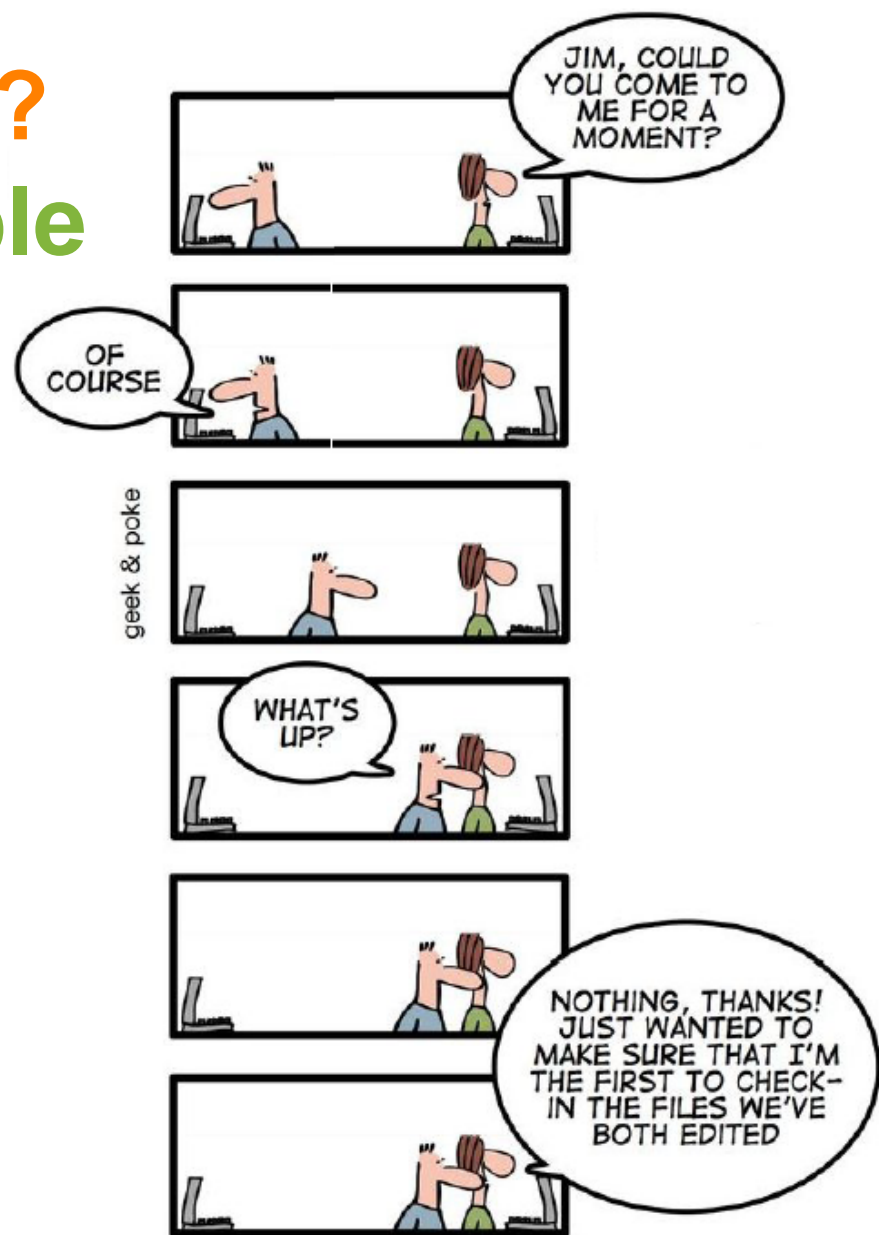


Is Our Merging Right? Towards More Reliable Merging Decision

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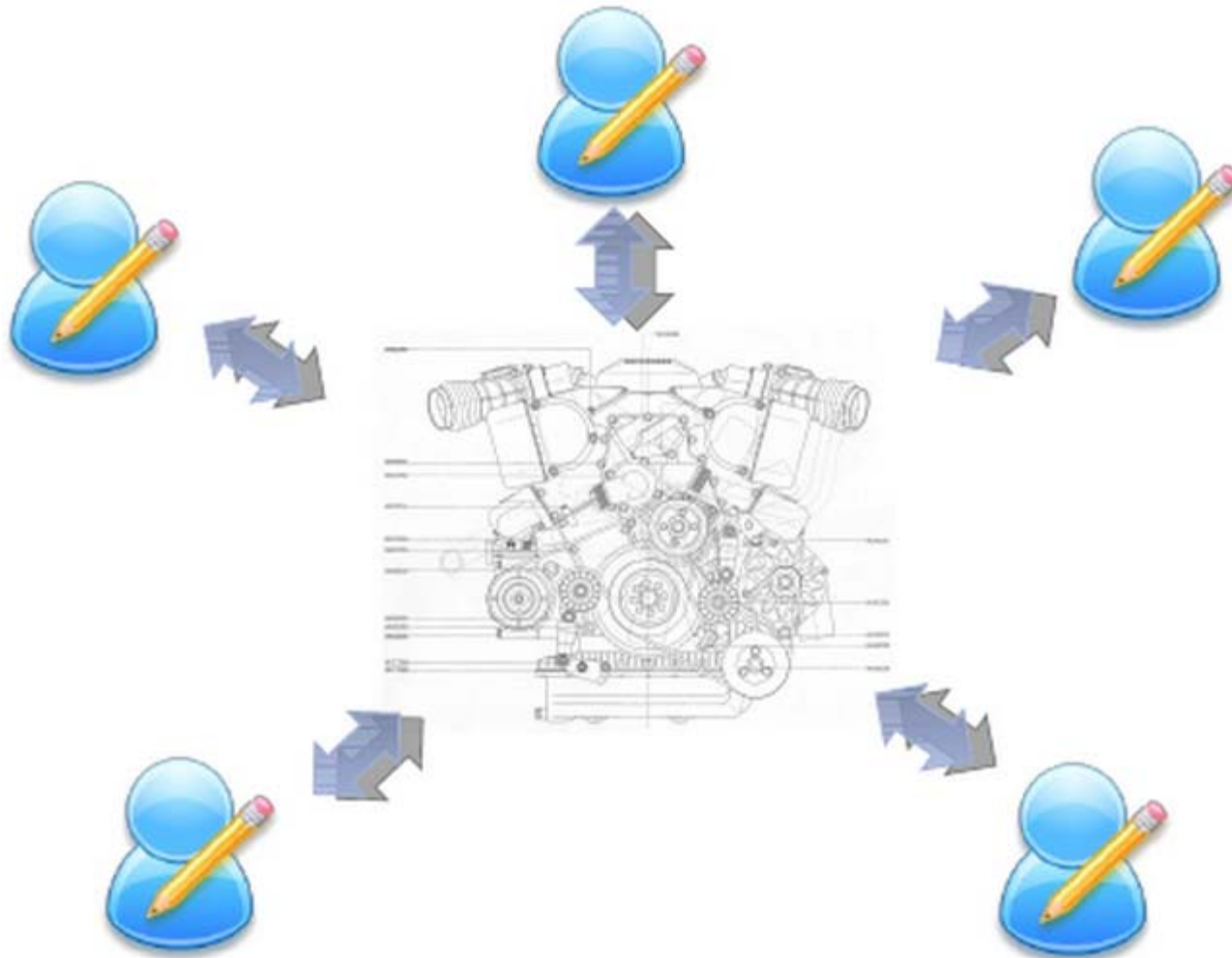
CSC 2125 Class, December 19, 2012



This Project is About

Version Control
Model Merge
Provenance Information
Model Management
Summarization
Visualization
Conflict Resolution

