Antares_Simulator 6.0.0

SYSTEM MAP EDITOR

REFERENCE GUIDE

Simulation package	***X***
Script Editor package	
Graph Editor package	
Data Organizer package	

Last Rev. 12 JUN 2018

SYSTEM MAP EDITOR

REFERENCE GUIDE

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1 Introduction

The purpose of this document is to detail the operations that can be carried out in the ***System Maps*** window of the Antares_Simulator GUI. It comes as a complement to the document named "General Reference Guide", whose content is assumed to be familiar to the reader.

GUI commands that can be performed in the various fields of the ***System Maps*** window give the user the ability to:

- Create, set the content and delete maps that allow to display the whole system, or parts of it, in different ways
- Create, update and delete primary data entities[1].
- Duplicate and update data associated[2] with primary data entities.

The next sections detail the content of these actions and explain how they can be performed.

2 Handling system maps

2.1 Basics

All Antares_Simulator GUI session begin either by opening an already existing Antares study (File/open…) or by creating a new empty study (File/New). The window immediately displayed after performing either action is the ***System Maps*** window.

At its top right, two tabs allow to switch between two categories of display mode:

- ***Set content:*** this mode is automatically activated on opening/creating a study. It gives access to basic map and data management operations (creation, deletion) and provides mouse-based shortcuts for some data presentation operations (move, show, hide). The latter can also be more regularly performed in the other display mode accessible with the second tab.
- ***Set visibility:*** this second tab enters a mode in which it is possible to determine how any area should be presented in any system map (visibility, coordinates). This can be performed by filling out either of the tables shown in the two ***area-wise*** or ***map-wise*** sub-tabs.

If the Antares study is a new one or if no auxiliary map was created beforehand, there is only one system map and it has no specific name. If the study is not a new one and if auxiliary maps were created in previous GUI sessions, the current map displayed on opening the study is the one that was on display when the study was last saved. The information visible in the ***set content*** mode is the graphical representation of:

- The areas for which the visibility attribute is set to "yes" for the current map
- The links whose extremities are visible in the current map

Switching to the ***Set visibility*** mode makes it possible to change visibility attributes, in a self-explanatory way that needs no further description.

As of now, it is assumed that the active mode is always ***Set content***.

[1] In Antares, the power system is assumed to be adequately modeled by a simplified graph. The primary data entities handled in the System Maps window are the vertices and edges of that graph. Vertices are called areas and edges are called links. Their physical content depends on choices made when setting up the system model (an area may represent a single bus-bar as well as one large region).
[2] E.g. thermal clusters attached to a given area, binding constraints attached to a given set of (non-zero weight) interconnections.

2.2 Creating a map

Map creation can take place only in the ***Set content*** mode. A click on the cross-shaped button located top right of the window adds a new sheet to the maps notebook. This new map is given a default name whose structure is “Map nn”, where “nn” is a number chosen with respect to the names of the other existing maps.

If no new map had been created previously in the study with the ad hoc button, the first newly created map is named “Map 1” and the initial current (nameless) map is renamed “All”.

2.3 Changing the current map

A click on the notebook sheet associated with map makes it come forward as the current map.

2.4 Renaming a map

Renaming a map requires that it is first picked up as current map (see 2.3). In this state, a click on the notebook sheet of the current map makes the GUI enter a notebook editing mode in which the field containing the map name can be typed anew. If the name typed is already in use for another map, renaming will not be performed.

Note: The map “All” has a special status: it cannot be renamed

2.5 Deleting a map

Deleting a map requires that it is first picked up as current map (see 2.3). In this state, there is a closing symbol in the notebook sheet, right of the map name. Clicking on this symbol deletes the map.

Note: When a map is deleted, the data removed from the study are only the local coordinates and visibility status of the objects so far visible in the deleted map. The objects themselves still exist at this point (see Sections 3.7, 3.8 and 6 for deleting objects from the ***system maps*** window)

Note: The map “All” has a special status: it can always be recovered after deletion, even if the study was saved in this state. To recover the map “All”, use in the main menu: “Input/View Map All”

2.6 Centering a map

The display can be centered at any time on any point of (x , y) coordinates. Centering a map on a (x,y) point is a two-step process:

- The first step consists in typing the x and y coordinates of the desired map center in the ad hoc fields located at the top of the ***system map*** window
- The second step is a click on the cross-wire button located left of the (x , y) fields

Centering the map on a given area may require different approaches that depend on the map content and on the current display state:

a) If the desired center of the map is an area that is visible on the current display and if the display is such that scrollbars are available at the bottom and on the right side of the ***system map*** window, using these scrollbars allows an approximate centering of the display on the desired area.

b) If the desired center of the map is an area that is visible on the current display and an exact centering is required, explicit typing of the (x , y) coordinates is required. Getting these coordinates is a two-step process :

- First, a click on the area turns the area status to “selected”
- Second, opening the inspector auxiliary tool displays the main properties of the area, among which its local coordinates in the current map. These can then be typed in the ad hoc fields

c) If the desired center of the map is an area that is not visible on the current display, explicit typing of the (x , y) coordinates is required. Getting these coordinates is a four-step process :

- First, the display has to be switched to any Antares data presentation window (using, for instance: Input/View Load)
- Second, a click on the desired item in the area names list turns the area status to “selected”
- Third, opening the inspector auxiliary tool displays the main properties of the area, among which the local coordinates can be found
- Fourth, the display can be switched back to the ***System Maps*** Window and the desired coordinates can be typed in the ad hoc fields

2.7 Trimming a map

The course of evolution of a map may involve a long series of object creation, relocation and deletion. This may bring the map to a stage where it is too large to be conveniently manipulated.

A solution to that issue consists in trimming the map, which can be achieved by a click on the trimming button located top center of the window. This restrains the displayed field to a rectangle exactly circumscribed to the study objects that are defined as visible in the current map.

For more trimming effect, it is possible to:

- First, turn off the visibility status of the remotest object displayed on the current map
- Trim again with the ad hoc button
- If need be, the creation of a new map dedicated to the remote objects that are no longer visible may compensate for their disappearance from the trimmed map

3 Handling Areas and Links

3.1 Creating Areas

Area creation is an operation that is necessarily carried out in the current map. It can be performed in different ways:

- A click on the addition-shaped symbol top of the ***System Maps*** window creates a new area at the coordinates defined as the center the map.
- The "N" key creates a new area at the coordinates to which the mouse points
- Other keys (see in appendix) may also to be used to create Areas whose default attributes are not standard

Areas receive default attributes when they are created. An Area created either with the standard click or with the N key receives the following attributes:

- A name whose structure is "Area nn", where "nn" is a number chosen with respect to the names of the other areas already existing in the study, regardless of the fact that they are visible or not in the current map or in any other map
- A default color (230,108,44)

Name, color and location can be modified by opening the inspector auxiliary tool, which displays the main properties of the newly created area, for which new values can be typed.

3.2 Creating Links

Link creation is an operation that is necessarily carried out on the current map. Creating a link demands that both areas chosen as extremities of the new link be visible on the screen. Creating a link is a two-step process:

- A click on any of the two terminating area turns its status to "selected"
- The link can then be created by an action combining:
  - A click on the chain-link green button located left of the selected area
  - A mouse-drag of the mouse to the other extremity

The visibility attribute of the link in any map is determined by the visibility status of its extremities in this map. If both extremities are visible then the link is visible, otherwise it is not.

3.3 Selecting an Area

In the ***Set Content*** display mode of the ***System Maps*** window, an area can be selected by clicking on it

3.4 Selecting a Link

In the ***Set Content*** display mode of the ***System Maps*** window, a link can be selected by clicking on it

3.5 Relocating Areas

In the ***Set Content*** display mode of the ***System Maps*** window, an area can be moved by an action combining:

- A click on the area to be moved
- A mouse-drag of the mouse to the desired new location

Note: This operation can be included in a larger one, regarding a set of selected objects including several other areas and links (see 5)

3.6 Relocating Links

In the ***Set Content*** display mode of the ***System Maps*** window, a link can be moved by relocating its extremities

Note: This operation can be included in a larger one, regarding a set of selected objects including several other areas and links (see 5)

3.7 Deleting an Area

The deletion of an area is possible only if it is visible in the current map. Deleting an area is a two-step process:

- A click on the area turns its status to “selected”
- It can then be deleted by a click on the red pin-shaped button right below

Note: Deleting an area deletes at the same time all links to which it is connected

Note: The operation is irreversible and requires confirmation in a dialog box

Note: This operation can be included in a larger one, regarding a set of selected objects including several other areas and links (see 6)

3.8 Deleting a Link

The deletion of a link is possible only if it is visible in the current map. Deleting a link is a two-step process:

- A click on the link turns its status to “selected” (its color turns to red)
- It can then be deleted by a click on the red link-shaped button below the bottom-left corner of the light purple rectangle drawn around the link

Note: The operation is irreversible and requires confirmation in a dialog box

Note: This operation can be included in a larger one, regarding a set of selected objects including several other links and areas (see 6)

4 Selecting multiple objects

Areas and links may be selected together and form a multiple selection set. The next two paragraphs describe two different methods that can be indifferently used to carry out a multiple selection. In both cases, the result of the operation depends on the status of the three toggle filtering buttons located top left of the ***System Maps*** window:

- The first toggle button is associated with areas: if it is "on" (circled in blue), areas can be involved in the selection, otherwise they cannot.
- The second toggle button is associated with links: if it is "on" (circled in blue), links can be involved in the selection, otherwise they cannot.
- The third toggle button is associated with binding constraints[3]: if it is "on" (circled in blue), constraints can be involved in the selection, otherwise they cannot.

