Compositor Specification

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SWS Assignment 12
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Assumptions

- All compositions have information for versioning (identification, version). In the following this information is not explicitly modeled.

Definitions

Pieces

A piece is a scan of a single physical scroll fragment.

$\mathcal{P}$ = the set of all pieces

Composition members

A composition members is a piece along with a position (relative to the origin of the working set) and rotation (in radians).

$\mathcal{M}$ = the set of all possible composition members
$\mathcal{M} = \{(p, pos, rot) \mid p \in P, pos \in Point, rot \in Double\}$
$Point = Double \times Double$

Definition

Compositions

A composition is a set of 0 or more composition members. It has a sequence of annotation strings attached.

$\mathcal{C}$ = the set of all compositions
$\mathcal{C} = \{C \mid C \subset \mathcal{M}\}$

To simplify the notation we do not represent the annotation sequence in the definition. The annotations of a composition are obtained by:

$getAnnot :: \mathcal{C} \rightarrow \mathcal{A}$
where $\mathcal{A}$ = the set of all annotations.

Definition:pieces, compositions & members

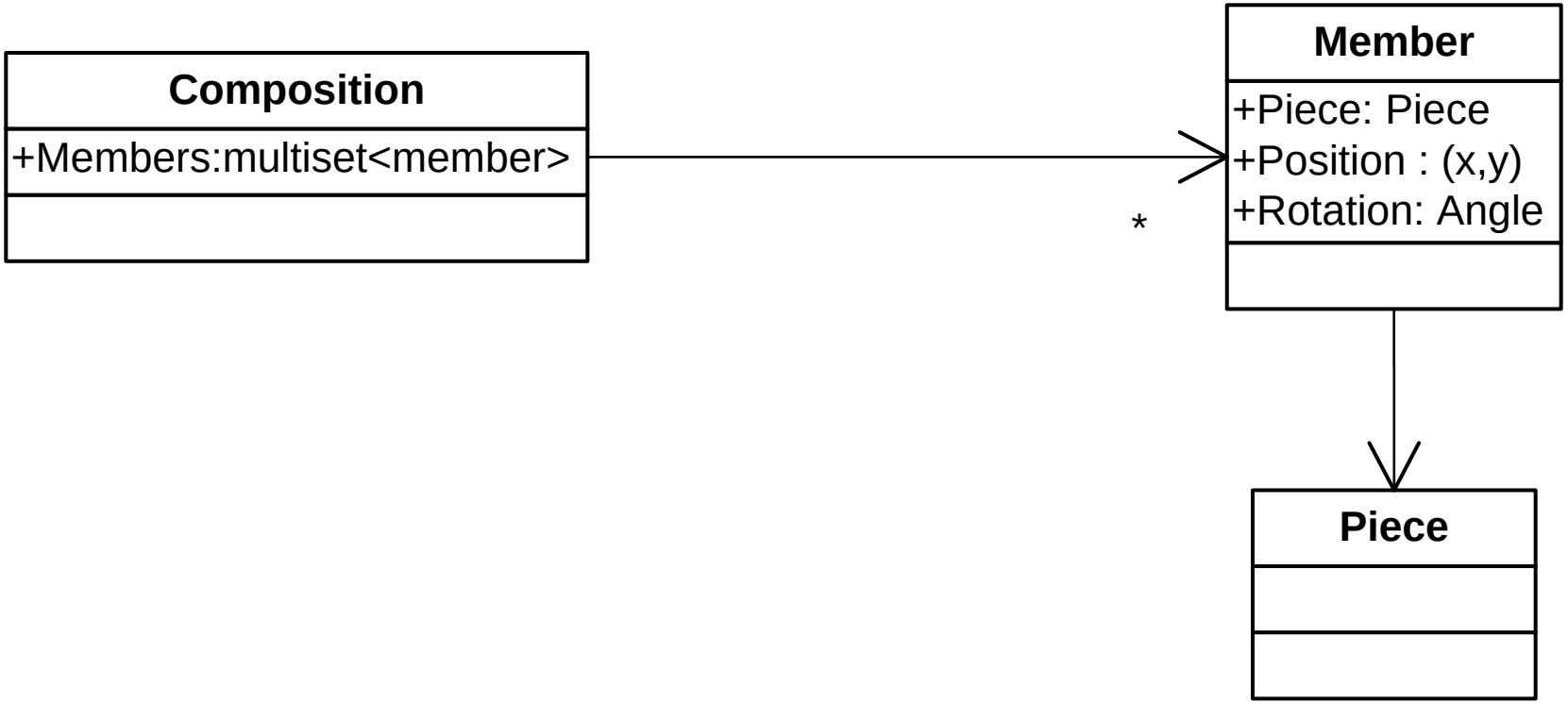


Figure: Relation between pieces, compositions & members

Definitions

Workspaces

A workspace is a 2-D space with a cartesian coordinate system ("normal" x-y coordinate system).

- contains 0 or more compositions
- in the coordinate system, the positive x axis goes to the right and the positive y axis goes up

$\mathcal{W}$ = the set of all compositions from the workspace

Helpers

Rotate a composition:

$Rotate :: \mathcal{C} \times Float \rightarrow \mathcal{C}$

$Rotate(c, \theta) = \{(p, pos, rot + \theta) \mid (p, pos, rot) \in c\}$

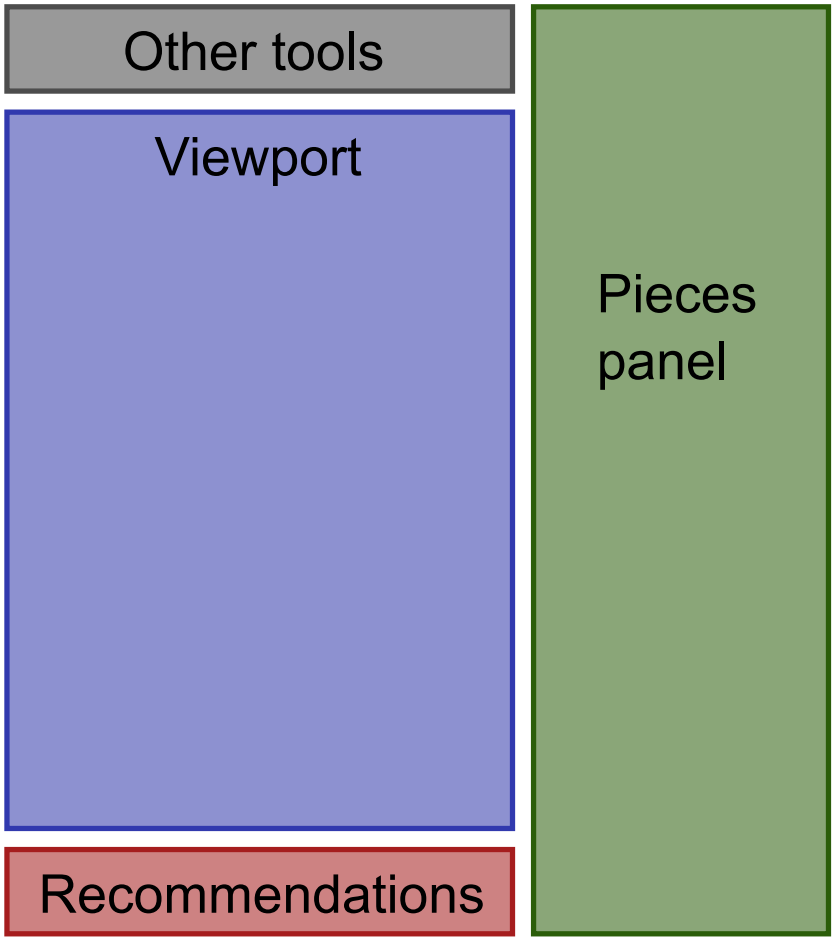
Translate a composition:

$Translate :: \mathcal{C} \times Point \rightarrow \mathcal{C}$

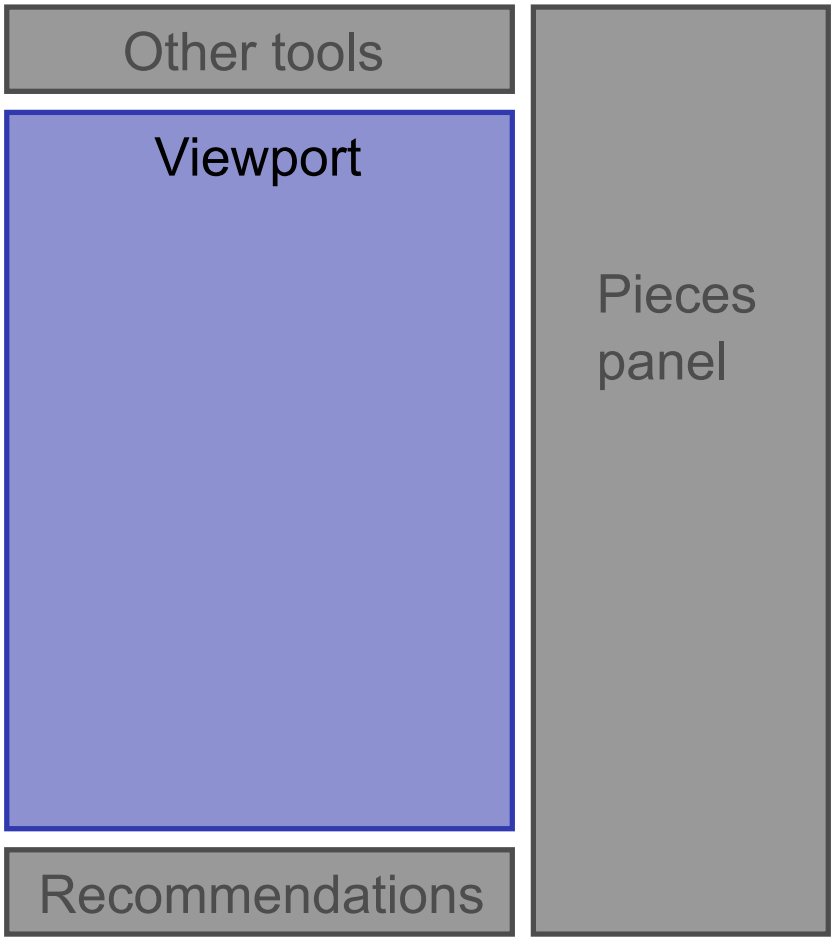
$Translate(c, pos) = \{(p, pos' + pos, rot) \mid (p, pos', rot) \in c\}$

GUI Elements

Interface elements in the compositor:

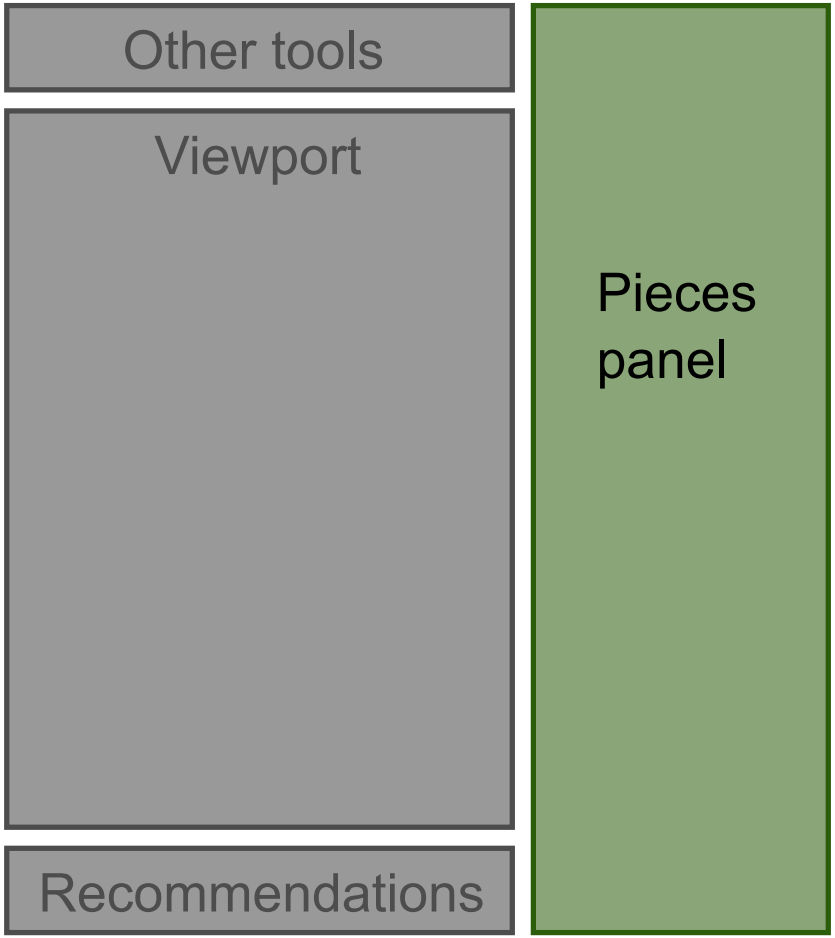


Viewport



- shows part of the workspace
- operations:
  pan, zoom, search

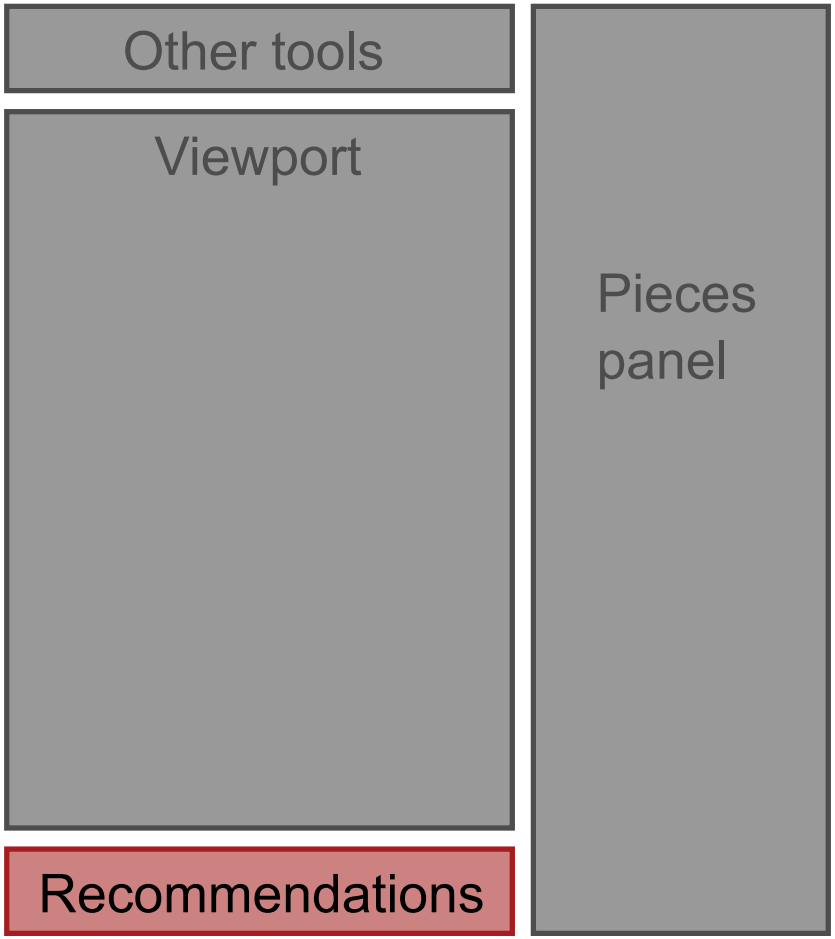
Pieces panel



- list of pieces in the system
- operations:
  filtering and sorting,
  add piece to workspace,
  request recommendations

In the following the piece panel will be viewed as the set of all pieces $\mathcal{P}$.

Recommendation panel



- shows pieces and compositions suggested by ASS
- operations: filtering and sorting, add piece/composition to the workspace

In the following the recommendation panel will be viewed as a tuple $\mathcal{R} = (\mathcal{R}_p, \mathcal{R}_c) =$ (piece recommendation, compositions recommendation)

Compositor Sate

The compositor state is has the following elements:

- $\mathcal{W}$ = the set of compositions from the workspace
- $\mathcal{P}$ = the set of all pieces as given by pieces panel
- $\mathcal{R} = (\mathcal{R}_p, \mathcal{R}_c)$ = the set of all current suggestions as given by the recommendation panel.

Workspace: Operations

The following operations can be performed in the compositor to modify the workspace:

add Add a composition to the workspace. To add a single piece, a one-element composition is created containing that piece.

