Mutation-based testing of model transformations

Joran Dox

University of Antwerp

Outline

Refresher:

- Mutation-based Testing
- Higher-Order Transformations
- Mutation-based Testing of Model Transformations

Project:

- Navigation
- Filtering
- Creation

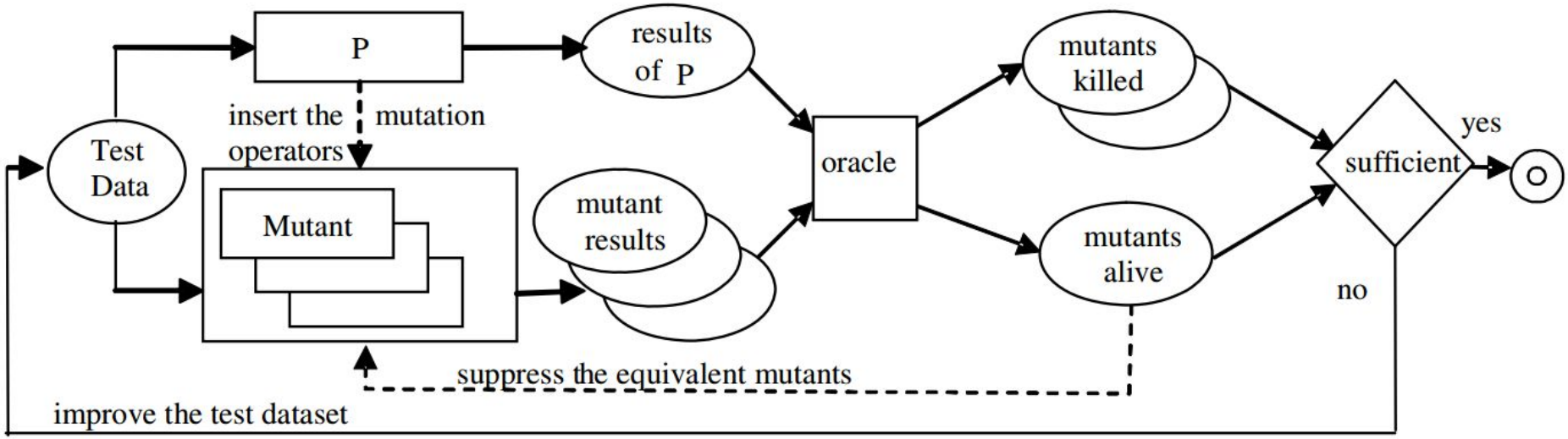
Mutation-Based Testing

Software needs testing

- But the testing suite needs testing too

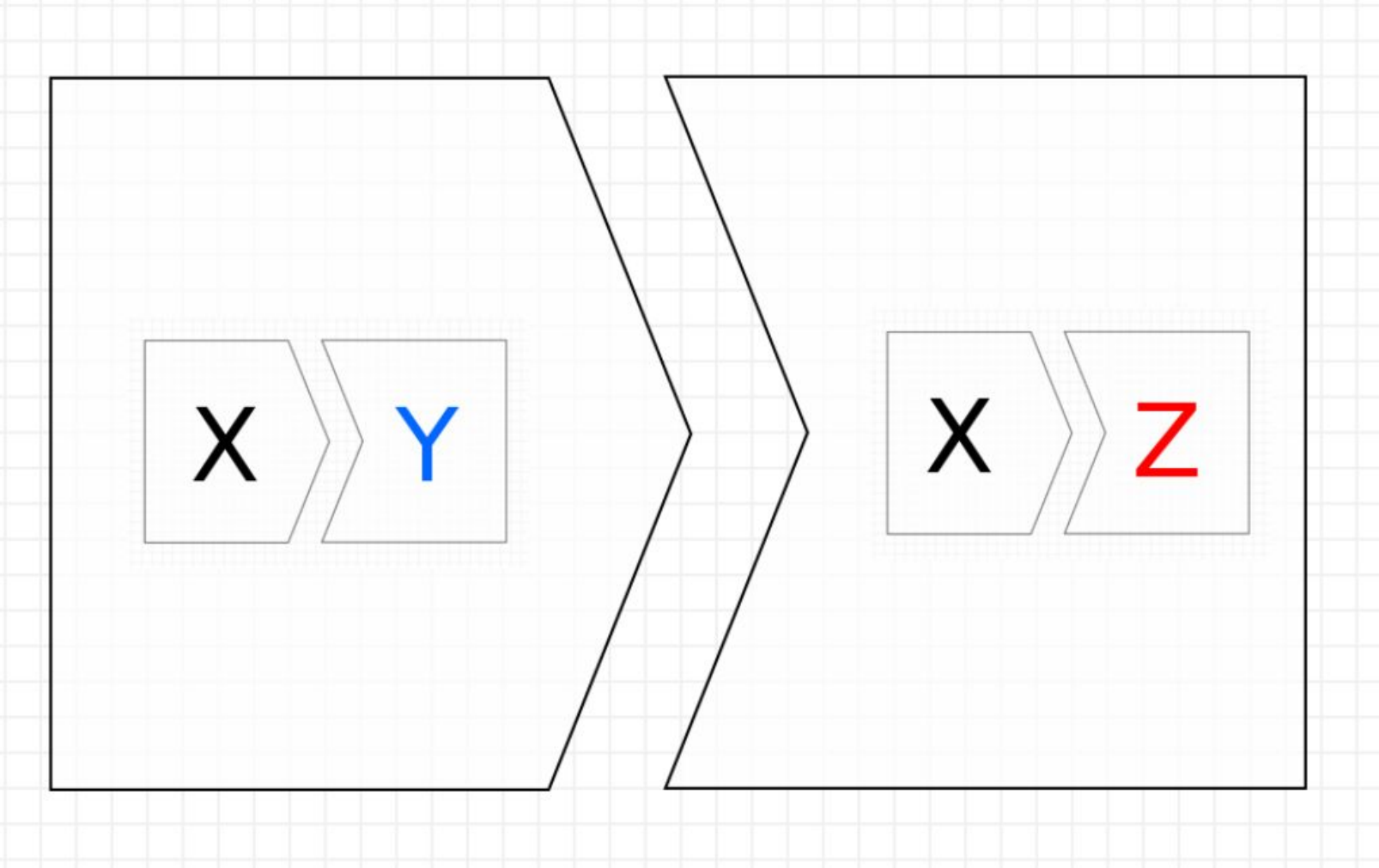
How do we do this?

Mutation-Based Testing



J. Andrews, L. Briand, Y. Labiche, Is mutation an appropriate tool for testing experiments? [software testing], in: Software Engineering, 2005. ICSE 2005. Proceedings. 27th International Conference on, 2005, pp. 402–411. doi:10.1109/ICSE.2005.1553583.

Higher-Order Transformations



A. Parsai, Mutation-based testing of model transformations (using hot), [Online; accessed 10-December-2015, http://msdl.cs.mcgill.ca/people/hv/teaching/MSBDesign/201314/projects/Ali.Parsai/] (2013).