Note: The progress of a selection can be checked at any time by opening the inspector tool window

Note: The inspector tool window can be detached and moved to another location (outside the application or reattached as top- or bottom- split window)

4.1 Single shot selection

On the current map, a selection rectangle can be created by combining two mouse operations:

- Move the mouse to one corner of the desired selection rectangle, click and hold down
- Drag the mouse to the diagonally opposite corner

As a result, all visible objects of the current map inscribed within the selection rectangle and compatible with the current status of the filtering toggle buttons form a multiple selection.

Note: Selected binding constraints are those whose supporting elements (non-zero weight objects) are all located inside the rectangle (regardless of the selection status they are given by the filtering toggle buttons)

4.2 One at a time selection

This operation requires to:

- Hold down the Shift key
- Click successively on each item (Area or Link) to select

Note: In the course of the process, clicking on an object already selected unselects it

Note: Toggle button allowing, the selected binding constraints are those for which all of their non-zero weight associated objects belong to the selection

4.3 Empty selection

A particular case to consider is that of an empty selection. An empty selection is the result of a simple left-click in a region of the map where there are no objects that can be selected. An empty selection may be of special interest when considering ***Paste*** actions (see 9)

[3] Unlike Areas and Links, brand new binding constraints cannot be created from the ***System Maps*** window. They can, however, be selected along with areas and links and therefore be concerned by data management operations (deletion, duplication).

5 Relocating a selection

In the ***Set Content*** display mode of the ***System Maps*** window, a (multiple) selection can be moved by an action combining:

- A click on any of the selected items[4]
- A mouse-drag of the mouse to the desired new location

6 Deleting a selection

In the ***Set Content*** display mode of the ***System Maps*** window, a (multiple) selection can be deleted by clicking on the red button located below the bottom left corner of the light purple rectangle drawn around the multiple selection.

Note: The operation is irreversible and requires confirmation in a dialog box

Note: The aspect of the deletion button depends on the items present in the selection: pin-shaped (selection of Areas), link-shaped (selection of links) or cross-shaped (mixed selection, potentially involving binding constraints)

7 Hiding/Showing a selection

In the ***Set Content*** display mode of the ***System Maps*** window, a (multiple) selection made in the current map can be used to modify the visibility attributes of the selected objects in the current map as well as in other maps:

- In the map where the selection is set up, a right-click makes it possible to turn the visibility status of the selected Areas to "off" (***Hide***). Note that, though the Areas (and the associated lines) are no longer visible, the selection remains effective until the next left-click within a map, and it can therefore still be used for other purposes[5]

- After a switch to any other map chosen as new current map, a right click makes it possible to turn the visibility status of the selected Areas to either desired value (***Hide*** turns the status to off, ***Show*** turns the status to on)

Note: Hide/Show cannot be performed in the map "All"

8 Copying a selection to the Antares clipboard

In the ***Set Content*** display mode of the ***System Maps*** window, a (multiple) selection can be copied in a private Antares clipboard which is shared with all other instances of Antares GUI that belong to the same user. There is no restriction regarding the scope of the copy command. ***Copy*** is performed by clicking on the ad hoc button located top of the ***System Maps*** window.

Note: The Antares clipboard remains unchanged until another ***Copy*** action is performed or until all Antares studies are closed

Note: Data inserted in the clipboard by ***Copy*** do not include items that depend on a particular simulation context: Monte Carlo year indices that may have been associated with copied Areas by the ***scenario builder*** tool are therefore not transferred into the clipboard.

[4] Make sure that the Shift key is depressed , unless the item will be unselected and dragging the set will not be possible
[5] For instance for copy/paste operations, or for show/hide operations in other maps

9 Pasting the Antares clipboard into a target field

9.1 General

The lists of objects respectively contained in the clipboard, the target selection and the target study are For the ***Paste*** command, which is performed by clicking on the ad hoc button located top of the ***System Maps*** window, the notion of target field is defined by three elements:

- A target study (any study opened in an active Antares instance)
- A target map (the current map of the target study)
- A target selection (an object selection[6] in any map of the target study)

The target selection chosen for the ***Paste*** action can be of any type (single, multiple, empty). Broadly speaking, the general effect of the ***Paste*** action is to duplicate, on the destination side, all of the data contained in the clipboard. The way data are duplicated depends on the presence of twins in either two couples of objects lists:

- The ***clipboard*** and the ***target selection***
- The ***clipboard*** and the ***target study***

Twin objects are objects that have exactly the same signature. The definition of the signature of the different objects that may be concerned by the ***Paste*** command is given in appendix.

A general data consistency commitment for a study is that it cannot include any pair of twins, whatever the type of object. Moreover, aside from the uniqueness of their signature, some objects may be committed to bear a name that is also unique within the study.

Hence, the rationale of the ***Paste*** command must make sure that the data duplication process does not create any pair of twins or any pair of forbidden homonyms.

Note: Pasting a clipboard taken from the same Antares instance (internal Copy/Paste) does not demand that the study be saved beforehand

Note: Pasting a clipboard taken from another Antares instance (external Copy/Paste) demands that the origin study be saved beforehand

9.2 Exclusion cases

In some situations depending on the presence of twins in the three lists, the ***Paste*** operation may be impossible to perform. There are five such possible situations, in which an error message is issued:

- The target selection contains several objects, one of them at least has no twin in the clipboard, and the clipboard contains at least one object of a type identical to that of the twin-less object
- The clipboard contains Binding Constraints that have no twin in the target selection and the destination target does not contain all of their supporting elements (set of non-zero weight objects)
- The clipboard contains Links that have no twin in the target selection, the clipboard does not contain their ending Areas, both clipboard and target selection contain more than one object
- The target selection contains exactly one object, it has no twin in the clipboard, and the clipboard contains more than one object
- The target selection and the clipboard both contain exactly one object but their types differ (Area/Link/Binding Constraint)

[6] Note that an empty selection is a valid target selection

9.3 Feasible cases

The lists of objects respectively contained in the clipboard, the target selection and the target study are hereafter assumed to be such that no exclusion case is encountered. ***Paste*** is then performed along the process described here below. This process may involve the automatic generation of names for data items that are subject to name uniqueness rules.

1. Each object of the clipboard that has no twin in the target study is duplicated in the target study as a visible new object of the target map, with its original signature. A copy of the all relevant associated data[7] found in the clipboard is attached to the new object. In this copy, binding constraints can be given a new name, to avoid the creation of pairs of forbidden homonyms. Pasted Areas bring with them all the correlation coefficients they had among the set of clipboard objects. The correlation coefficients with all other Areas of the target study are set to zero.

2. Each object of the clipboard that has a twin in the target study and has no twin in the target selection is duplicated in the target study as a visible new object of the target map, with a new signature. A copy of the all relevant associated data found in the clipboard is attached to the new object. In this copy, binding constraints can be given a new name, to avoid the creation of pairs of forbidden homonyms. Pasted Areas bring with them, under their new name, all the correlation coefficients they had previously among the set of clipboard objects. The correlation coefficients with all other Areas of the target study are set to zero.

3. Each object of the target selection that has a twin in the clipboard is updated with respect to the following principles :

    i. If it was not already visible in the target map (i.e. the target selection was made in another map of the target study) , it is made visible in the target map

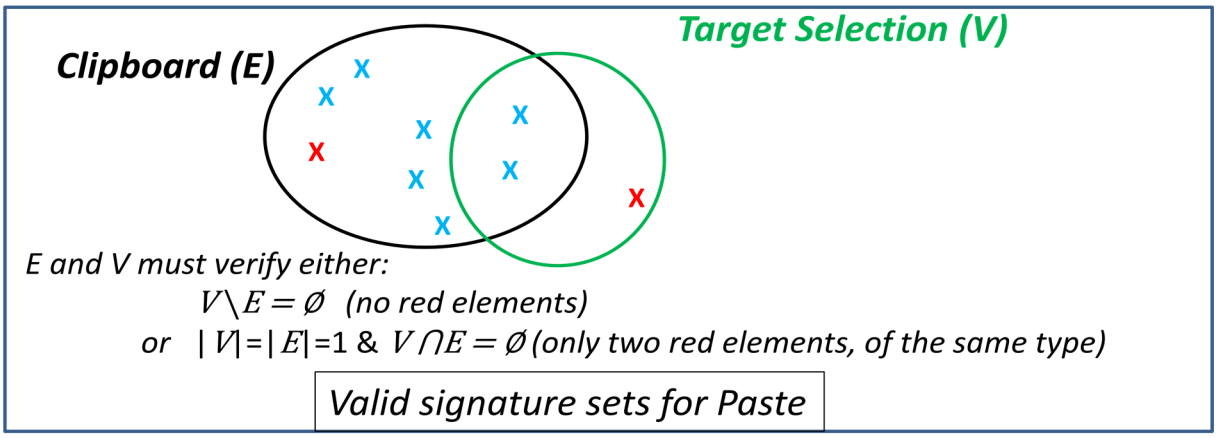
    ii. If the object is an Area or a Link, all of its initial data is replaced by a copy of the content of the clipboard, to the exception of the color, coordinates and correlation coefficients, which are kept identical to those found in the target selection

