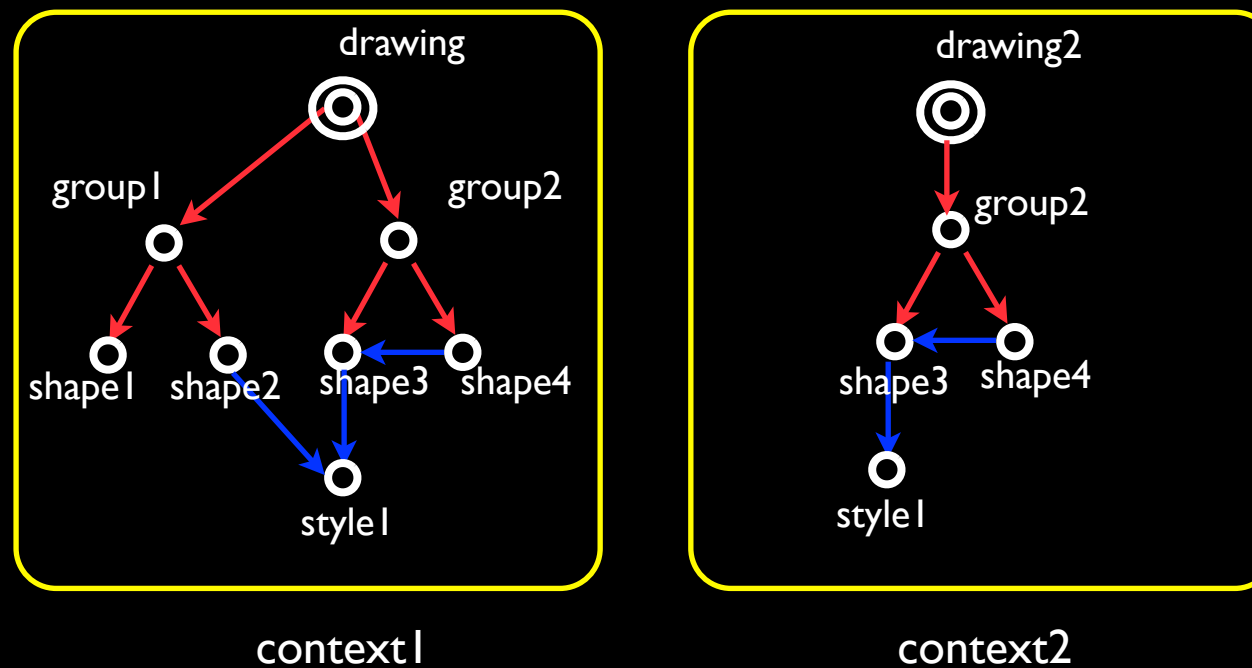
There are a few complications with cross-context copying:

1. we don't necessarily need to rename the copied objects, since embedded object UUIDs don't need to be unique across contexts.
2. If you used the initial algorithm I described, you would end up not copying style1

- ⊙ Root embedded object
- Embedded object
- Persistent root
- ↘ Composite reference
- ↙ Reference
- Root object to copy

# Copying across contexts

## 4. copy group2 into context2



Proposed modified algorithm:

- When copying to a different context, continue to rename the copied objects even though it's not strictly necessary, for the sake of consistency with regular embedded object copying
- Unlike when pasting a copy into the same context from which it was copied, when you know that the non-composite referenced objects will be there, you don't know if they will be there when pasting into another context.
- Consider 2 cases:
  1. when pasting group2 into drawing2, style1 may have been already there
  2. style1 was not there.
- Let's say that having a broken reference to style1 in the copy is unacceptable, because we require the copy to be fully working.
- We could create a cross-persistent root reference back to the original context's style1.
- My preference is, when gathering the set of objects to copy, for each reference, check if the referenced object is in the destination context (usually won't be, unless the dest context was a copy of the original). If it isn't, include the referenced object in the set of objects to copy, even though it's not a composite reference
- Or, simpler: when copying across contexts, always copy all composite referenced as well as regular referenced objects i.e. don't make an attempt to automatically join the object graph being copied with the existing objects in the destination context, whereas we would when copying within the same context.