Mutation-based Testing of Model Transformations

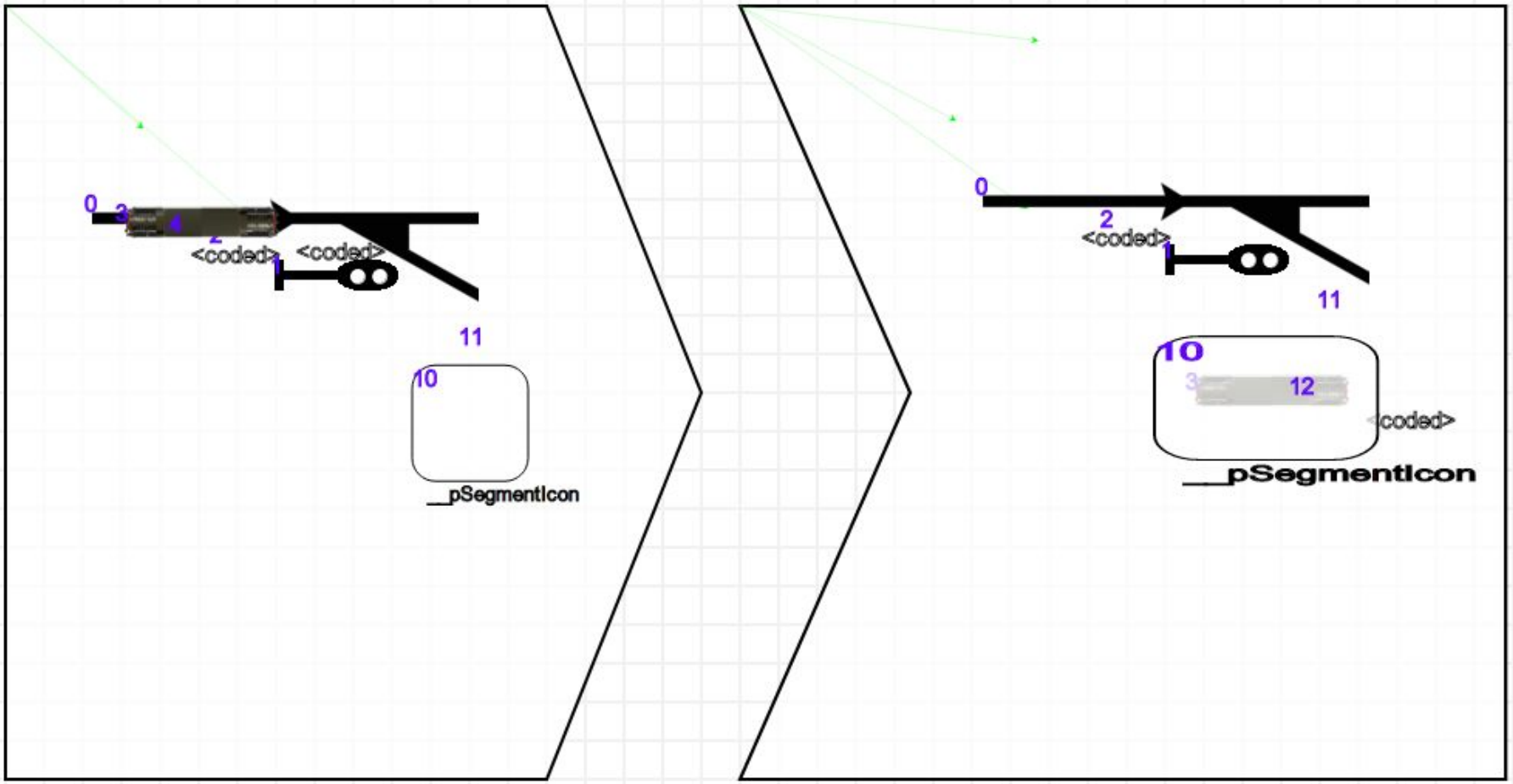
Different operators than classic programming:

- navigation
- filtering
- creation
  - output model creation
  - input model creation

Mutation analysis testing for model transformations, in: A. Rensink, J. Warmer (Eds.), Model Driven Architecture Foundations and Applications, Vol. 4066 of Lecture Notes in Computer Science, 2006. doi:10.1007/1178704428.

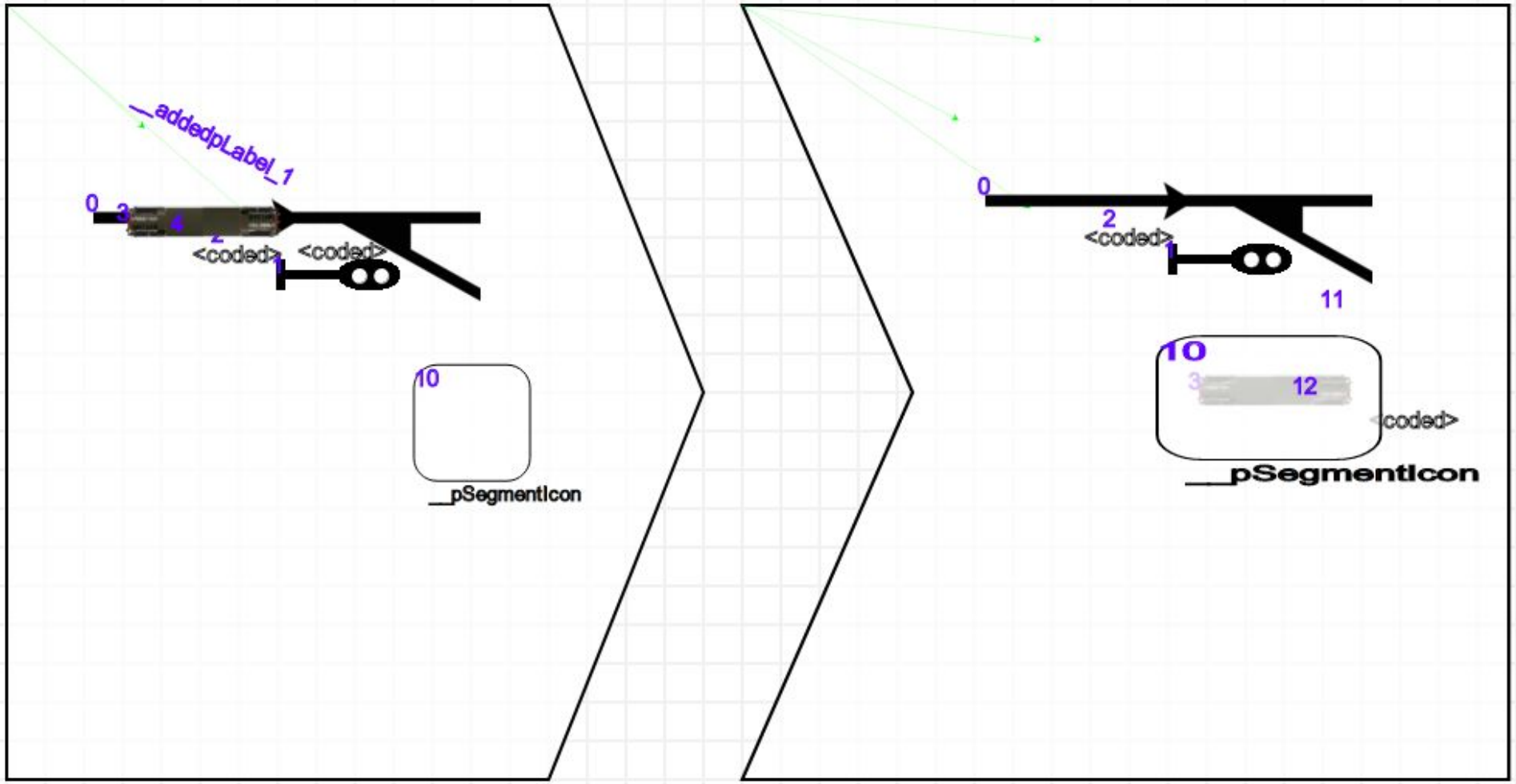
Project: Navigation

Relation to the same class change (RSCC):