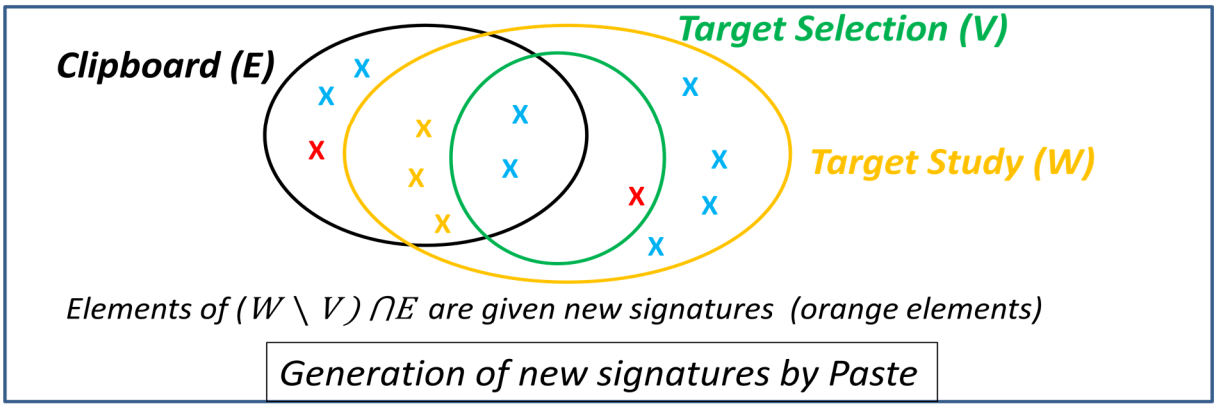
    iii. If the object is a binding constraint, all of its initial data is replaced by a copy of the content of the clipboard

        Note: Binding constraints data include their time span and bounds category, their weights, offsets and bound(s) values. It is therefore possible that in the latter case ***Paste*** results in transforming, for instance, an “hourly equality” constraint into a “weekly bounded on both sides” constraint

4. Finally, it is possible that the target selection contains one single object without twin in the clipboard. In this case, all of its initial data is replaced by a copy of the content of the clipboard, to the exception of the name, color, coordinates and correlation coefficients, which are kept identical to those found in the target selection

[7] E.g. times-series of thermal clusters available power, hydro-generation parameters, etc.





9.4 Special Paste

Special Paste is an alternative to the regular ***Paste*** command. Its domain of validity is identical to ***Paste.***

Special Paste is therefore possible when the target selection and the clipboard do not fall into one of the three exclusion cases listed in 9.1.

In the context of ***Special Paste***, it is possible to choose for each data item contained in the clipboard (Area, thermal clusters, time-series set, binding constraints, etc.) whether the data from the clipboard should:

- Come in replacement of the data found in the target selection (**Overwrite** option)
- Be mixed with the data found in the target selection (**Merge** option)
- Be ignored, thus leaving intact the target selection data (**Skip** option)

Note: For binding constraints, the **Merge** option may require the generation of new names, to avoid creating pairs of B.C. twins in the same study

Note: For thermal clusters, the **Merge** option may require the generation of new names, to avoid creating pairs of thermal twins (homonyms within an Area)

In a Special Paste session, the clipboard content is displayed as a data tree. For each data node, an option can be chosen among sets which depend on the node type:

- **Overwrite** is available for all nodes. It replaces data found in the target selection (if any) by the clipboard content associated with the matching data node. It has a partial propagating effect: choosing the option for a node automatically sets the same option for most of the node's children (the exceptions are the children for which the **Merge** option is available, see infra).

  Note: When the pasted object has no twin in the target selection, **Overwrite** has no pre-existing data to replace and it duplicates the clipboard content as a new object. In this process, new names may have to be generated for binding constraints and thermal clusters.

- **Skip** is available for all nodes. It ignores the clipboard content and leaves unchanged data associated with the matching data node found in the target selection (if any). It has a total propagating effect: choosing the option for a node automatically sets the same option for all of the node's children.

- **Merge** is available only for some data nodes and its effect depends on the data node type:

  - Individual Binding constraint: the effect is to duplicate the binding constraint as a new object within the target study. In this process a new name may have to be generated

  - Individual thermal cluster, within a set attached to a specified Area: the effect is to duplicate the thermal cluster as a new object within the target study. In this process a new name may have to be generated

  - Whole sets of thermal clusters attached to a specified Area: the effect on each element of the set can be freely chosen among the three options: **Overwrite, Skip, Merge**

APPENDIX

1 Objects signatures and names

The different data items that can be manipulated as elementary entities in ***Paste*** and ***Special Paste*** bear a signature, which is committed to be unique in a study, among the set of objects of the same category. Besides, most of these data items also bear a name, which may be committed to be unique too:

- Binding constraints can have no homonym in a study
- Thermal clusters can have no homonym in a study Area

The object name is an attribute of the object. In the course of data duplication, it may be necessary for the ***Paste*** or the ***Special Paste*** command to generate new names to avoid the creation of forbidden homonyms. Likewise, ***Paste*** or ***Special Paste*** command may have to generate new signatures to avoid the creation of twins. Tables I and II below give a definition and an illustration of what names and signature stand for:

Object Category	Name	Signature
Area	"name" field typed in the inspector	*{Area name}*
Load TS, etc.	Name of the associated Area	*{Area name}*
Thermal cluster	"name" field (Thermal/common Tab)	*{Area name* cluster name}*
Link	"caption" field (Inspector tool)	*{Area name 1/Area name 2}*
Binding Constr.	"caption" field (B.C. editor)	*{name§signatures of all non-zero weight objects}*

Table I : Name and signature definitions

Object Category	Name	Signature
Area	WEST	*WEST*
Load TS, etc.	*No name*	*WEST*
Thermal cluster	Coal 1	*WEST*Coal 1*
Link	4*570 mm2	*EAST/WEST*
Binding Constr.	Mesh 1	*Mesh 1§EAST/NORTH!EAST/WEST!NORTH/WEST*

Table II : Name and signature exemples

Regardless of their type, the automatic generation of a new name for the duplication of an object by ***Paste*** or ***Special Paste*** obeys the following principle, based on the analysis of the character string ***Str*** forming the name:

a) If ***Str*** = "Any_name-nn", where "Any_name" is a character string forming a valid character sequence[8], " -" is a hyphen and "nn" a sequence of arbitrary length of 0-9 digits that does not begin by "0": the generated new name will be: "Any_name-mm", where mm is the smallest number greater than nn such that "Any_name-mm" is a free name in the relevant context[9].
b) Otherwise (i.e. ***Str*** = "Any_name"), the generated new name will be "Any_name-mm", where mm is the smallest number greater than 1 such that "Any_name-mm" is a free name in the relevant context.

Examples:

Area	BUS-124	→ BUS-125	if BUS-125 is a free name
	BUS-124	→ BUS-127	if BUS-127 is free & BUS-125 & BUS-126 are not
	BUS-0124	→ BUS-0124-2	if BUS-0124-2 is a free name
	BUS 124	→ BUS 124-2	if BUS 124-2 is a free name
	BUS_124	→ BUS_ 124-2	if BUS_124-2 is a free name
B.C.	Bind_const_hr-1	→ Bind_const_hr-2	if Bind_const_h-2 is a free name
Clust.	O Coal refurb	→ O Coal refurb-2	if O Coal refurb-2 is a free name

[8] Valid characters in the Antares GUI are: A-Z,a-z,hyphen,underscore,&,@,comma,space. Valid sequences exclude repeated spaces and do not begin by a space.

[9] A free Area name or Binding Constraint name is a name absent from: the target study **AND** the clipboard **AND** the list of names built when processing previous objects. A free cluster name obeys the same rule but at the scale of the Area to which it is to be attached. Clipboard objects that are "short" homonyms (i.e. name-nn & name-pp) are sorted by ascending numeric suffix in the ***Paste*** process (when duplicating (name-3 +name-4) as (name-3 +name-4 +name-5 + name-6), name-5 replicates name-3 while name-6 replicates name-4)

2 Creating Areas with non standard attributes

Areas receive default attributes when they are created. Depending of the creation mode used, these default (name and color) attributes are not the same. In all cases, the name given to the new Area will be:

"Type_name nn"

Where "nn" is a number chosen with respect to the names of the other areas already existing in the study, regardless of the fact that they are visible or not in the current map or in any other map.