Development is Collaborative

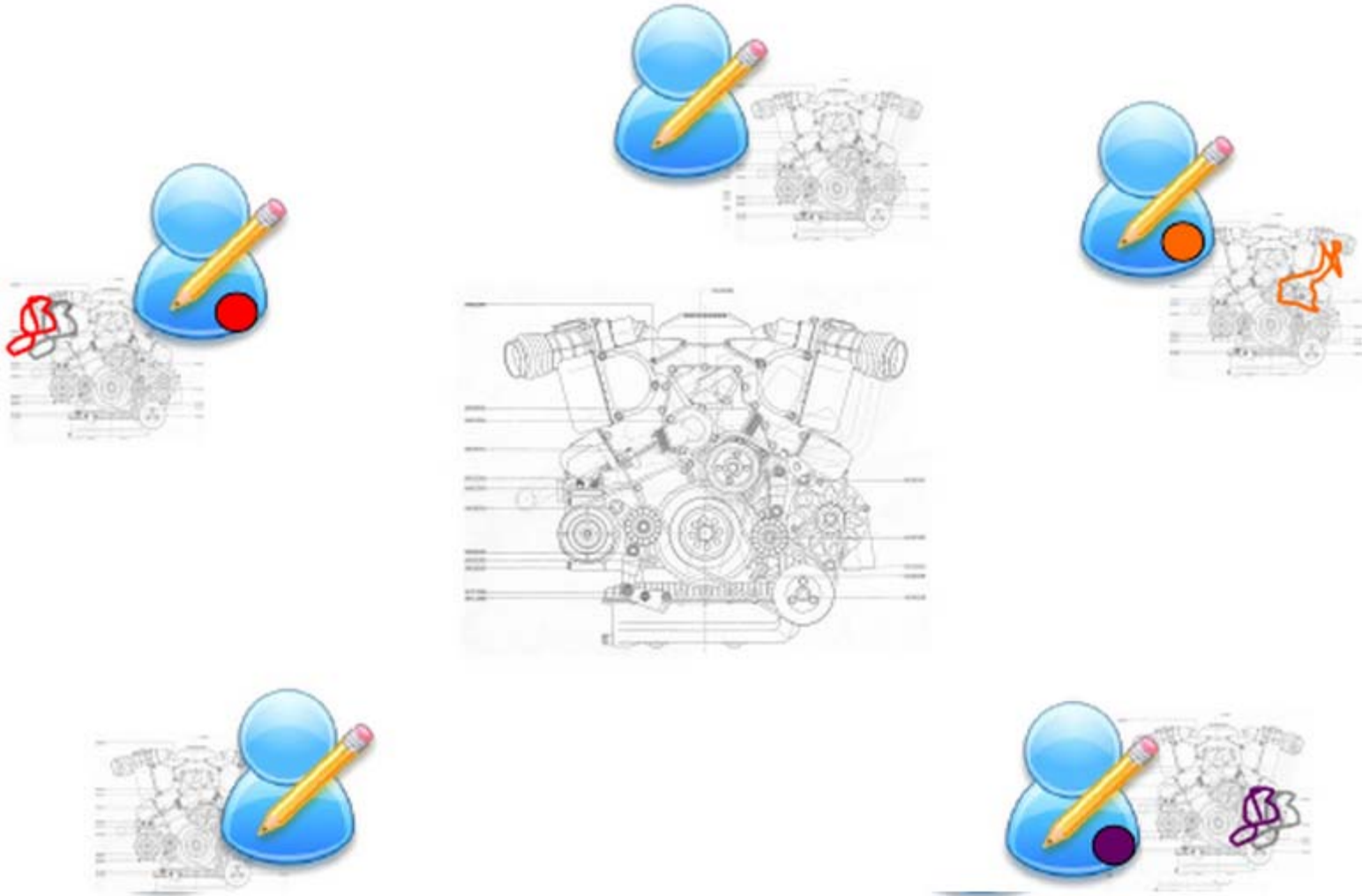


Version Control System (VCS)

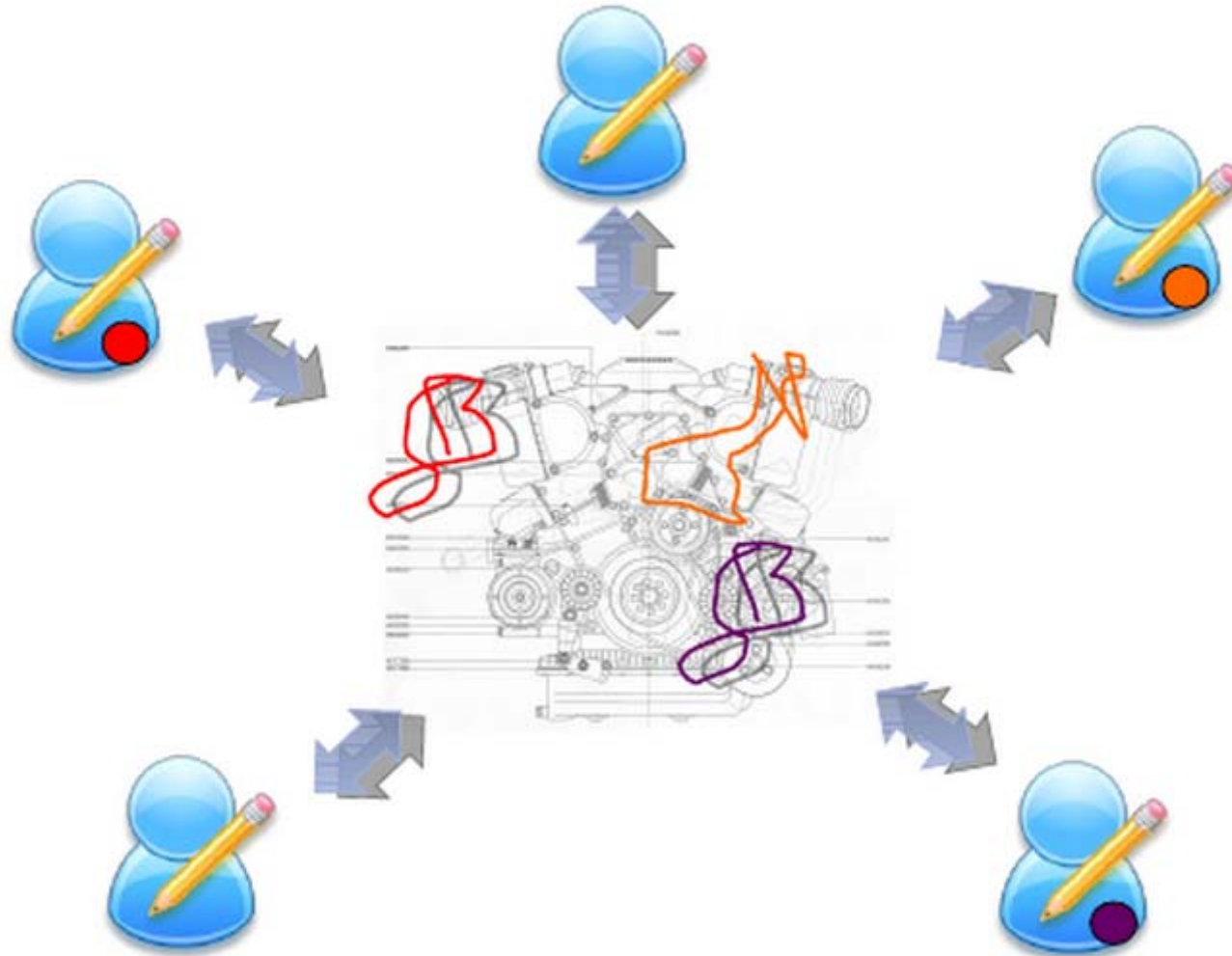
CVS, SVN, Git, Mercurial, Dropbox(!), etc.

- Keeps multiple (older and newer) versions of everything (not just source code).
- Requests comments regarding every change.
- Typically synchronize through “check in” and “check out”.
- Displays differences between versions.