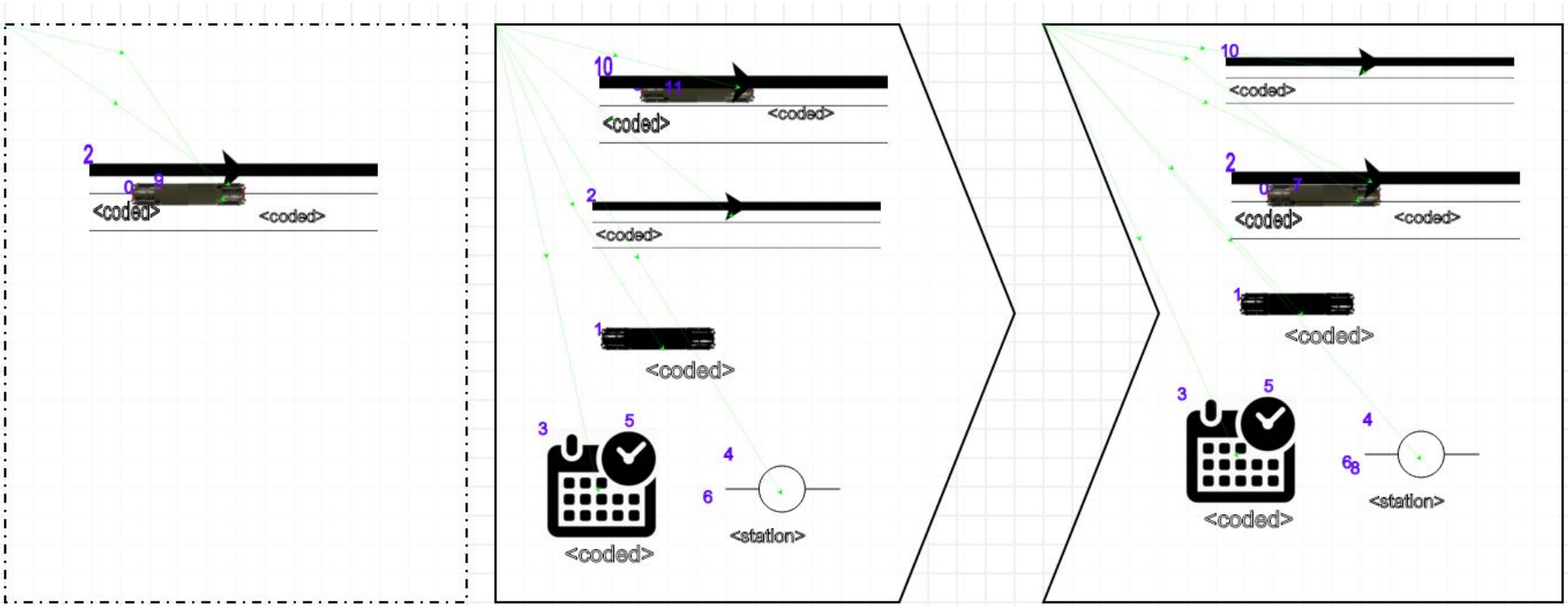
Project: Navigation

Relation to the same class change (RSCC):



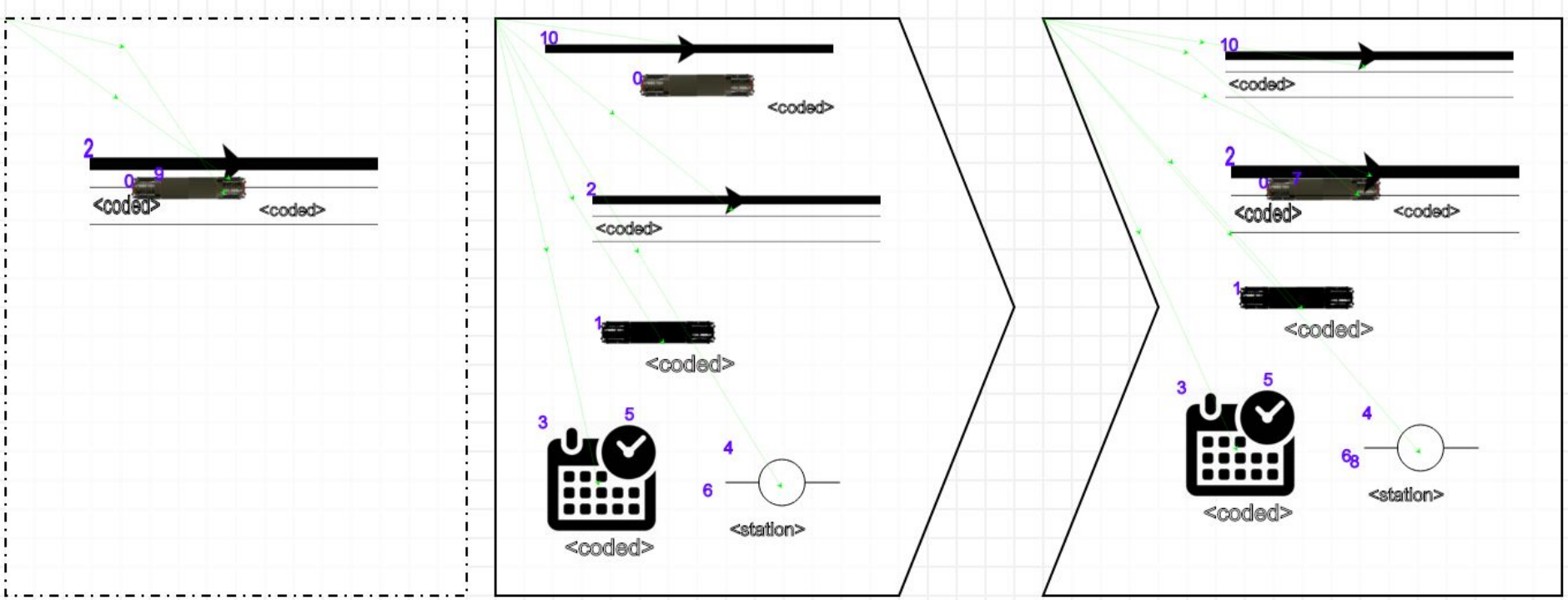
Project: Navigation

Relation to another class change (ROCC):