Keyboard shortcuts keys listed in the table below allow quick creation of various Area types

Shortcut Key	Type_name	Color
N	Area	230,108,44
L	LOAD	0,0,0
T	THER	128,64,64
U	NUCL	255,255,0
G	CCGT	255,128,128
C	COAL	255,128,128
O	OILT	255,128,128
H	HYDR	0,0,255
P	PSPP	0,128,255
R	RENW	0,128,128
W	WIND	0,255,128
S	SOLA	0,255,128
B	BIOM	0,255,128
E	void	192,192,192
V	&vir	255,0,0

Note: Whatever the creation mode, all of the attributes of an Area can be changed at any time with the inspector tool

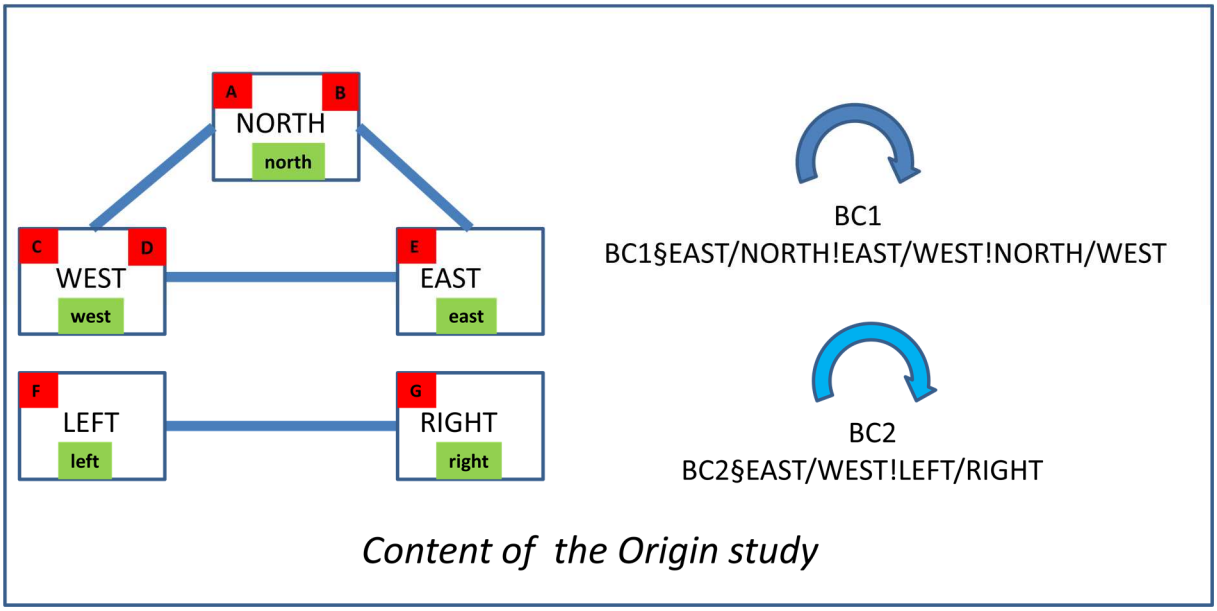
Note: The predefined Area types are indicative only. Nothing compels the user to give them the content that the category suggests

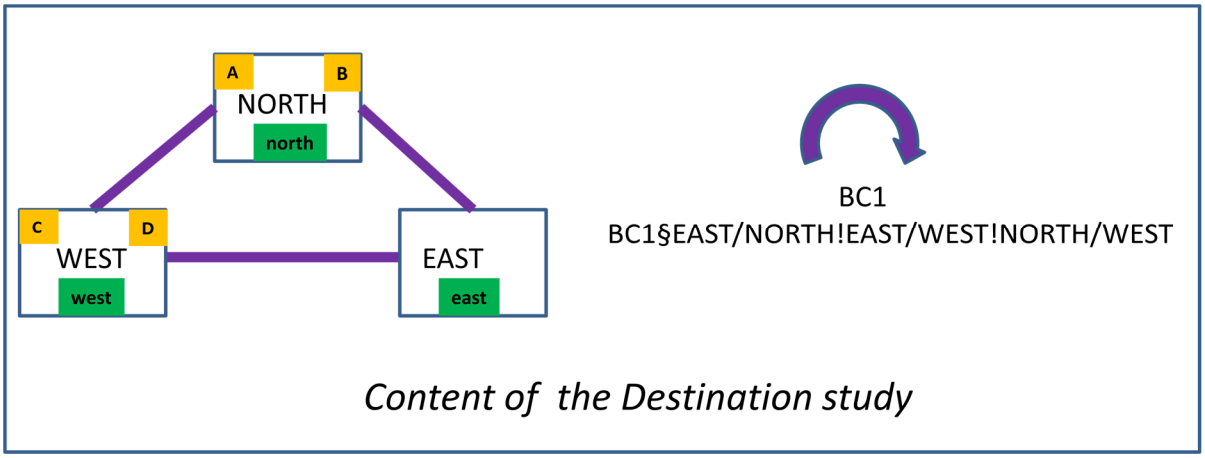
3 Copy/Paste examples

This section gives some examples of the result of a Copy/Paste sequence. For simplicity's sake, the following self-explanatory symbolic representation is used for the different objects:

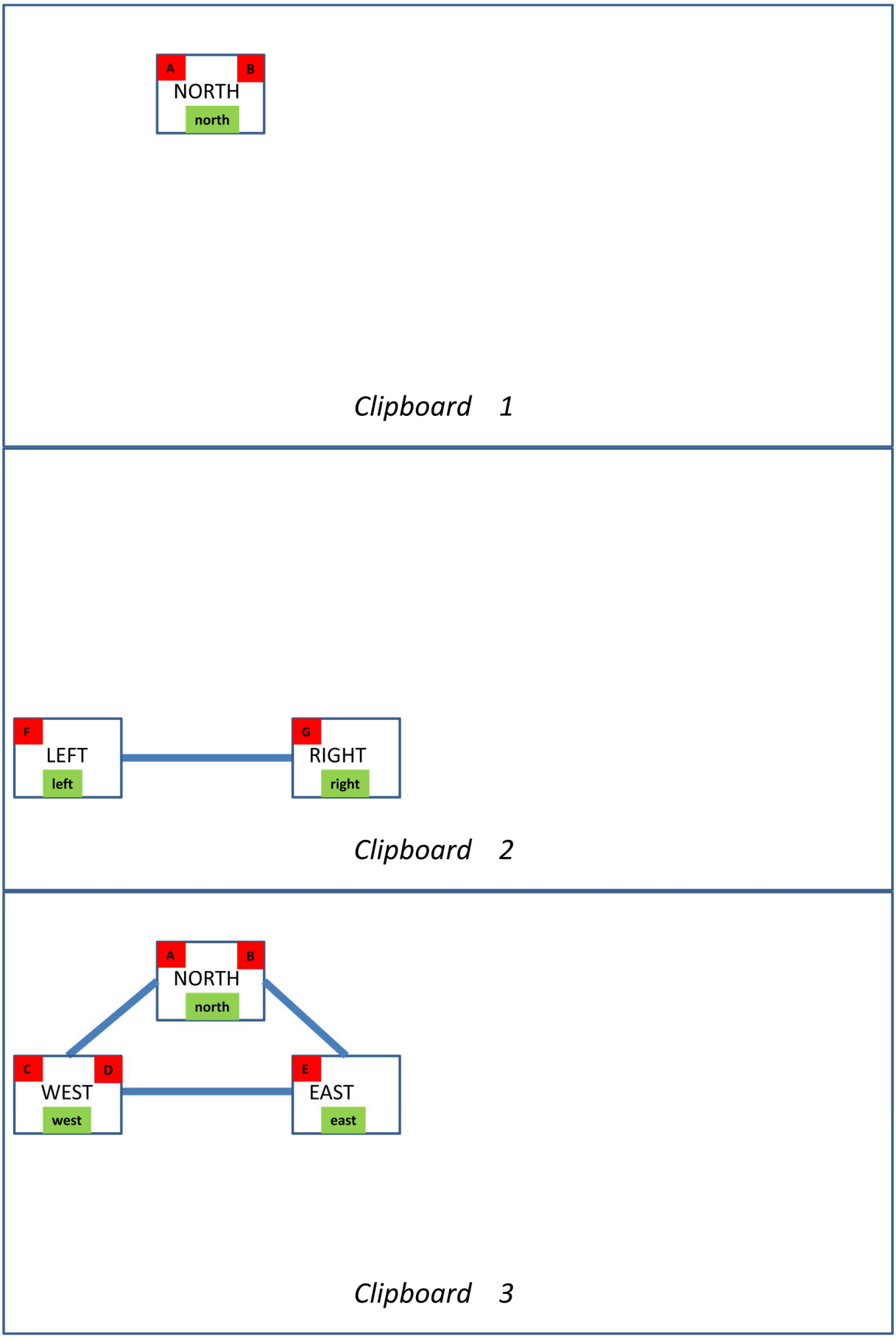
Area (name "zone")	Thermal cluster (name "A")	Non-thermal data (attached to Area "zone")	Link	Binding Constraint (name & signature)
ZONE	A	zone		name Signature

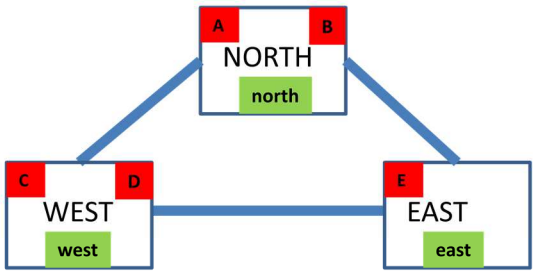
The content of the origin study from which the clipboard is taken (***Copy***) and that of the destination study to which it is duplicated (***Paste***) are illustrated hereafter. Different colours are used for each study to indicate that, although objects names and signatures may be identical, their attached data generally differ.





Hereafter are illustrated ***Copy***/***Paste*** sessions associating a clipboard (taken in a set of 6, out of the 863 possible non-empty clipboards) with a target selection (taken in a set of 5, out of the 72 possible target selections). The next pages show the 6 clipboards, 5 target selections and all feasible combinations (18).