Collaboration on Different Parts



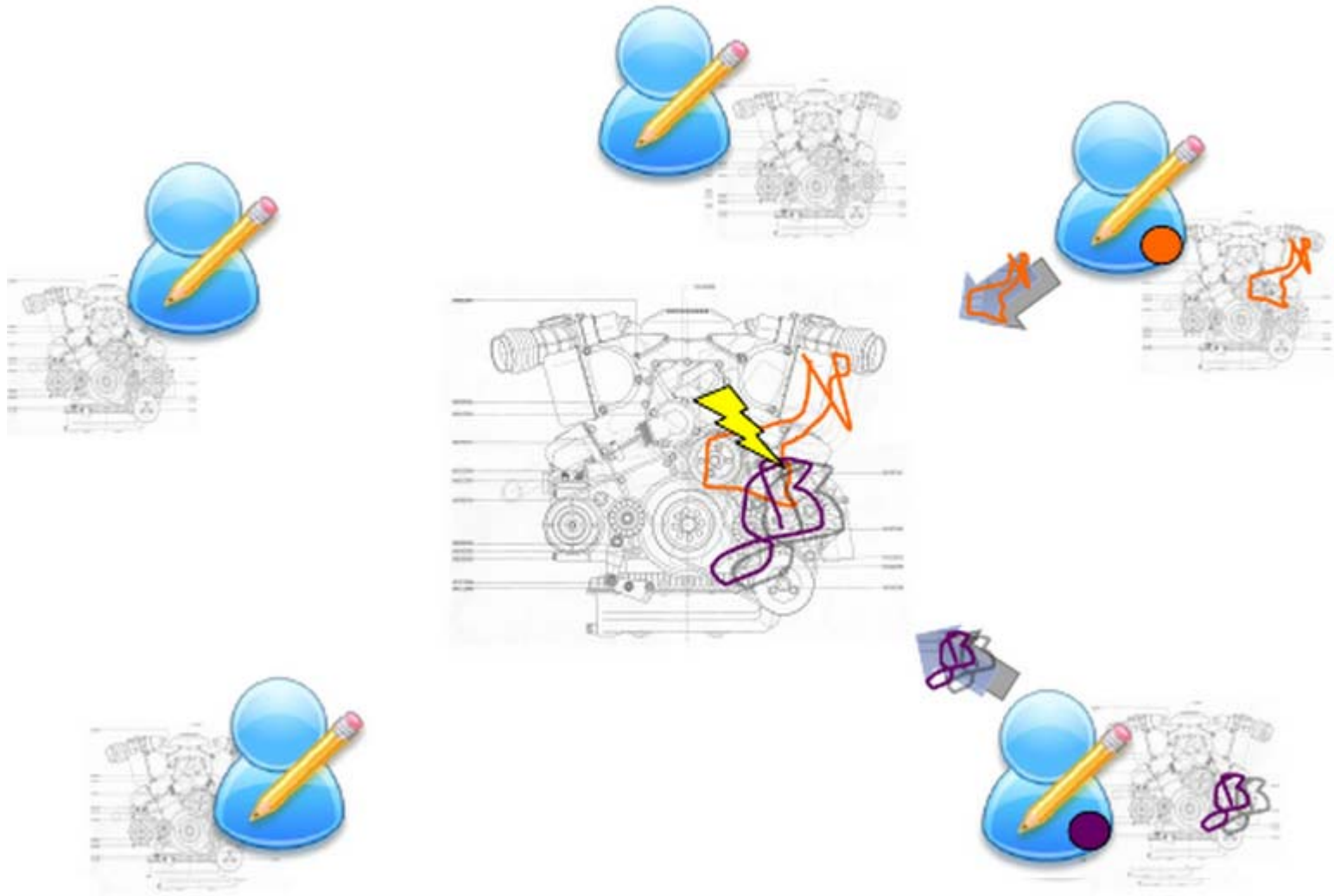
Collaboration on Different Parts



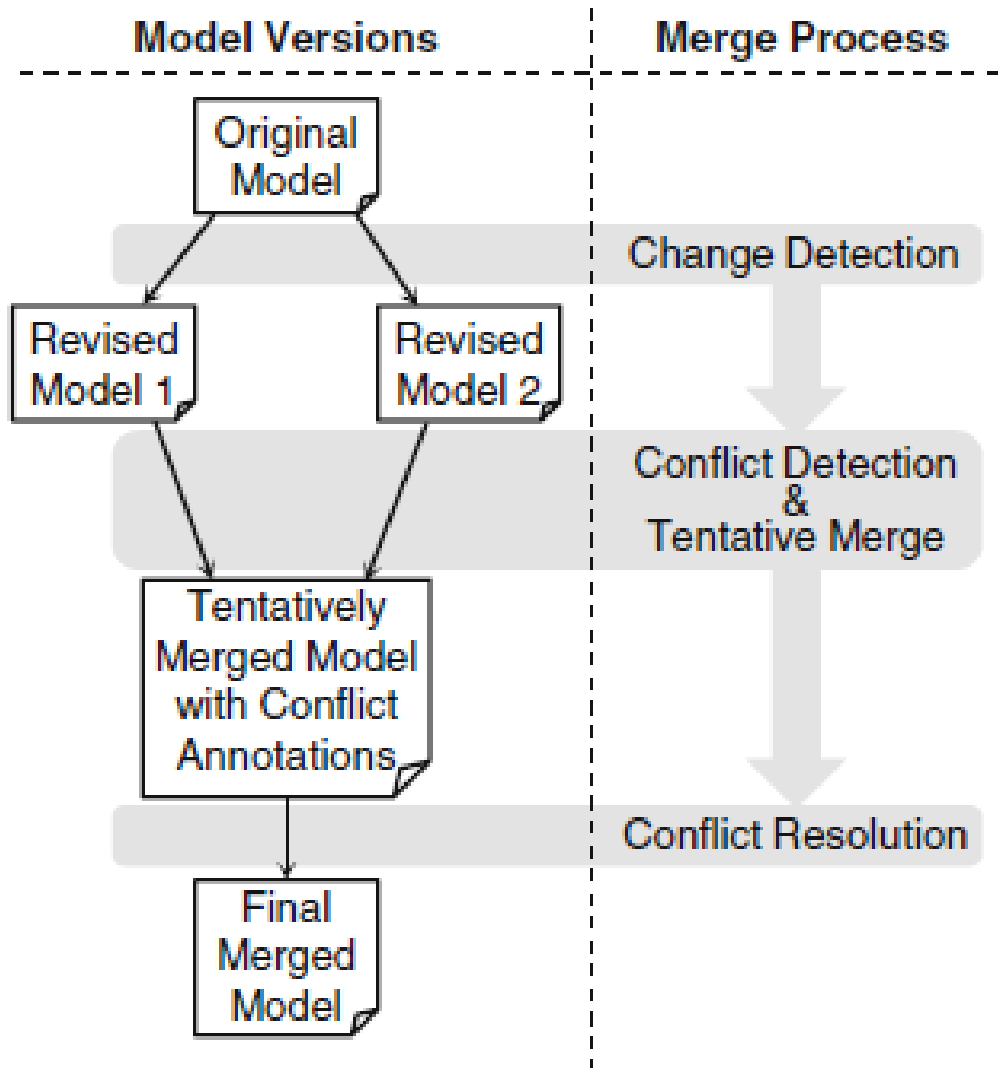
Model Version Control Systems

- AMOR.
- EMF Store.
- IBM Rational Software Architect (Based on Jazz).
- CDO

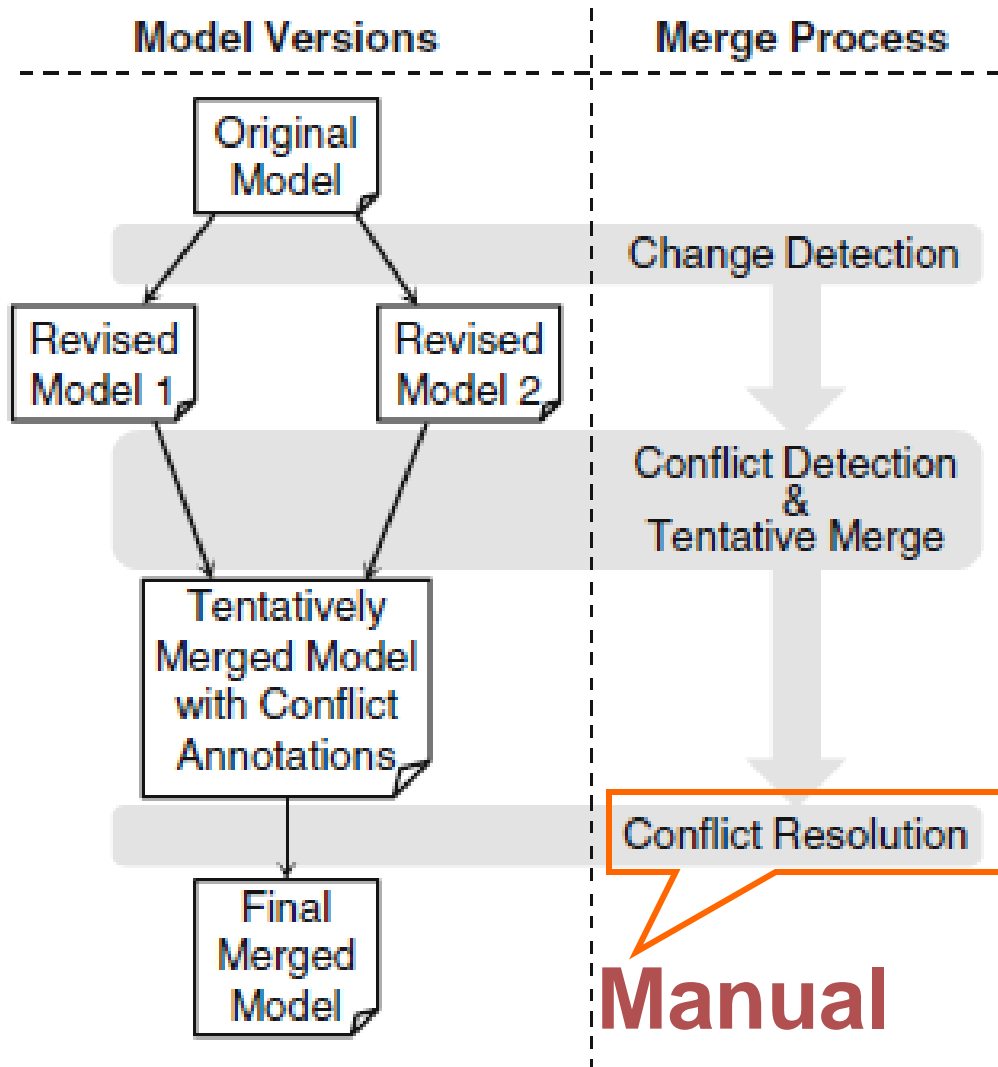
Collaboration on Same Part



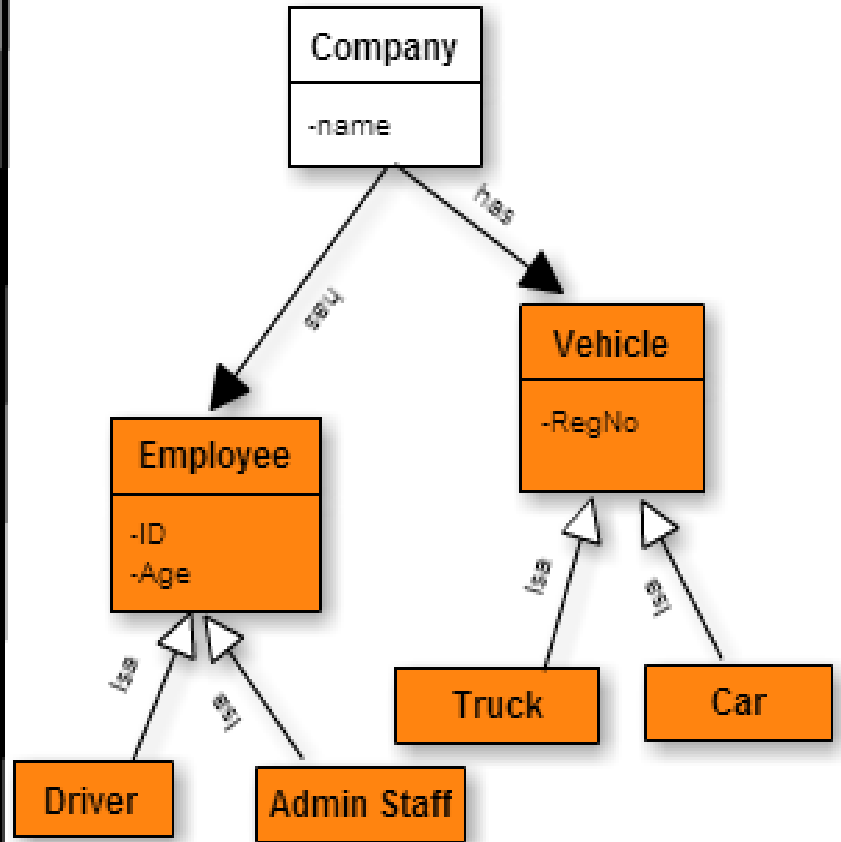
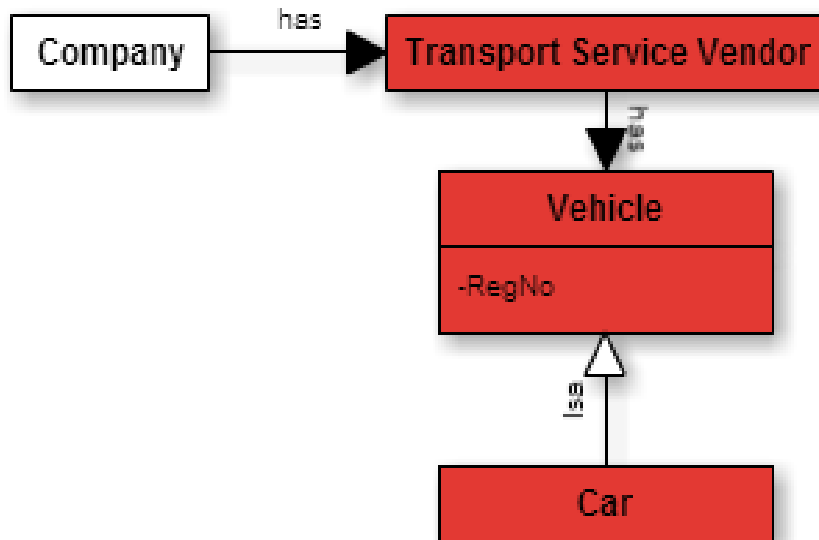
Conflict Resolution