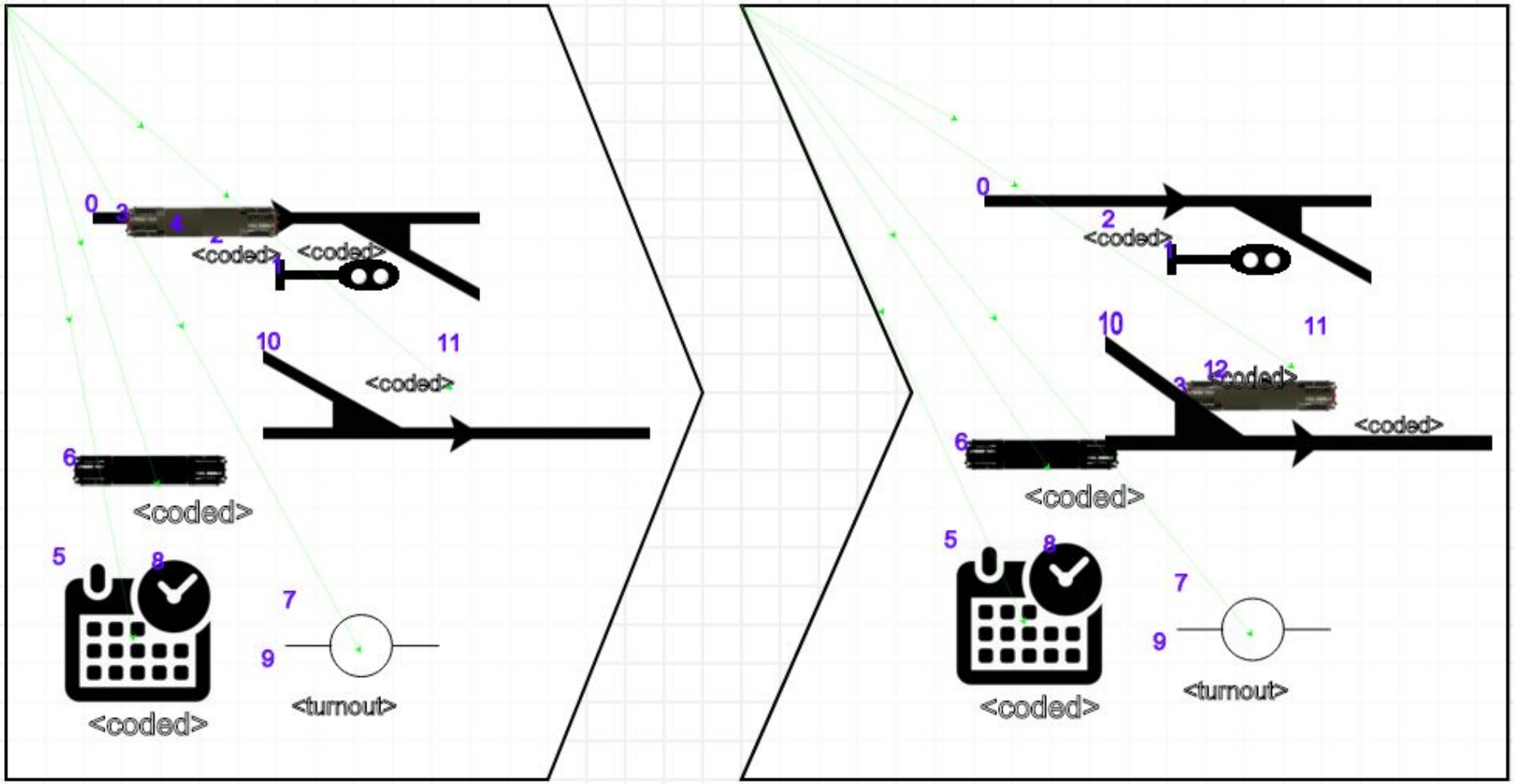
Project: Navigation

Relation to another class change (ROCC):



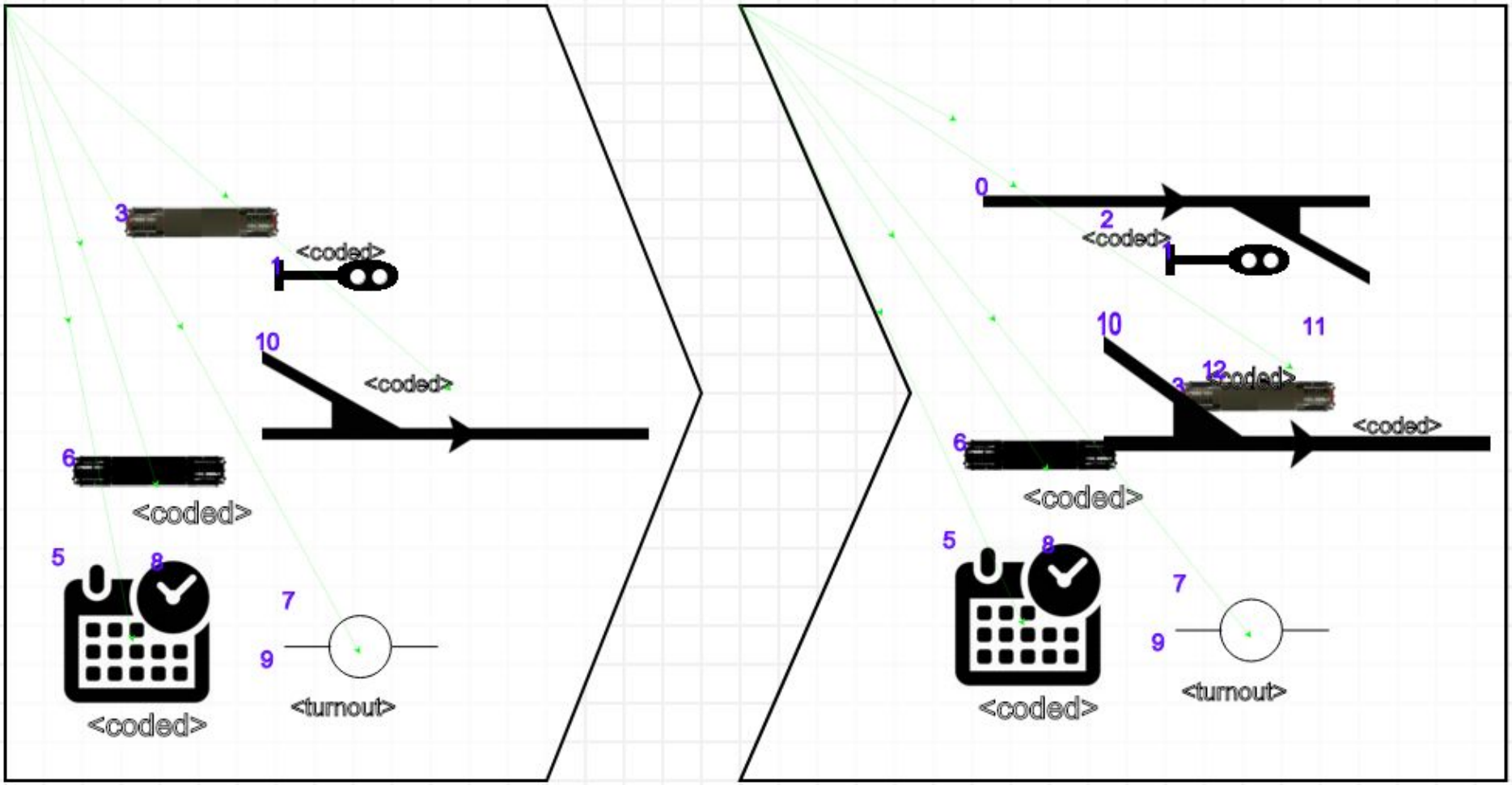
Project: Navigation

Relation sequence modification with deletion (RSMD):