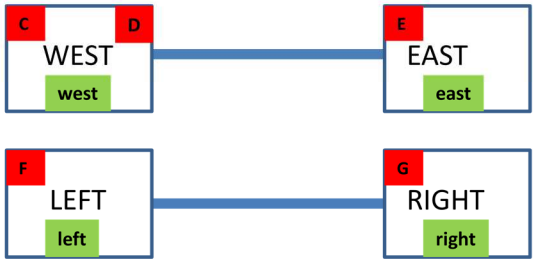




BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

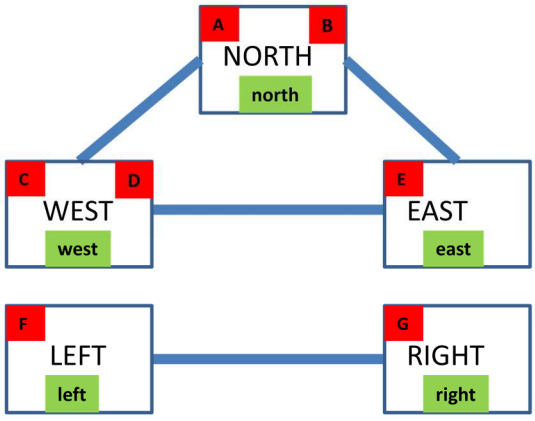
Clipboard 4



BC2

BC2§EAST/WEST!LEFT/RIGHT

Clipboard 5



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

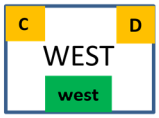
BC2

BC2§EAST/WEST!LEFT/RIGHT

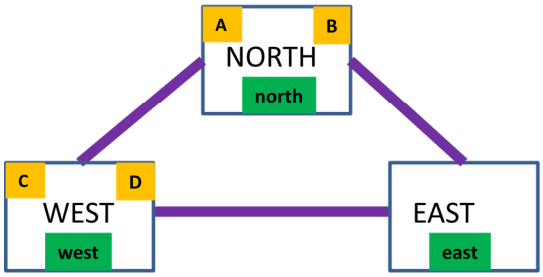
Clipboard 6

EMPTY

Target selection 1



Target selection 2

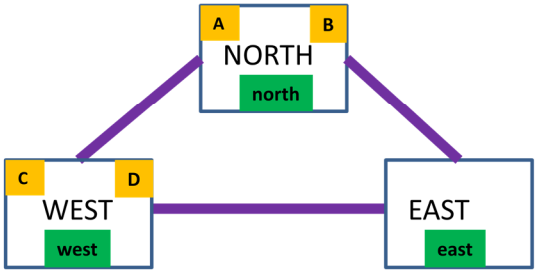


Target selection 3

BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

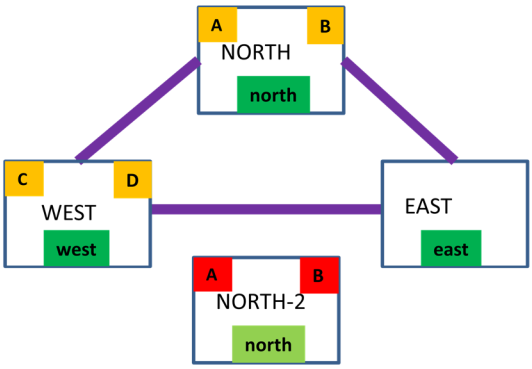
Target selection 4



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

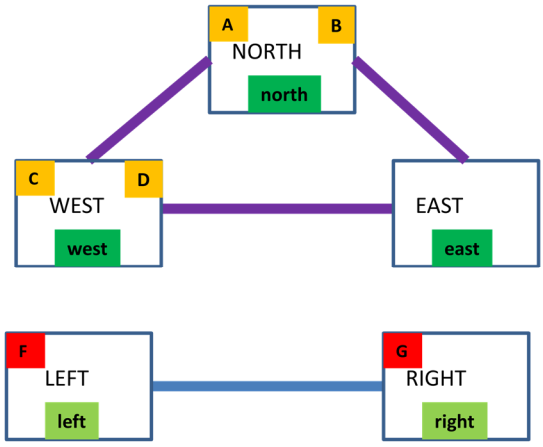
Target selection 5



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

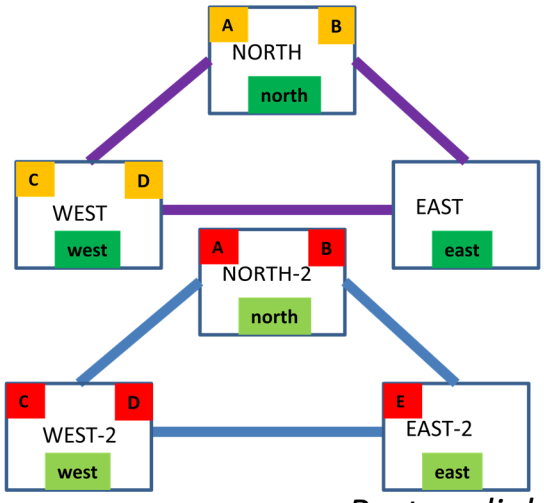
Paste : clipboard 1 + target 1



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

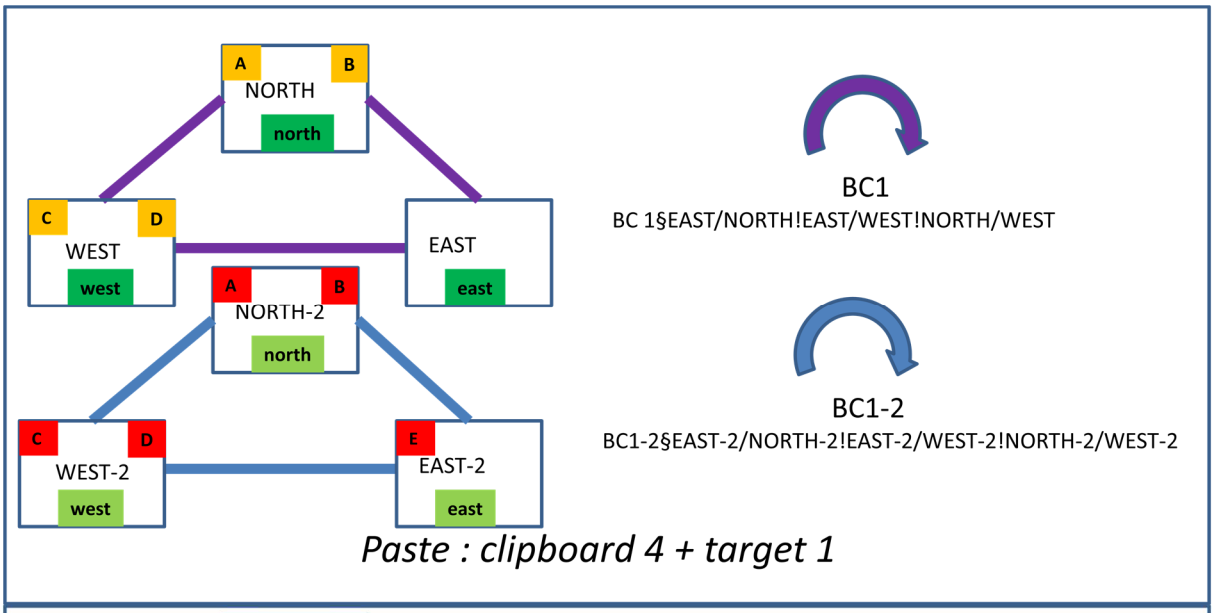
Paste : clipboard 2 + target 1



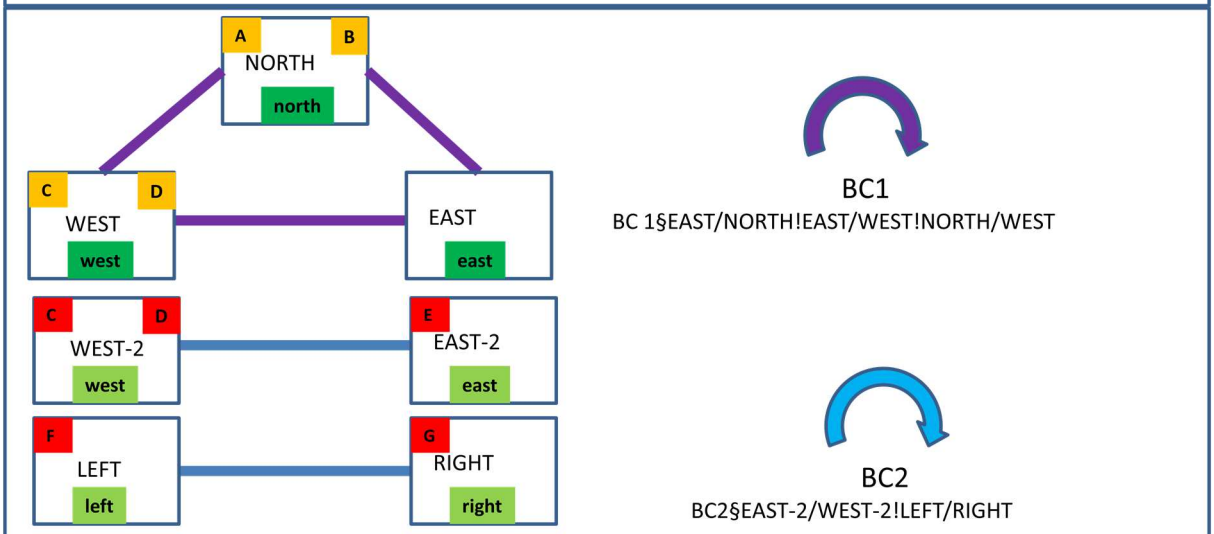
BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