Conflict Resolution

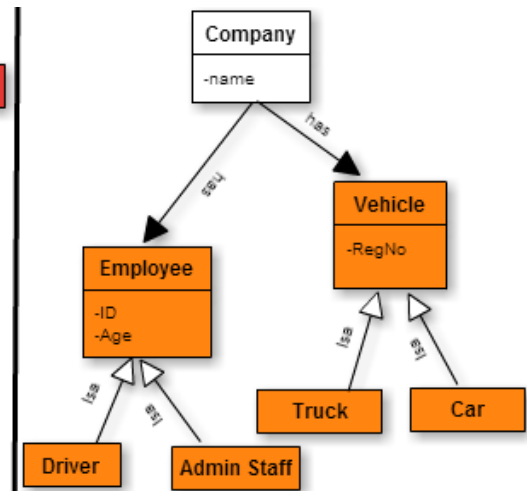
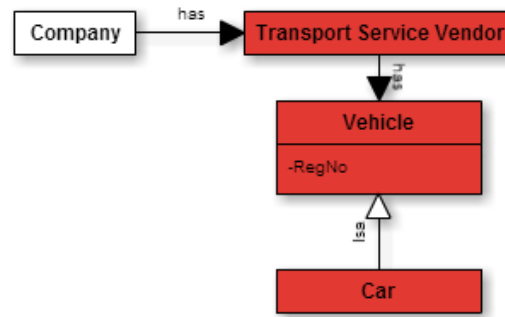


Quick Quiz

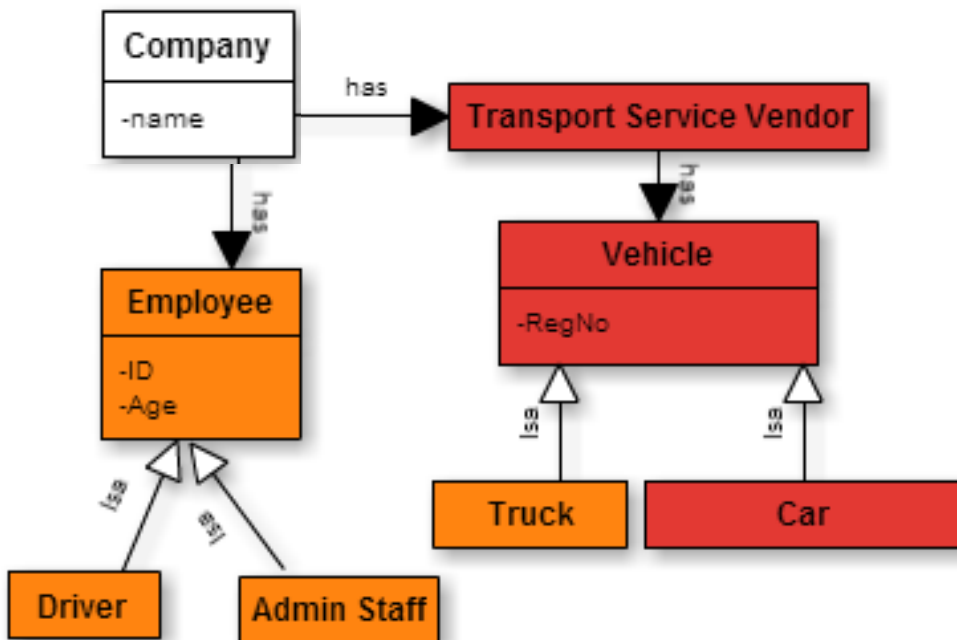


What will be the merge model?

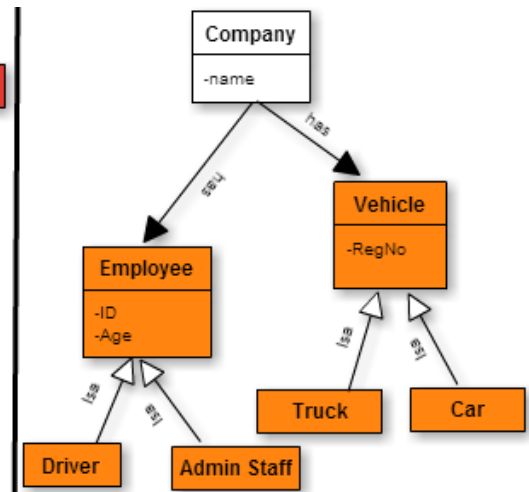
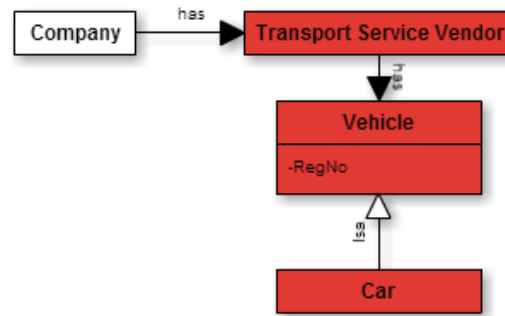
Quick Quiz



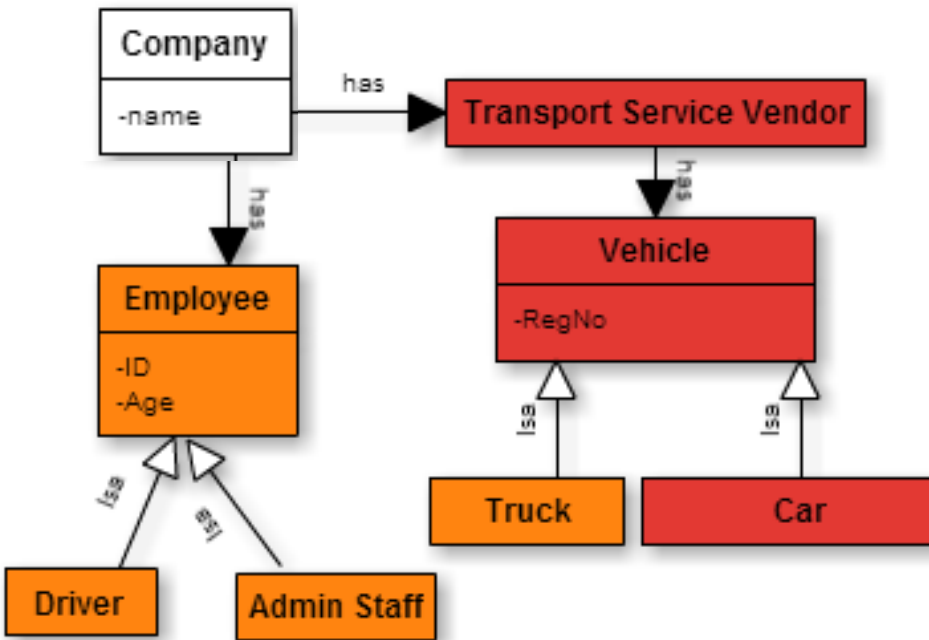
Is this the merged model?