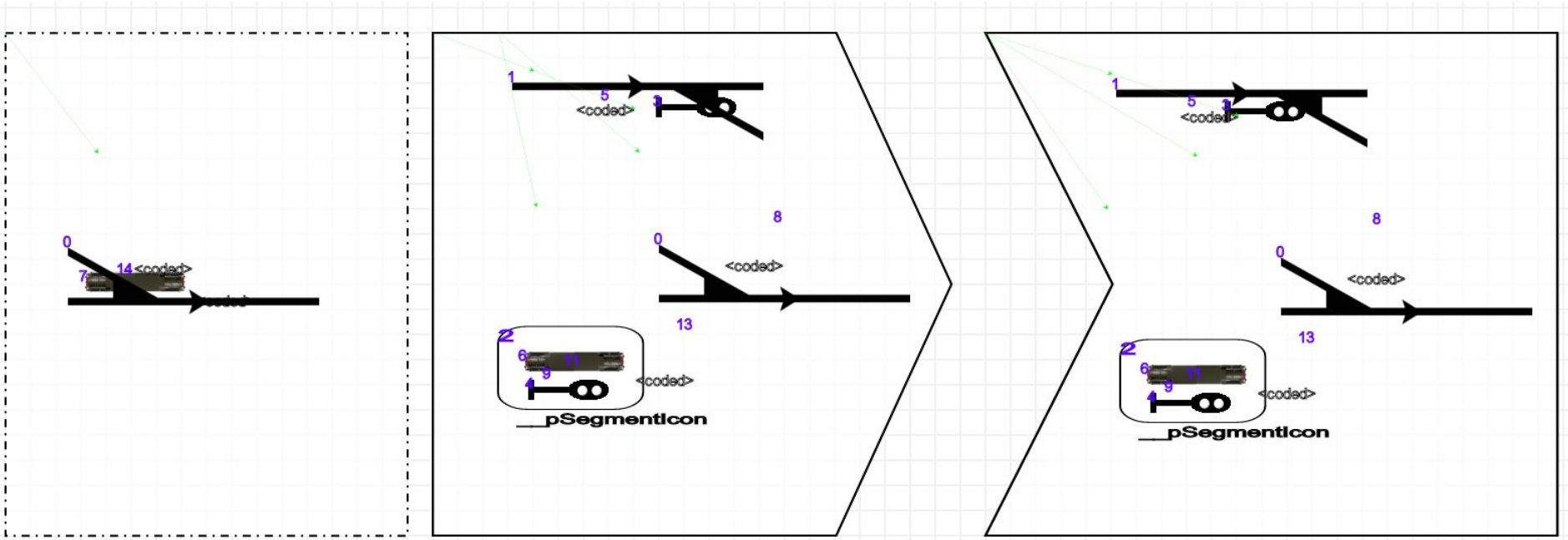
Project: Navigation

Relation sequence modification with deletion (RSMD):



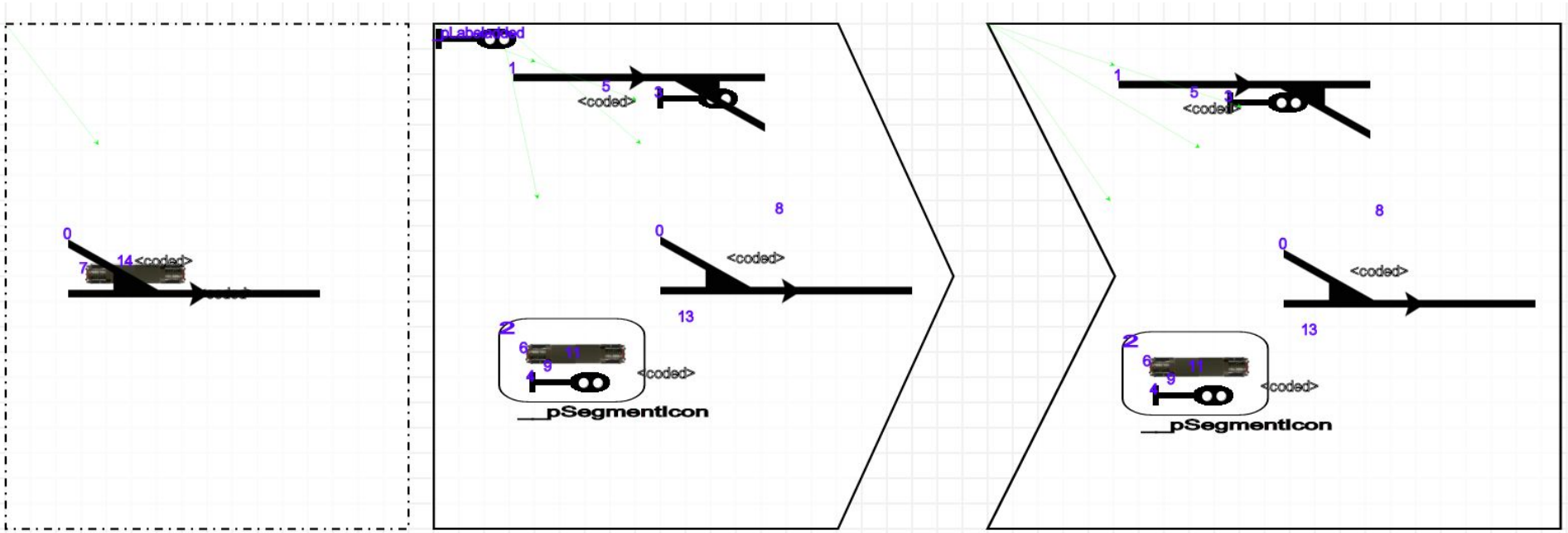
Project: Navigation

Relation sequence modification with addition (RSMA):