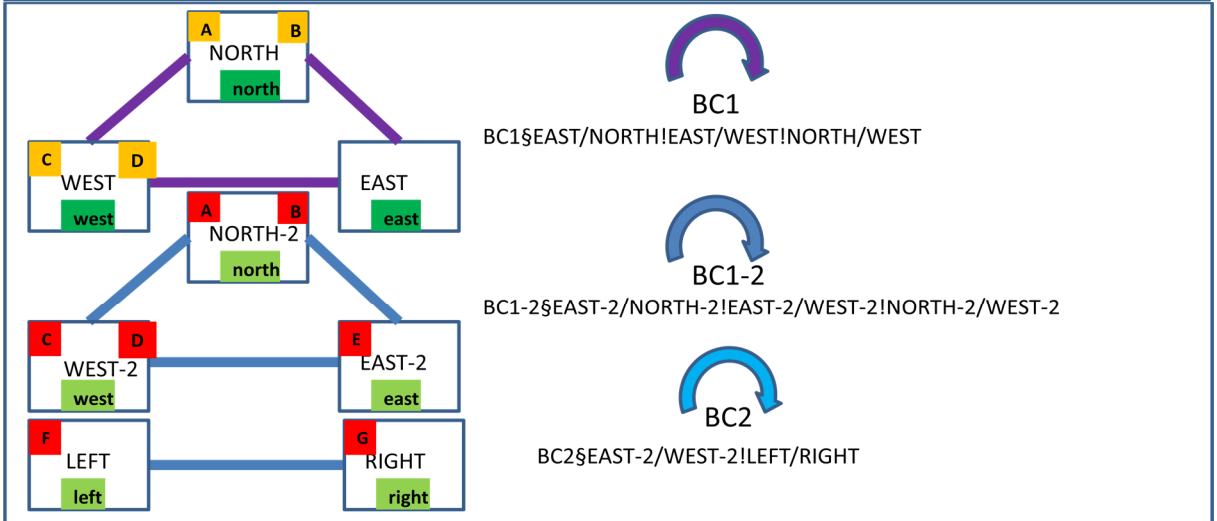
Paste : clipboard 3 + target 1



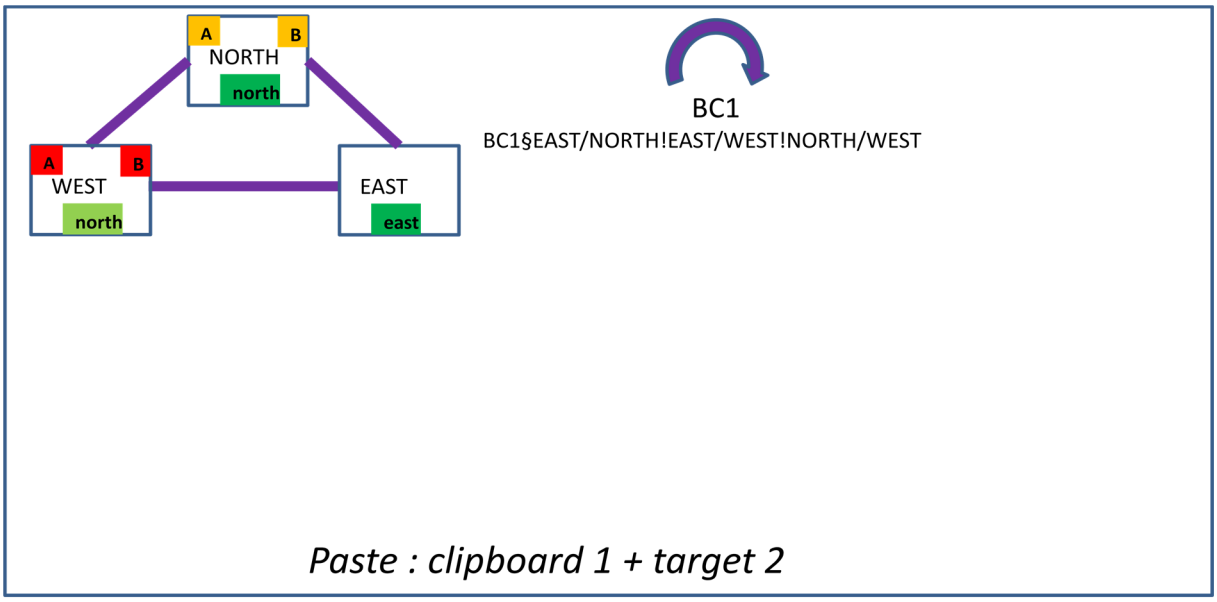
Paste : clipboard 4 + target 1

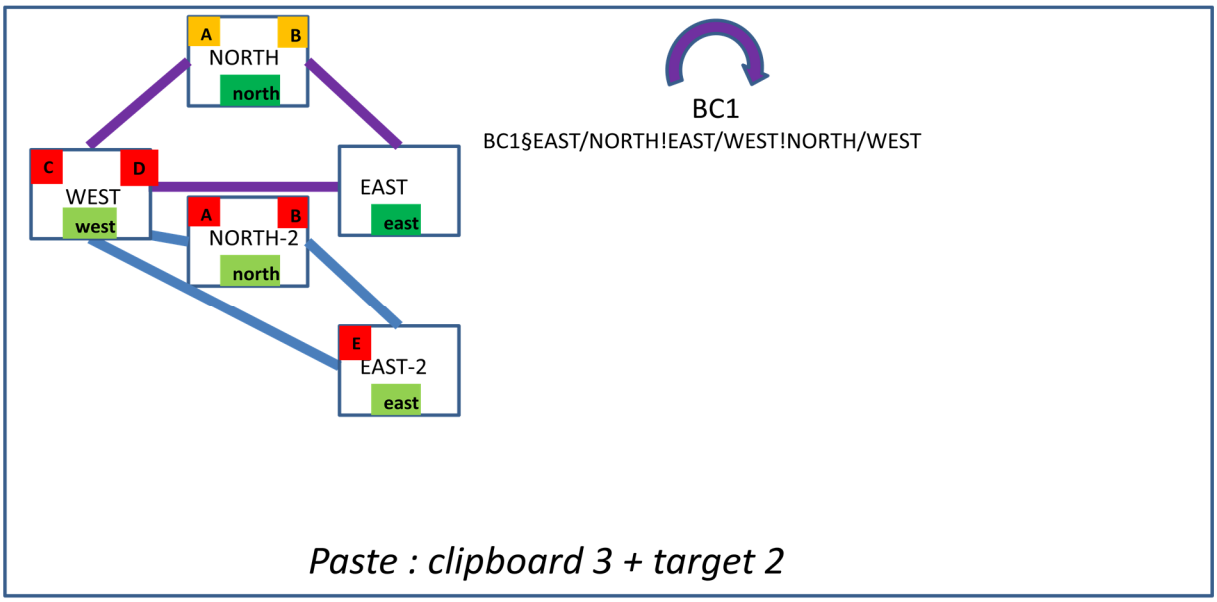


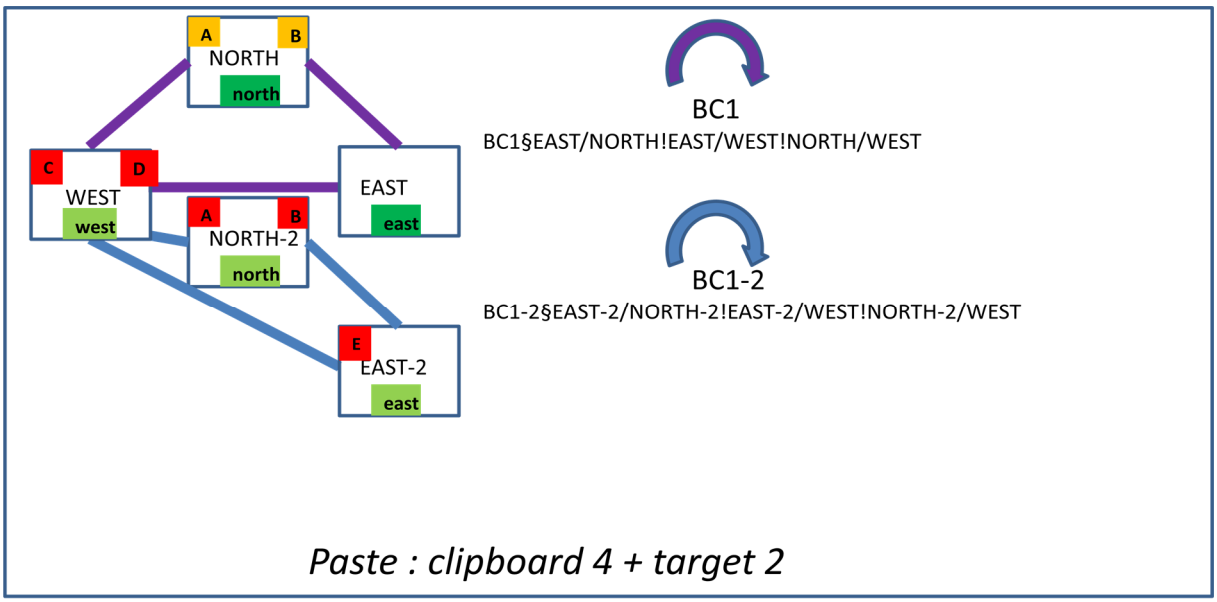
Paste : clipboard 5 + target 1

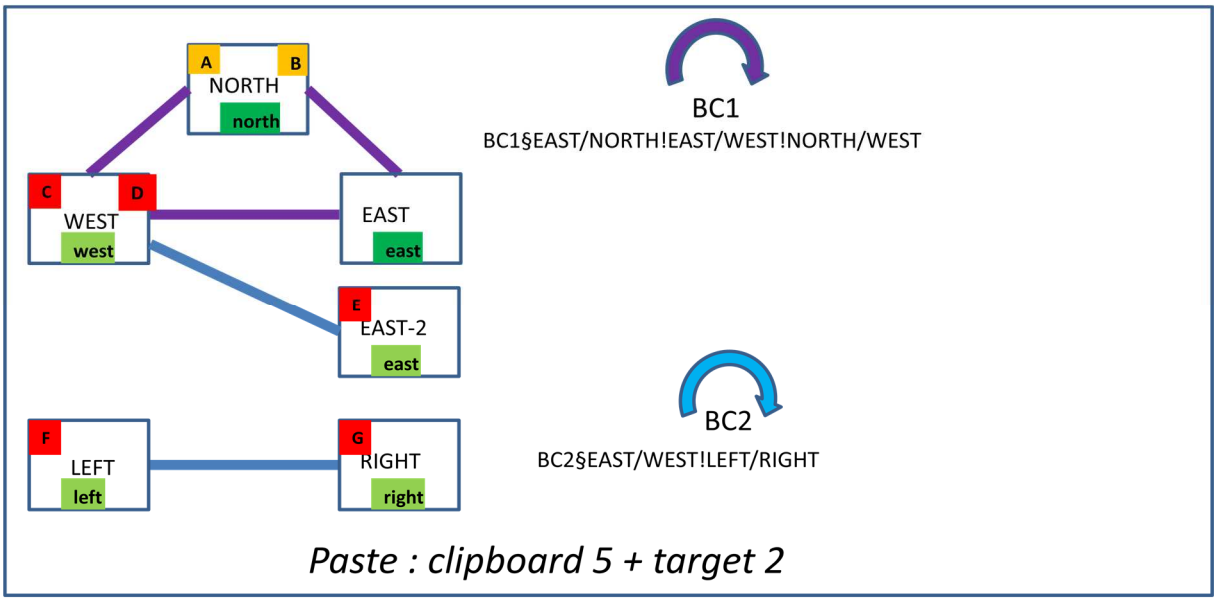


Paste : clipboard 6 + target 1

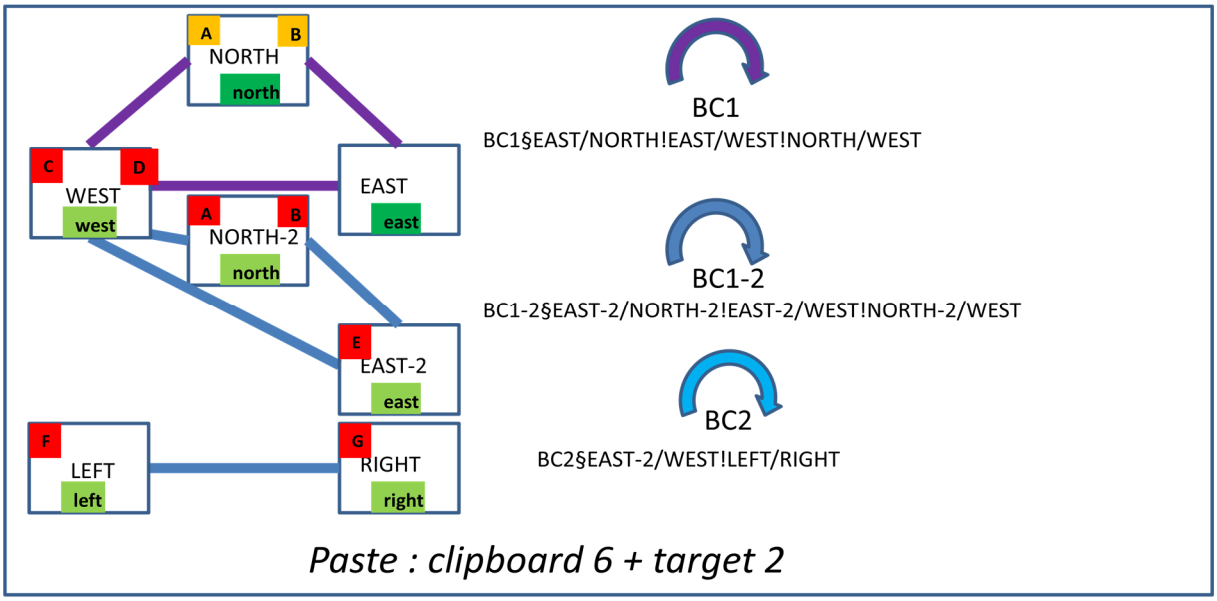