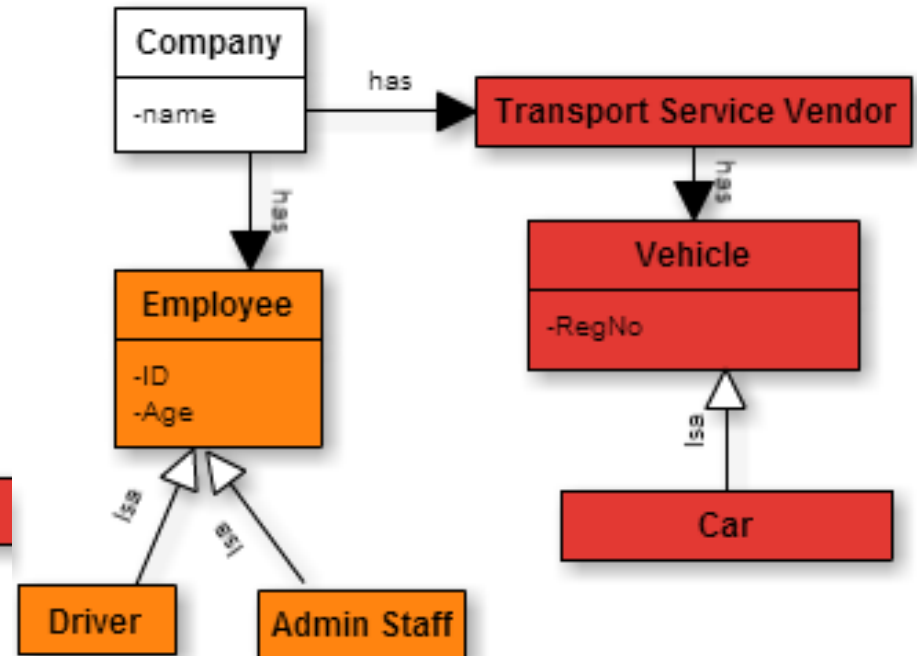
Quick Quiz



Option One

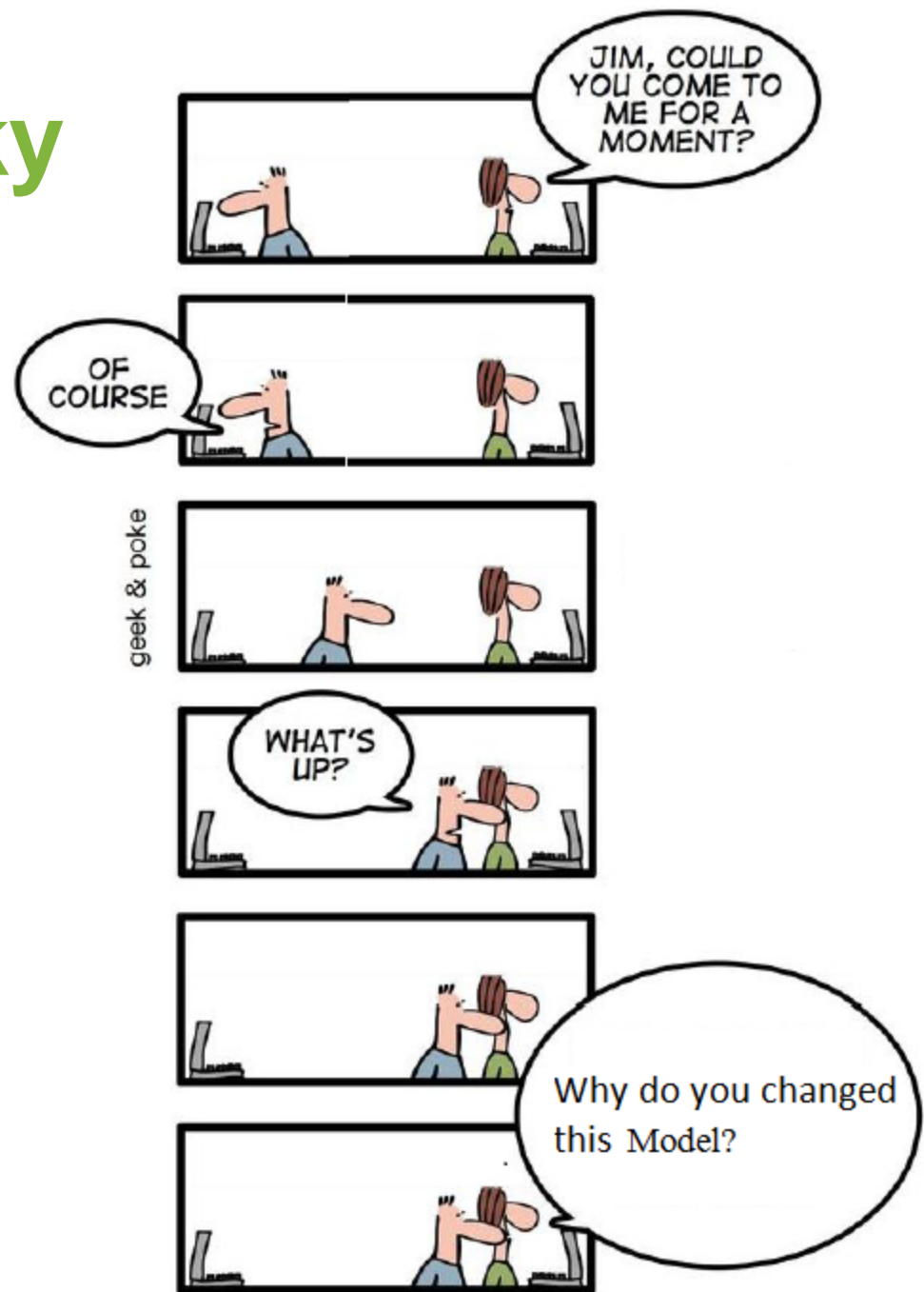


Option Two



Are we sure?

If we are lucky



Otherwise..

Search answer for:

- why this changes has been done?
- How the model evolved to this point?

Otherwise..

Search answer for:

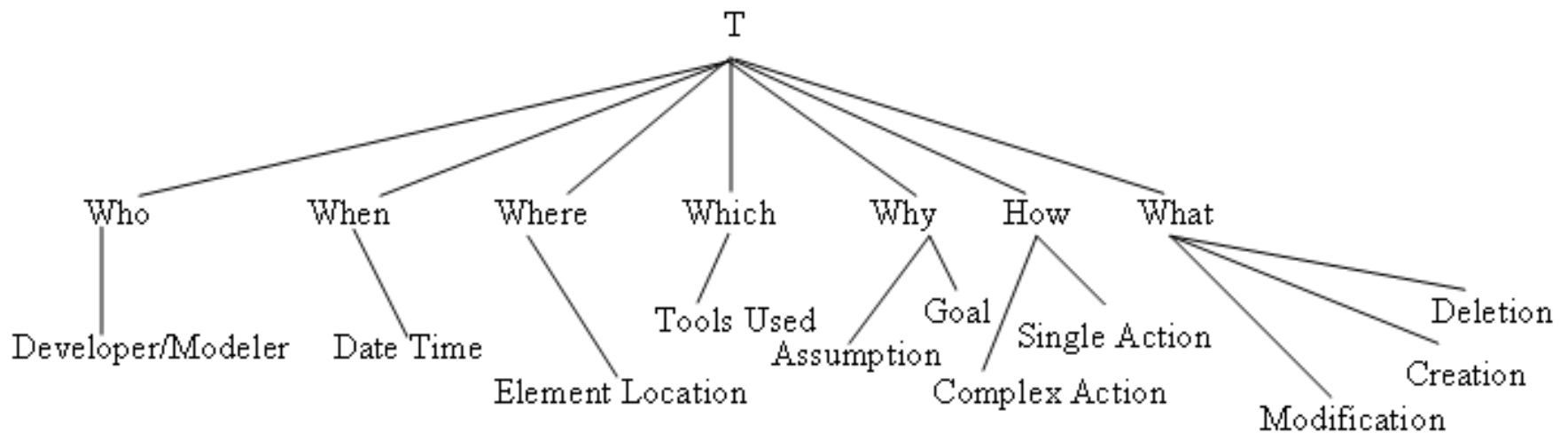
- why this changes has been done?
- How the model evolved to this point?

Current Model VCS answer the questions
like:

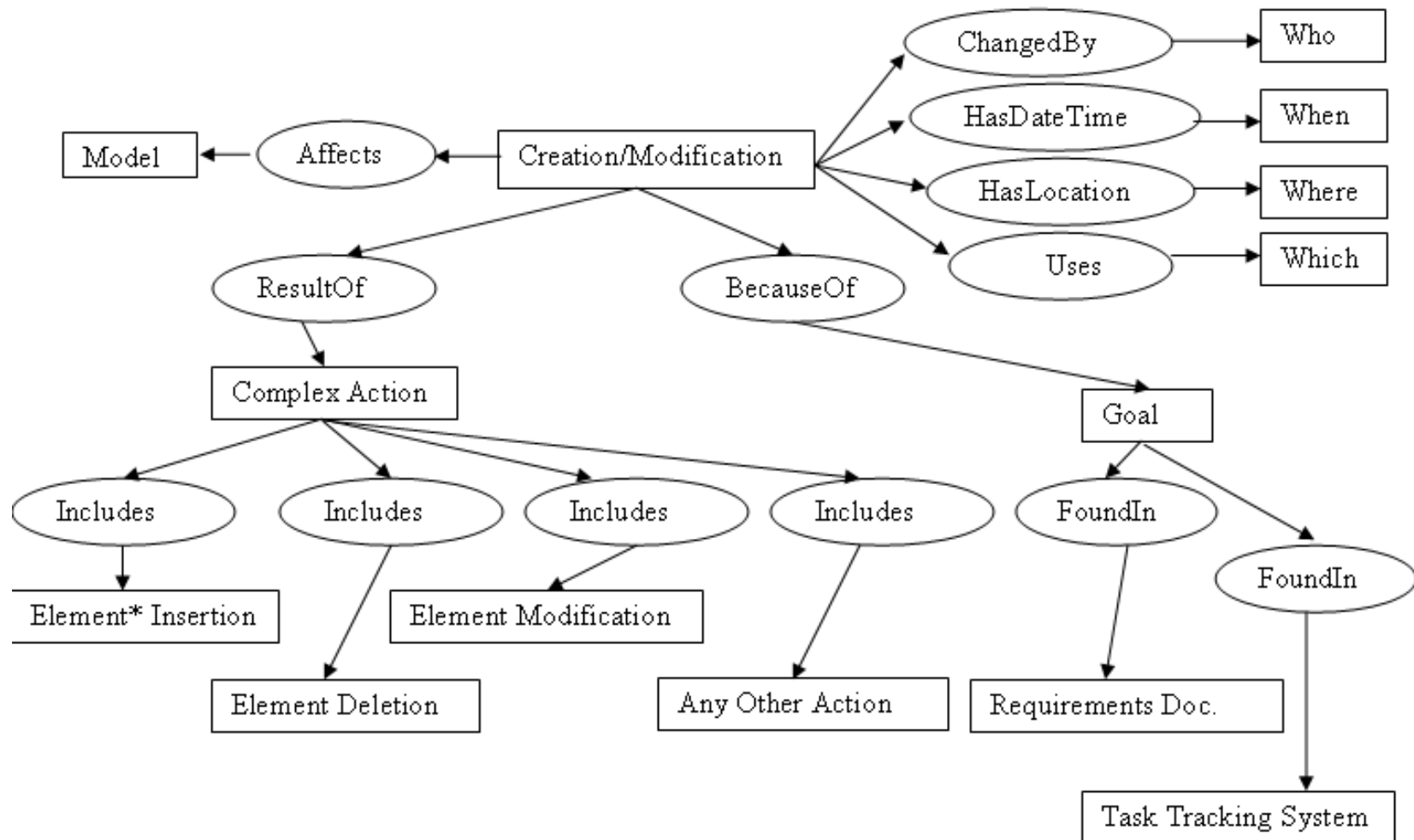
- Who made this change and when?
- Where the change had been made?