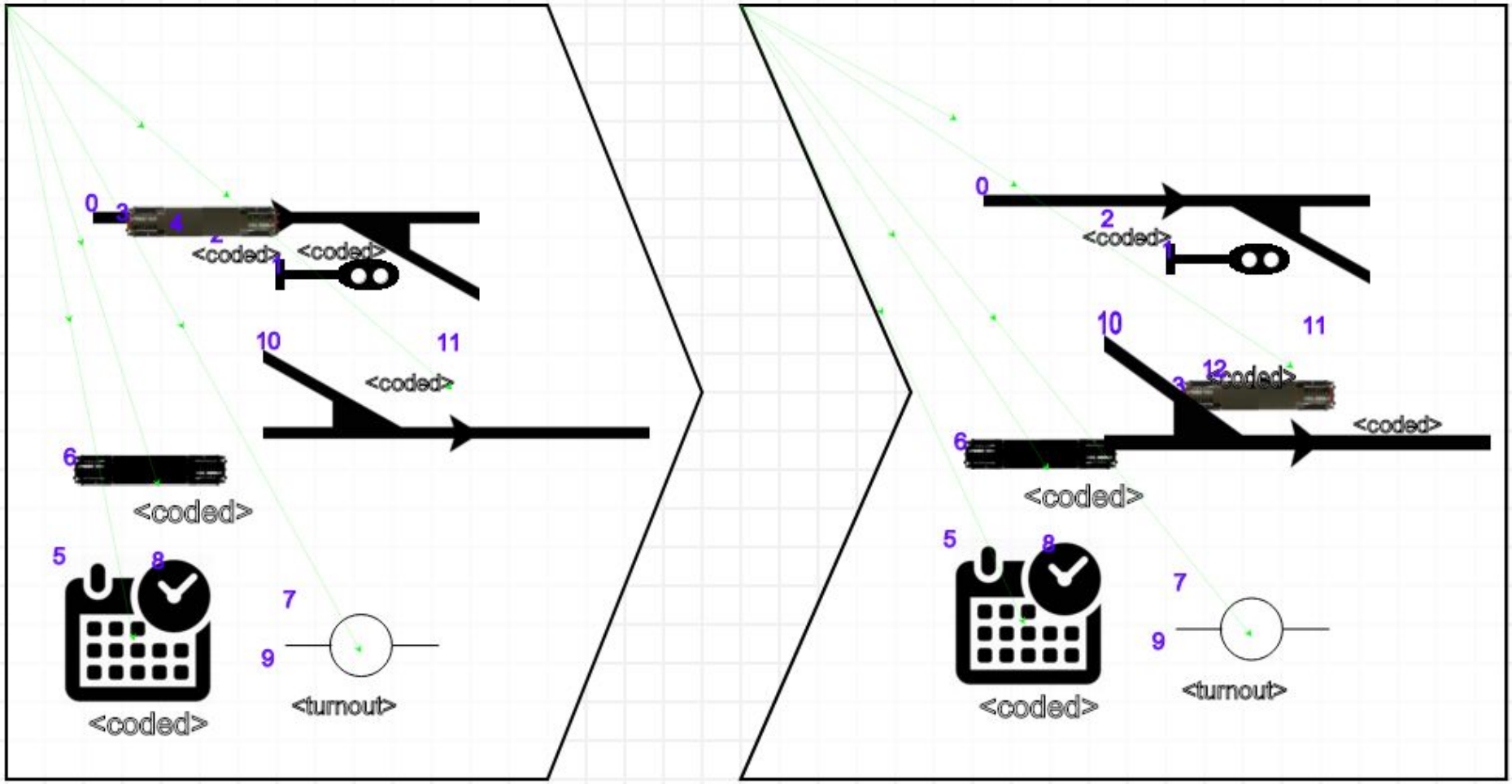
Project: Navigation

Relation sequence modification with addition (RSMA):



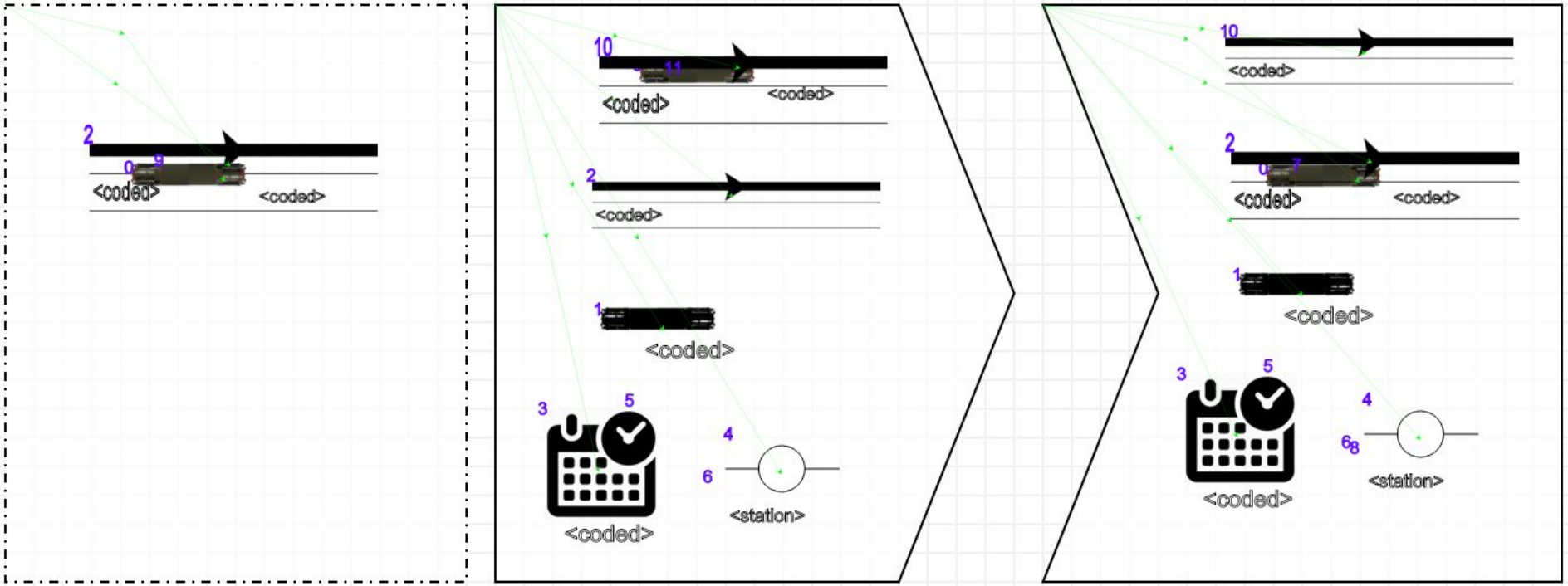
Project: Filtering

Collection filtering change with perturbation (CFCP) &
Collection filtering change with deletion (CFCD):