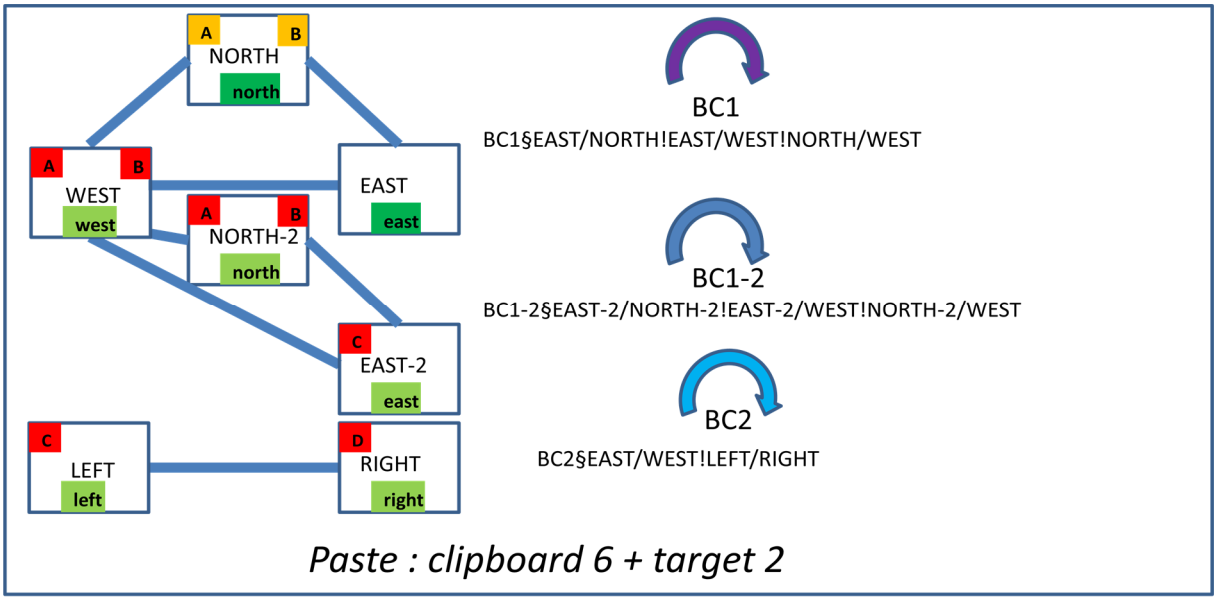




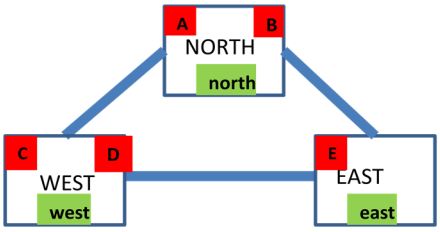
Paste : clipboard 5 + target 2



Paste : clipboard 6 + target 2



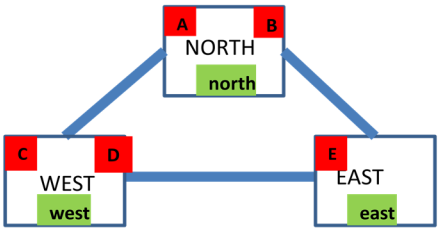
Paste : clipboard 6 + target 2



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

Paste : clipboard 3 + target 3



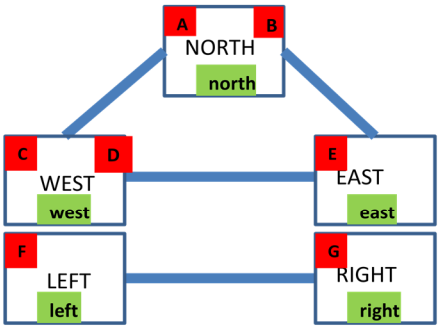
BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