Model Provenance Information

The 7 W's



Model Provenance Information Semantics



*Element can be any modeling element.

Prototype

Summarization

- Open Text Summarizer (multiple contributor),
- MEAD (University of Michigan),
- SweSum (kth, sweden),
- FociSum (CS, Columbia),
- SUMMARIST (ISI, Southern California).

Prototype

Summarization

MEAD: Most comprehensive

Keyword based feature

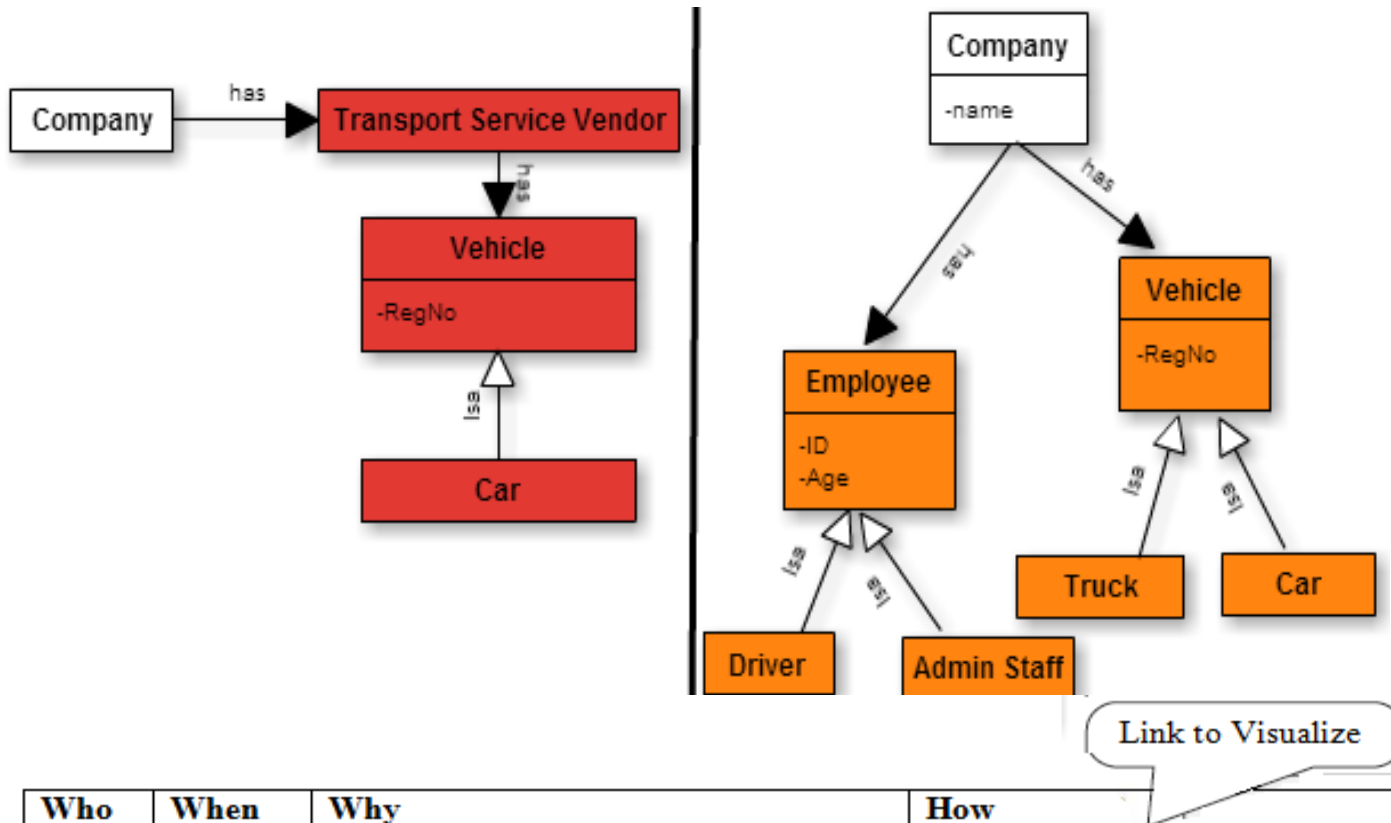
A keyword feature script can be found in \$BIN DIR/feature-scripts/keyword/QueryPhraseMatch.pl. This new feature script assigns weights to sentences according to keywords and regular expressions it contains. Meaning that this feature may be used for boosting up the score of the sentences that have critical importance for the user. For example, the user may want to include all the sentences that contain the name of a specific person in the summary. One should be careful to note that the regular expressions provided should be PERL regular expressions. The keywords and regular expressions are specified by the user in a query file in which the script looks for the "KEYWORDS" tag.

Summary

A keyword feature script can be found in \$BIN DIR/feature-scripts/keyword/QueryPhraseMatch.pl.

Prototype

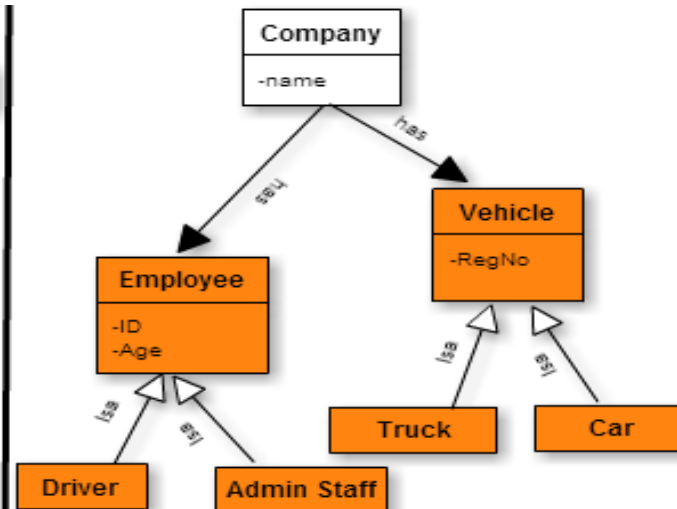
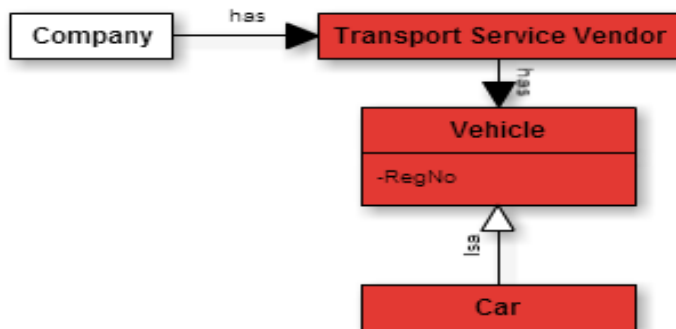
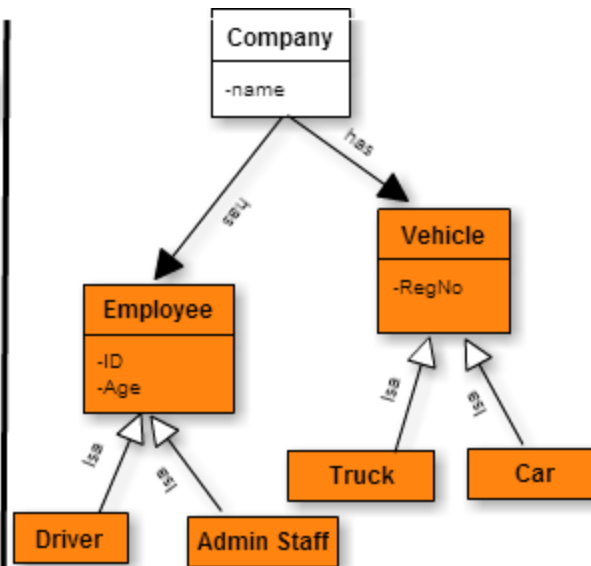
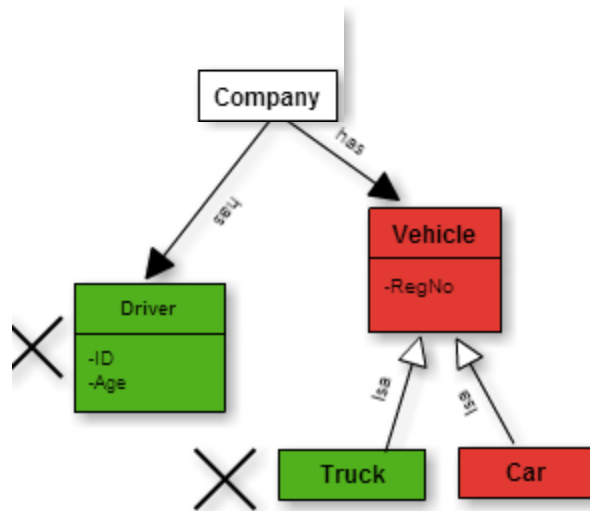
Visualization (Mock Up)



Who	When	Why	How
Bob	10 Dec, 2012	Msg: Change requirement in Task 107. Summary: Due to underutilization of resources, we need to outsource our transformation service.	Deleted element (MID: 12, name='driver'), Deleted element (MID: 12, name='has'), Added element (MID: 35, name='Transport Service Vendor'), etc.