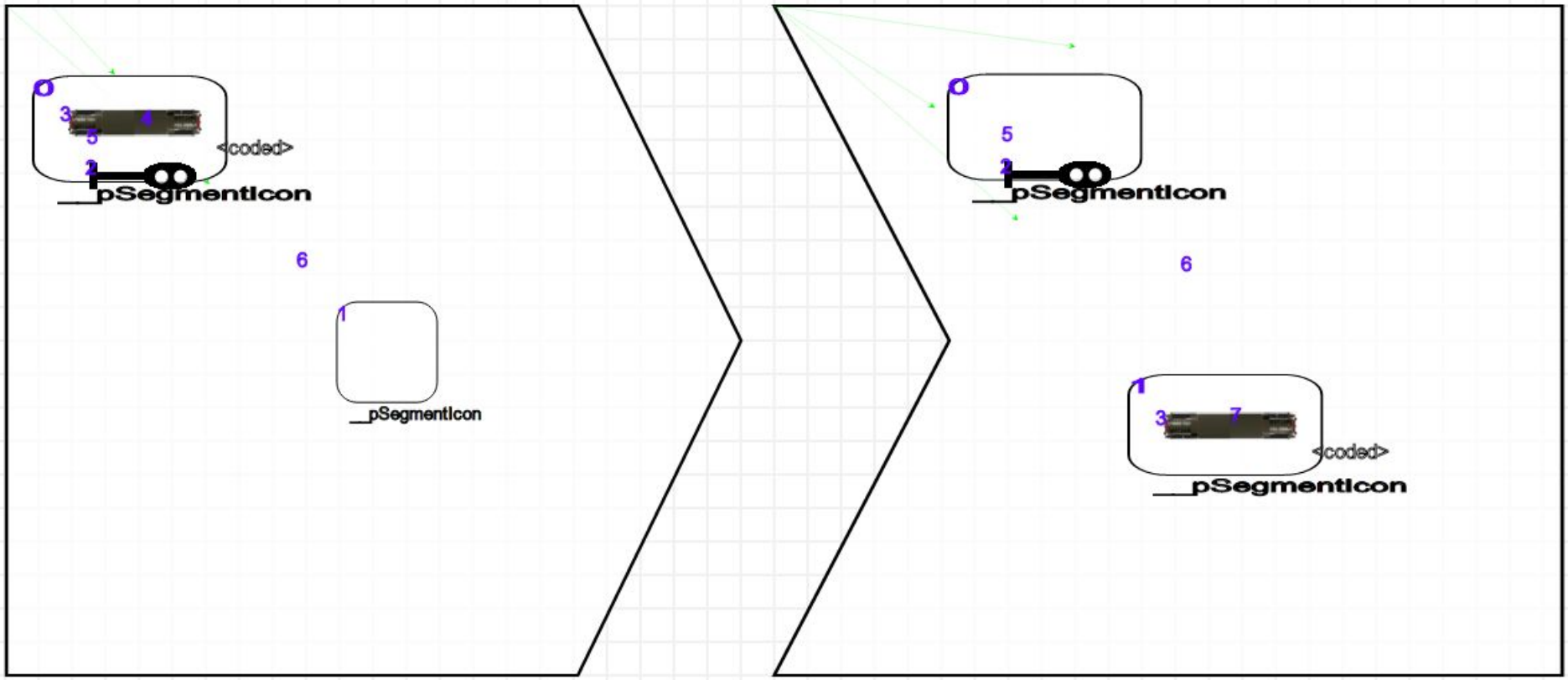
Project: Filtering

Collection filtering change with addition (CFCA):



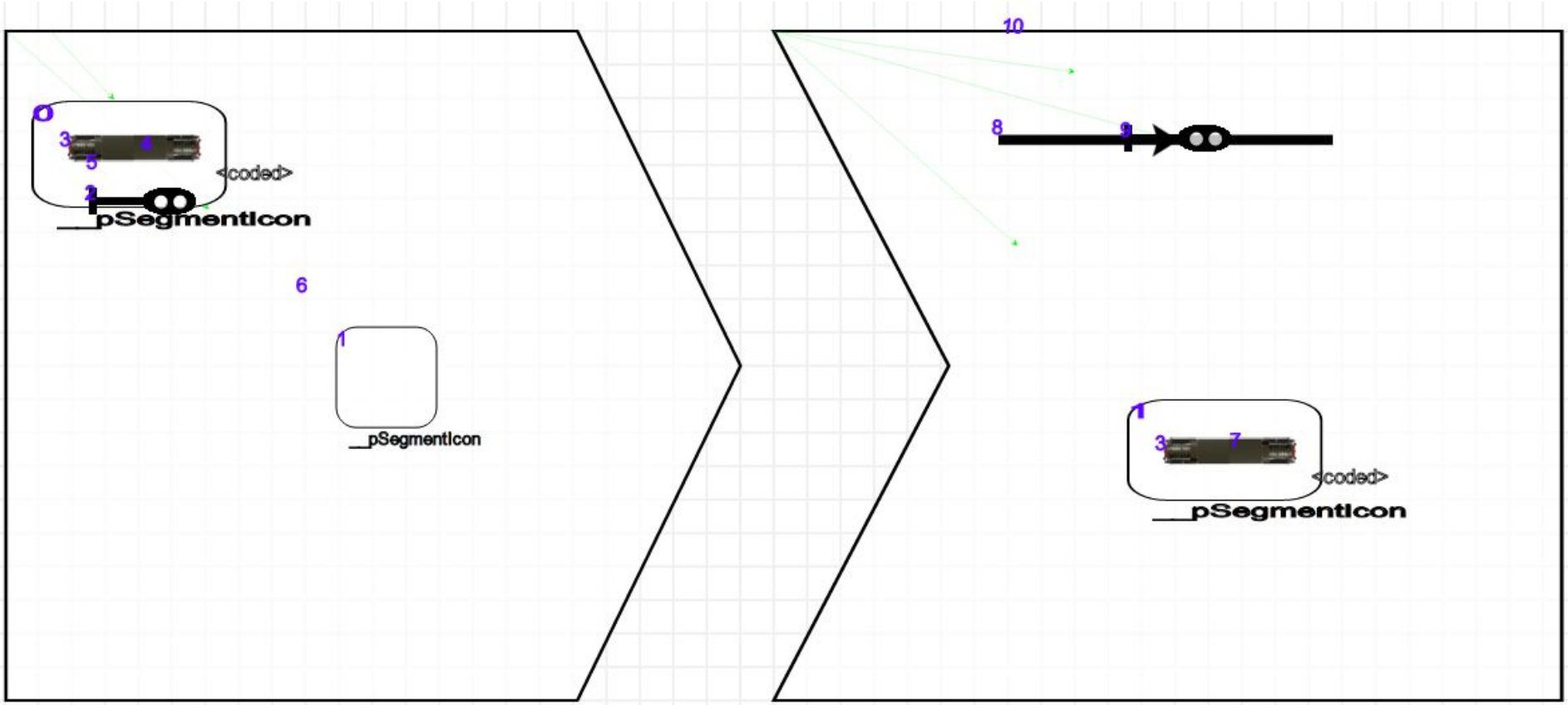
Project: Creation

Class compatible creation replacement (CCCR):