BC1-2

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

Paste : clipboard 4 + target 3



BC1

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

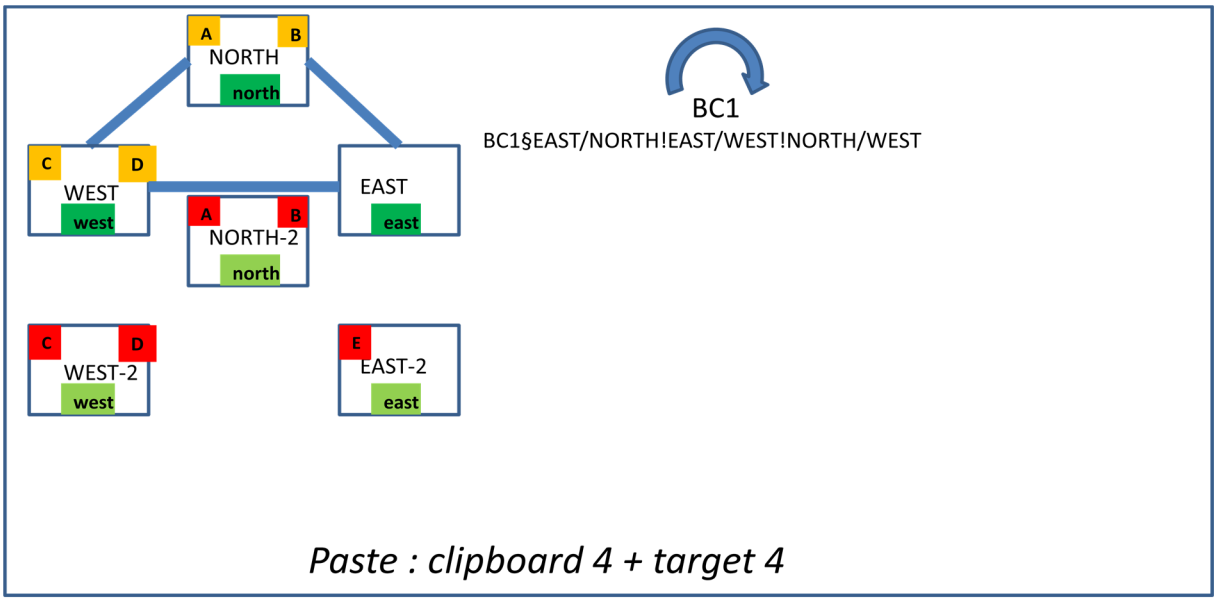
BC1-2

BC1§EAST/NORTH!EAST/WEST!NORTH/WEST

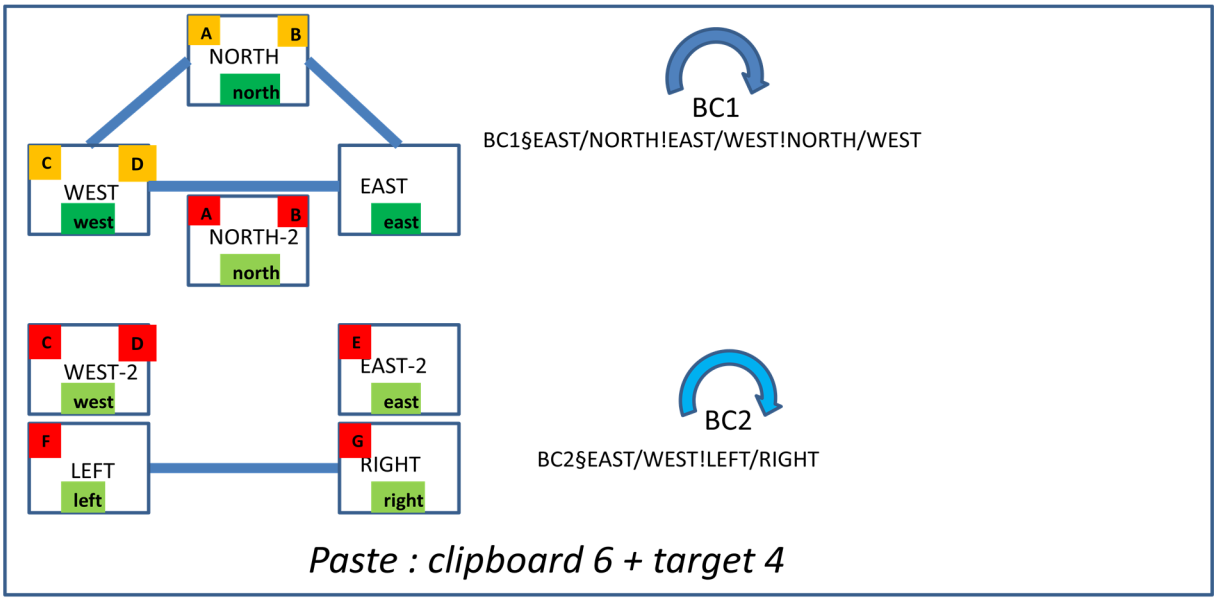
BC2

BC2§EAST/WEST!LEFT/RIGHT

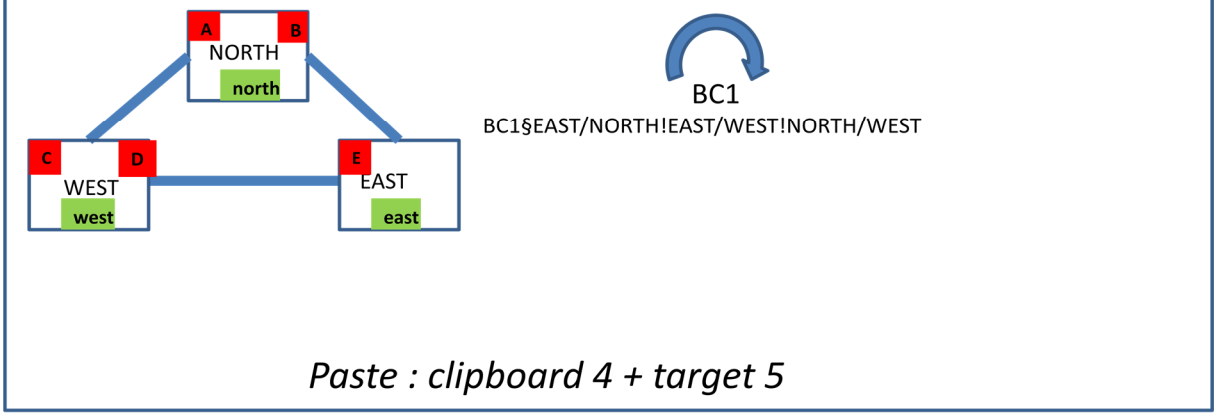
Paste : clipboard 6 + target 3



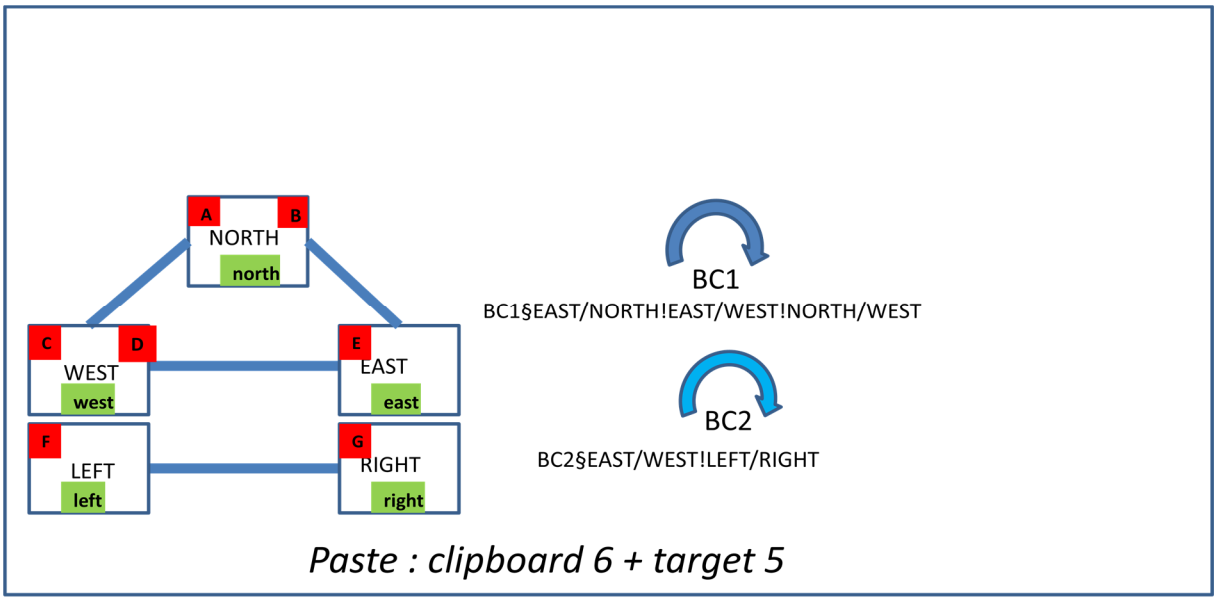
Paste : clipboard 4 + target 4



Paste : clipboard 6 + target 4



Paste : clipboard 4 + target 5



APPENDIX : ATTRIBUTION NOTICES

Antares_Simulator

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