Pre	Action	Post
$\mathcal{W}, \mathcal{P}, \mathcal{R}_p \cup \mathcal{R}_c$ $p \in P \cup \mathcal{R}_p$	add(p,pos)	$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}_p \cup \mathcal{R}_c$ $c = (p, pos, 0)$
$\mathcal{W}, \mathcal{P}, \mathcal{R}_p \cup \mathcal{R}_c$ $c \in \mathcal{R}_c$	add(c,pos)	$\mathcal{W} \cup \{c'\}, \mathcal{P}, \mathcal{R}_p \cup \mathcal{R}_c$ $c' = Translate(c, pos)$

Workspace: Operations

remove composition Remove a composition, including all its members, from the workspace.

remove member Remove a member from a composition and from the workspace.

Pre	Action	Post
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $m \in c$	remove(m)	$\mathcal{W} \cup \{c'\}, \mathcal{P}, \mathcal{R}$ $c' = c - \{m\}$
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$	remove(c)	$\mathcal{W}, \mathcal{P}, \mathcal{R}$ $c' = c - \{m\}$

Workspace: Operations

extract Removes a piece from a composition and re-adds it to the workspace in a new composition (see Add).

merge Take the members from two and create a new composition with those members. Then, remove the old compositions.

Pre	Action	Post
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $m \in c$	extract(m)	$\mathcal{W} \cup \{c', c''\}, \mathcal{P}, \mathcal{R}$ $c' = c - \{m\}$ $c'' = \{m\}$
$\mathcal{W} \cup \{c', c''\}\mathcal{P}, \mathcal{R}$	merge(c',c'')	$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $c = c' \cup c''$

Workspace: Operations

rotate Rotate a multiset of members around a point.

- The Compositor offers functionality to select the members of a composition, or an arbitrary multiset of members.

translate Translate (move) a multiset of members.

Pre	Action	Post
$\mathcal{W} \cup \{c \cup c'\}, \mathcal{P}, \mathcal{R}$	rotate(c',θ)	$\mathcal{W} \cup \{c \cup c''\}, \mathcal{P}, \mathcal{R}$ $c'' = Rotate(c', \theta)$
$\mathcal{W} \cup \{c \cup c'\}, \mathcal{P}, \mathcal{R}$	translate(c',pos)	$\mathcal{W} \cup \{c \cup c''\}, \mathcal{P}, \mathcal{R}$ $c'' = Translate(c', pos)$

Workspace: Operations

addAnnot Add remove an annotation to a composition.

remAnnot Remove an annotation from a composition

Pre	Action	Post
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $as = getAnnot(c)$	addAnnot(c,a)	$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $getAnnot(c) = as \cup \{a\}$
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $as = getAnnot(c)$ $a \in as$	remAnnot(c,a)	$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$ $getAnnot(c) = as - \{a\}$

Workspace: Operations

save Save the current state of the workspace to the versioning system.

get Change the workspace, or a set of compositions, to a specified version retrieved from the versioning system.

Pre	Action	Output	Post
$\mathcal{W}, \mathcal{P}, \mathcal{R}$	save	SAVE (VS event)	$\mathcal{W}, \mathcal{P}, \mathcal{R}$
$\mathcal{W} \cup \{c \cup c'\}, \mathcal{P}, \mathcal{R}$	get(vers)	GET(vers)	$\mathcal{W}', \mathcal{P}, \mathcal{R}$ $\mathcal{W}'$ = version *vers* of the workspace
$\mathcal{W} \cup \{c\}, \mathcal{P}, \mathcal{R}$	get(c,vs)	GET(c,vers)	$\mathcal{W} \cup \{c'\}, \mathcal{P}, \mathcal{R}$ c' = version *vers* of composition c

VS = versioning system

Conflicts

User operations may lead to conflicts.

Conflict A conflict is an event that is raised when a composition becomes inconsistent.

Inconsistency A composition is inconsistent if it has two or more members with the same piece.

$$isInconsistent :: \mathcal{C} \rightarrow Bool$$

$$isInconsistent(c) = \exists (p_1, pos_1, rot_1), (p_2, pos_2, rot_2) \in c \; . \; p_1 == p_2$$

If a composition is inconsistent, the members causing the inconsistent state are highlighted in the compositor.