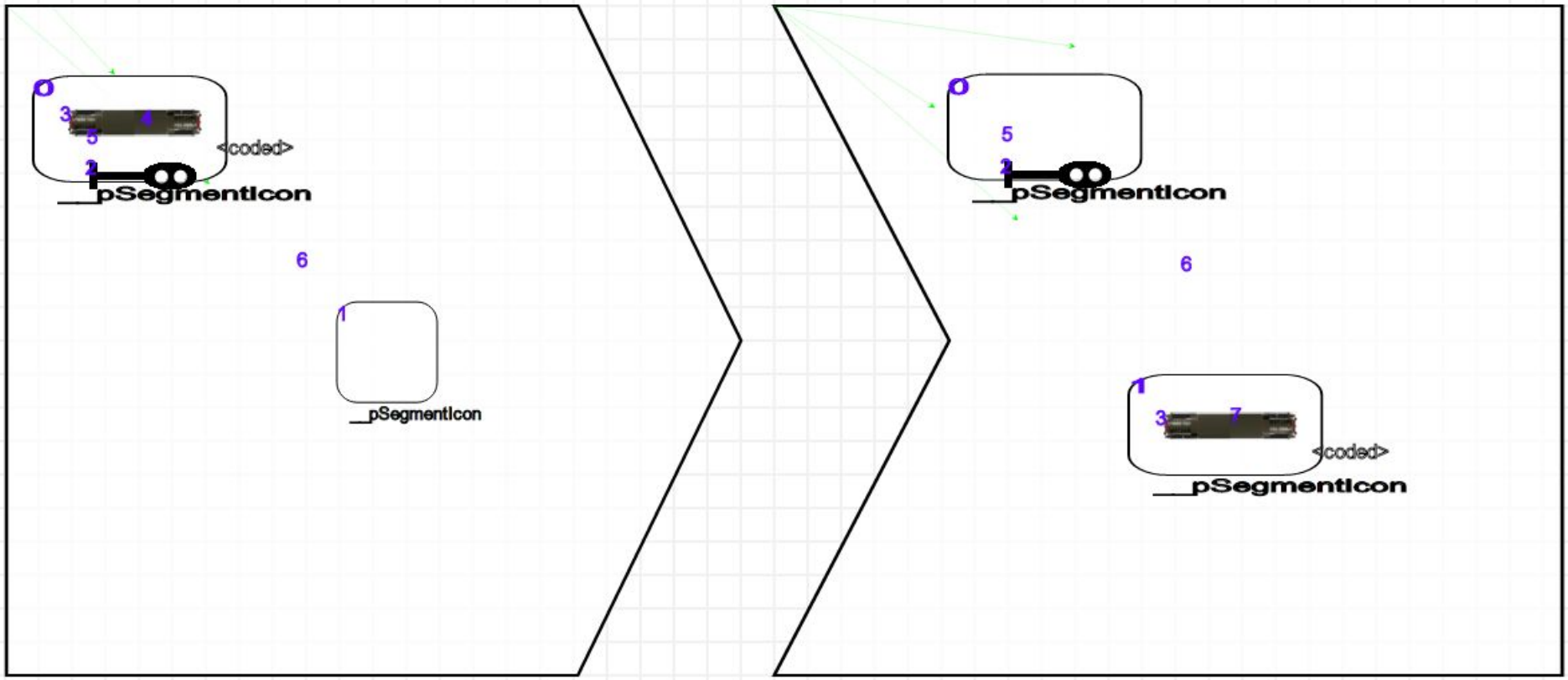
Project: Creation

Class compatible creation replacement (CCCR):



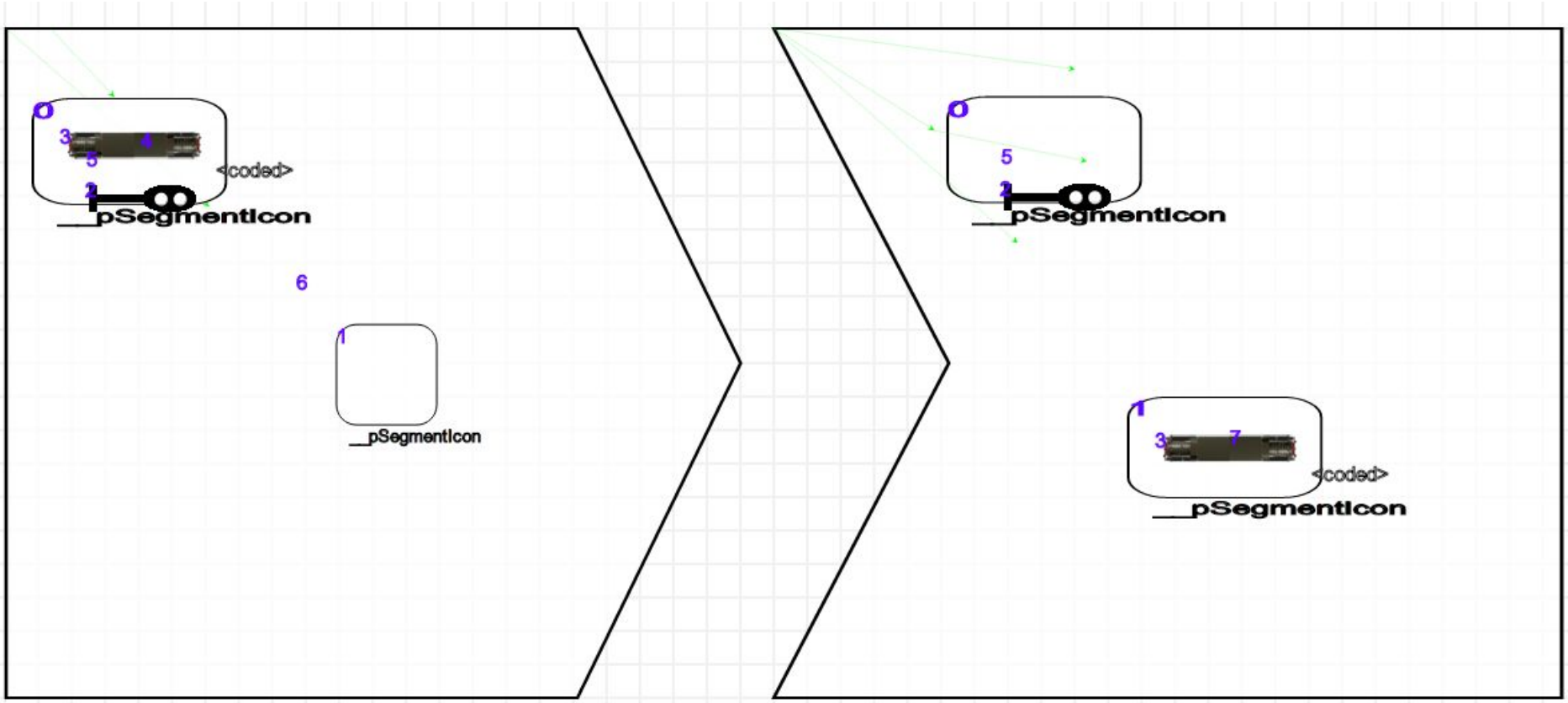
Project: Creation

Classes association creation deletion (CACD):



Project: Creation

Classes association creation deletion (CACD):



References

1. J. Andrews, L. Briand, Y. Labiche, Is mutation an appropriate tool for testing experiments? [software testing], in: Software Engineering, 2005. ICSE 2005. Proceedings. 27th International Conference on, 2005, pp. 402–411. doi:10.1109/ICSE.2005.1553583.
2. Mutation analysis testing for model transformations, in: A. Rensink, J. Warmer (Eds.), Model Driven Architecture Foundations and Applications, Vol. 4066 of Lecture Notes in Computer Science, 2006. doi: 10.1007/1178704428.
3. On the use of higher-order model transformations, in: R. Paige, A. Hartman, A. Rensink (Eds.), Model Driven Architecture - Foundations and Applications, Vol. 5562 of Lecture Notes in Computer Science, 2009. doi:10.1007/978-3-642-02674-43.
4. A. Parsai, Mutation-based testing of model transformations (using hot), [Online; accessed 10-December-2015, http://msdl.cs.mcgill.ca/people/hv/teaching/MSBDesign/201314/projects/Ali.Parsai/] (2013).
5. E. Syriani, H. Vangheluwe, R. Mannadiar, C. Hansen, S. Van Mierlo, H. Ergin, Atompm: A web-based modeling environment., in: Demos/Posters/StudentResearch@ MoDELS, 2013, pp. 21–25.
6. H. Vangheluwe, Model Driven Engineering, [Online; accessed 21-January-2016,http://msdl.cs.mcgill.ca/people/hv/teaching/MSBDesign/] (2016).
7. E. Syriani, H. Vangheluwe, AToMPM, [Online; accessed 21-January-2016, http://www-ens.iro.umontreal.ca/ syriani/atompm/atompm.htm] (2016).

Questions?


University
of Antwerp