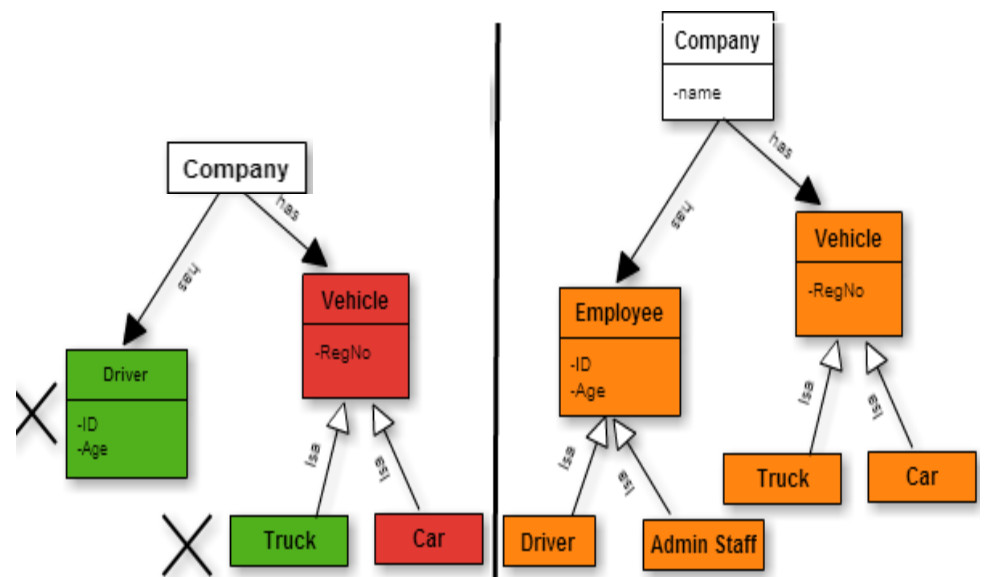
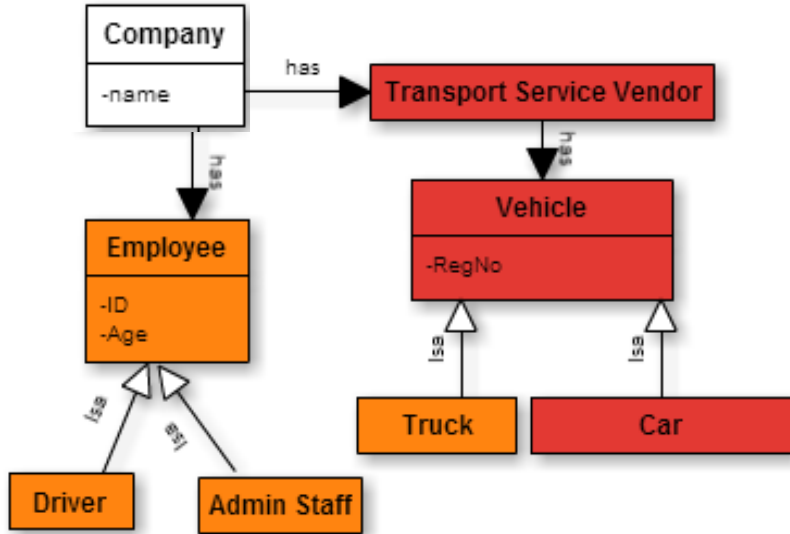
Prototype

Visualization (Mock Up)

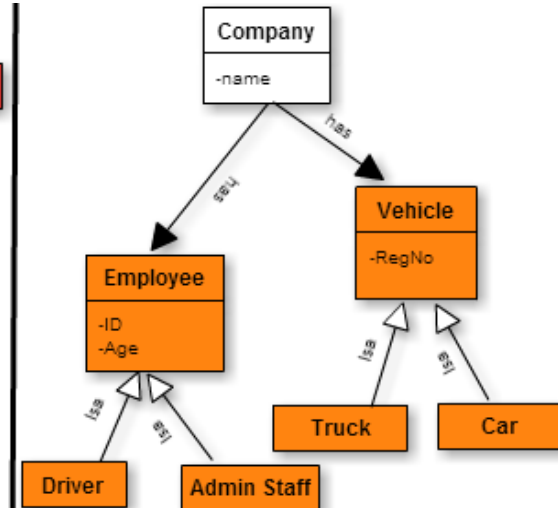
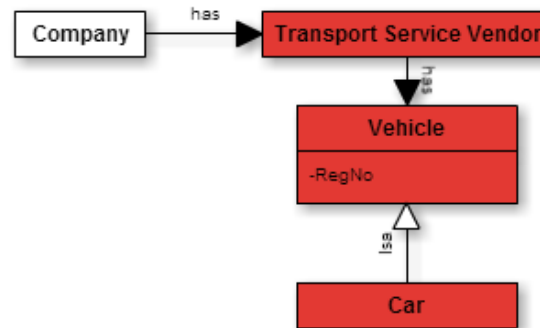
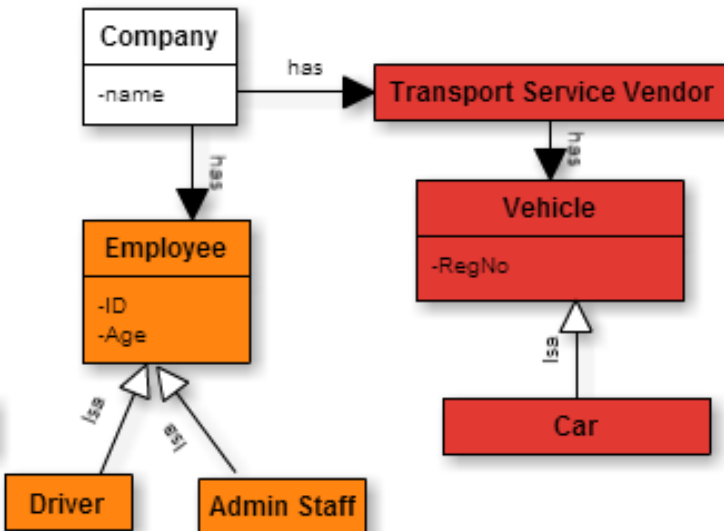


Quiz Returns

Option One

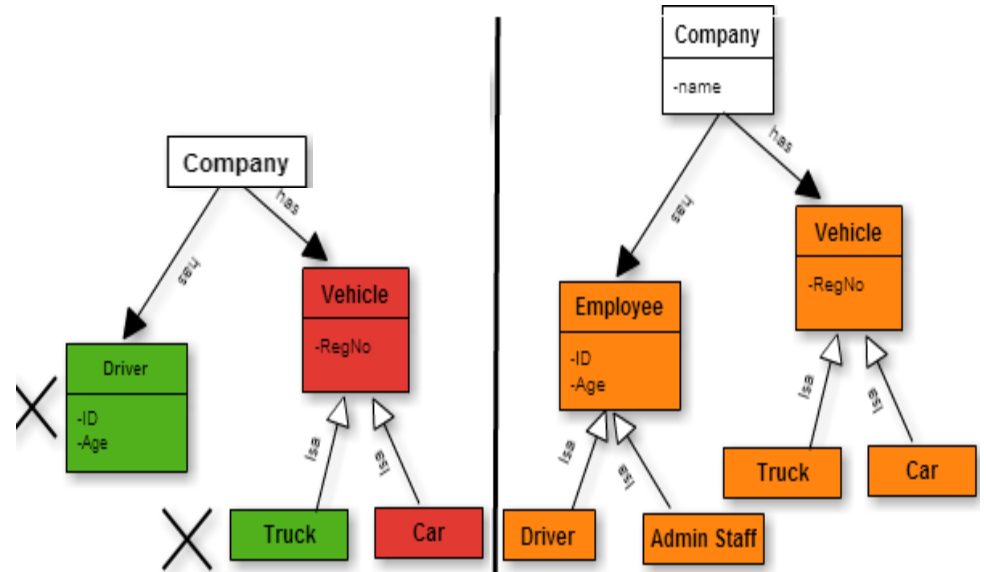
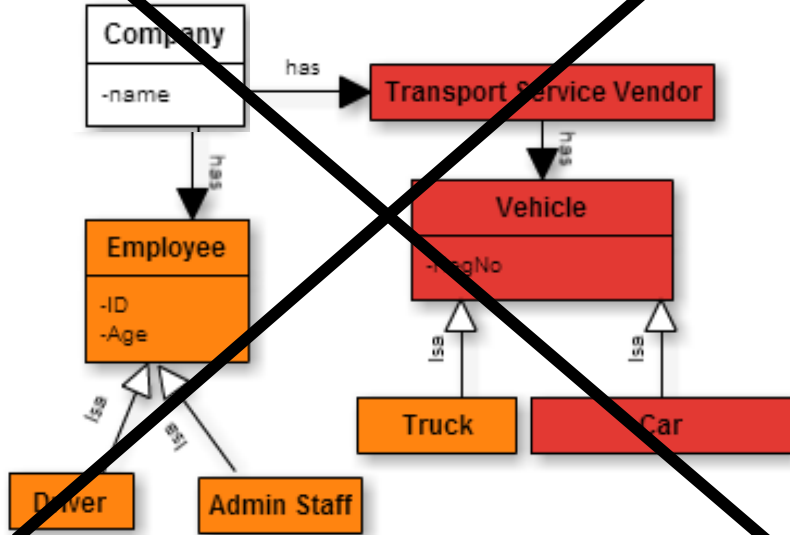


Option Two

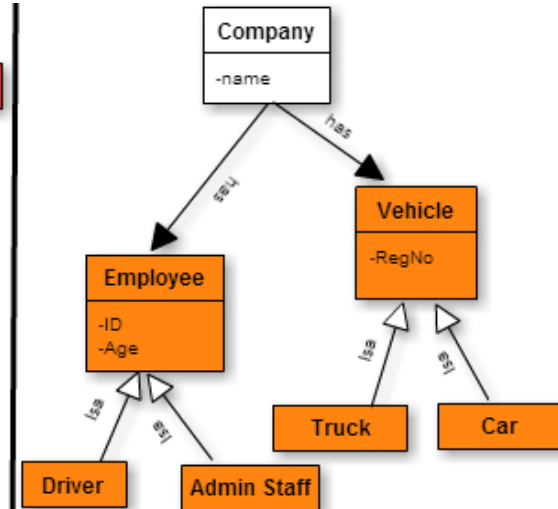
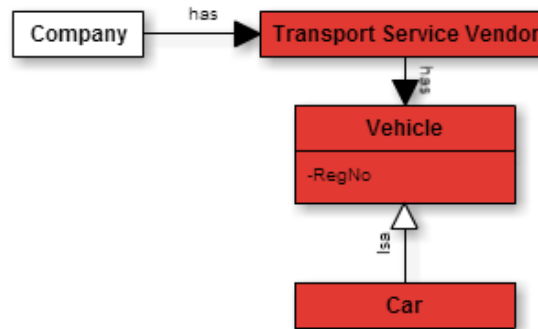
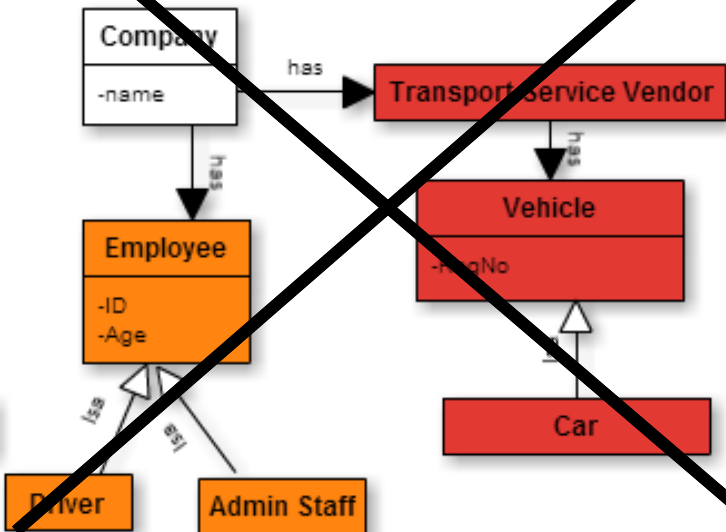


Quiz Returns

Option One

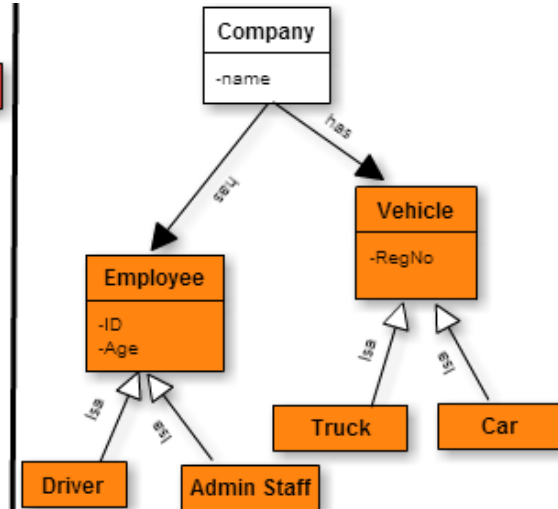
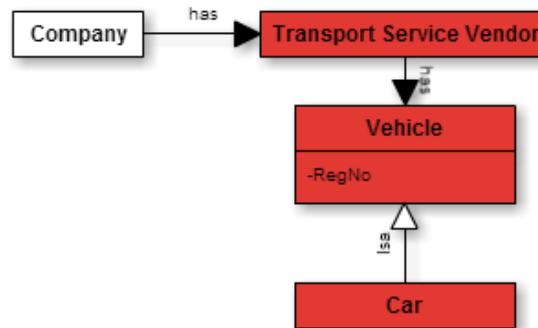
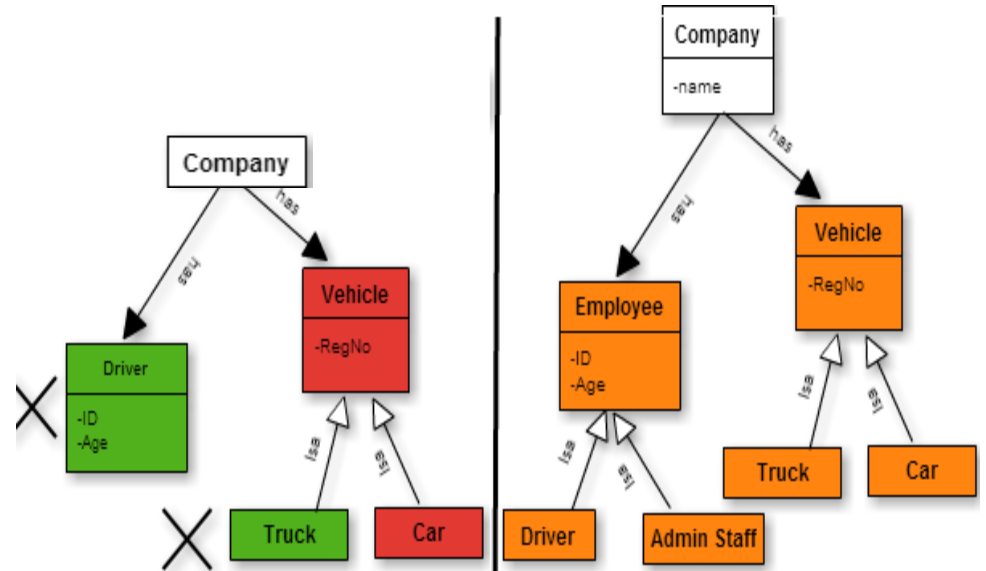
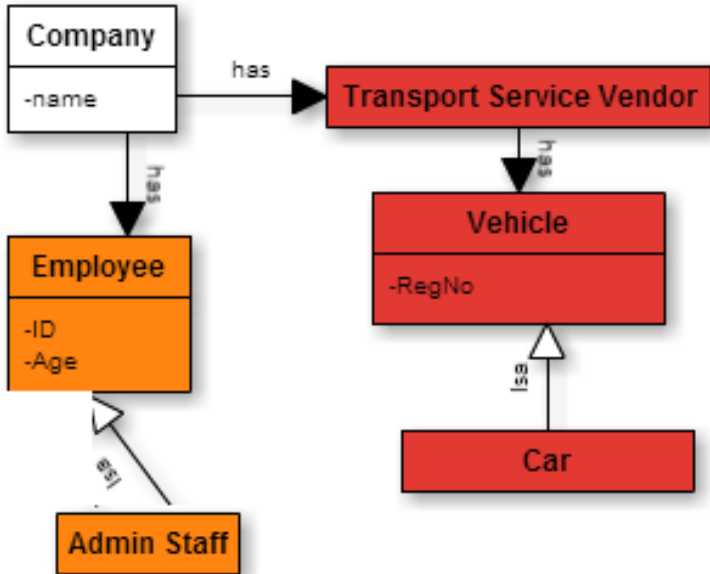


Option Two



Quiz Returns

Correct Merge



Evaluation

- We think that this approach will be useful, no scientific evaluation yet.
- We have plan to conduct a online survey.
- Measure the time required, Precision, and Recall.

Contribution

- Investigate and analyse the state of the art model versioning tools and identify a need which is not fulfilled by the current model/code versioning tools.
- Outline a model of provenance semantic for Model versioning.
- Propose a framework which can potentially fulfill the need.

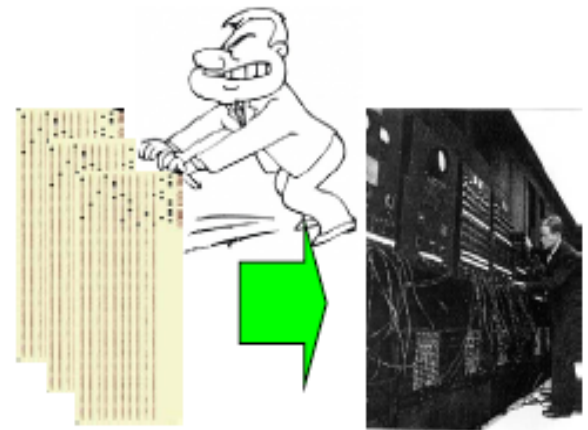
Future Work

- Finish implementation.
- Conduct an evaluation
- Incorporate pro-active conflict resolution.

A Look at History

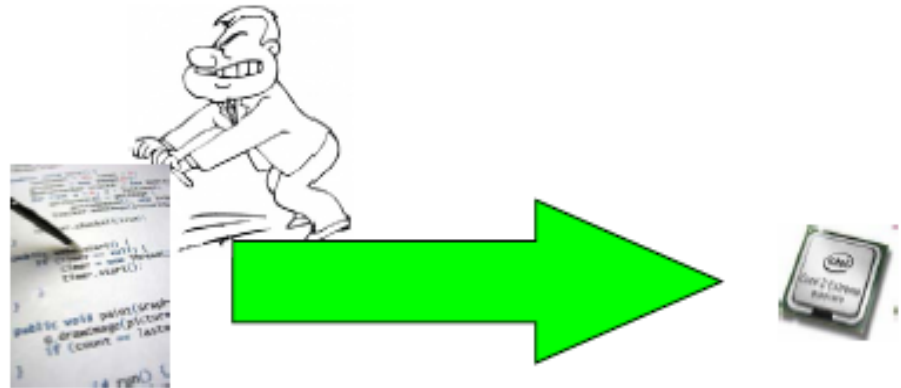
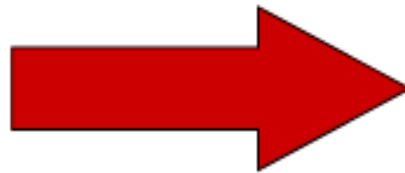
40 years ago

"The system shall do this, that, and the other thing"



Today

"The system shall do this, that, and the other thing"



How do we shorten the "arrow of pain" further?

Reference

- www.cvshome.org
- Slide of Marsha @ First Class
- Jonas Helming, A model Repository for EMF, EMF Store, July 19, 2011.
- Numerous image from web (Shamelessly copied)
- G. Taentzer, C. Ermel, P. Langer, and M. Wimmer. A fundamental approach to model versioning based on graph modifications: from theory to implementation. *Software & Systems Modeling*, pages 1-34, 2012.