Natural Language Generation from Class Diagrams

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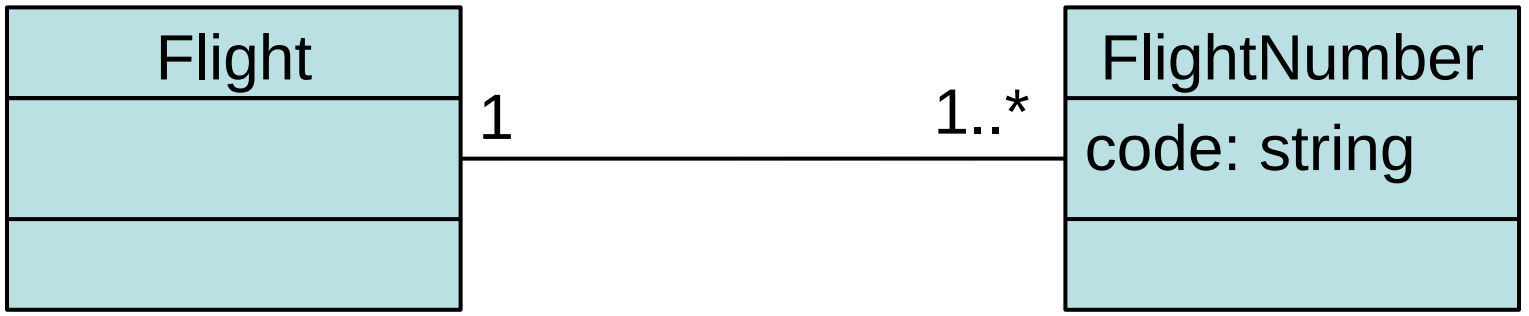
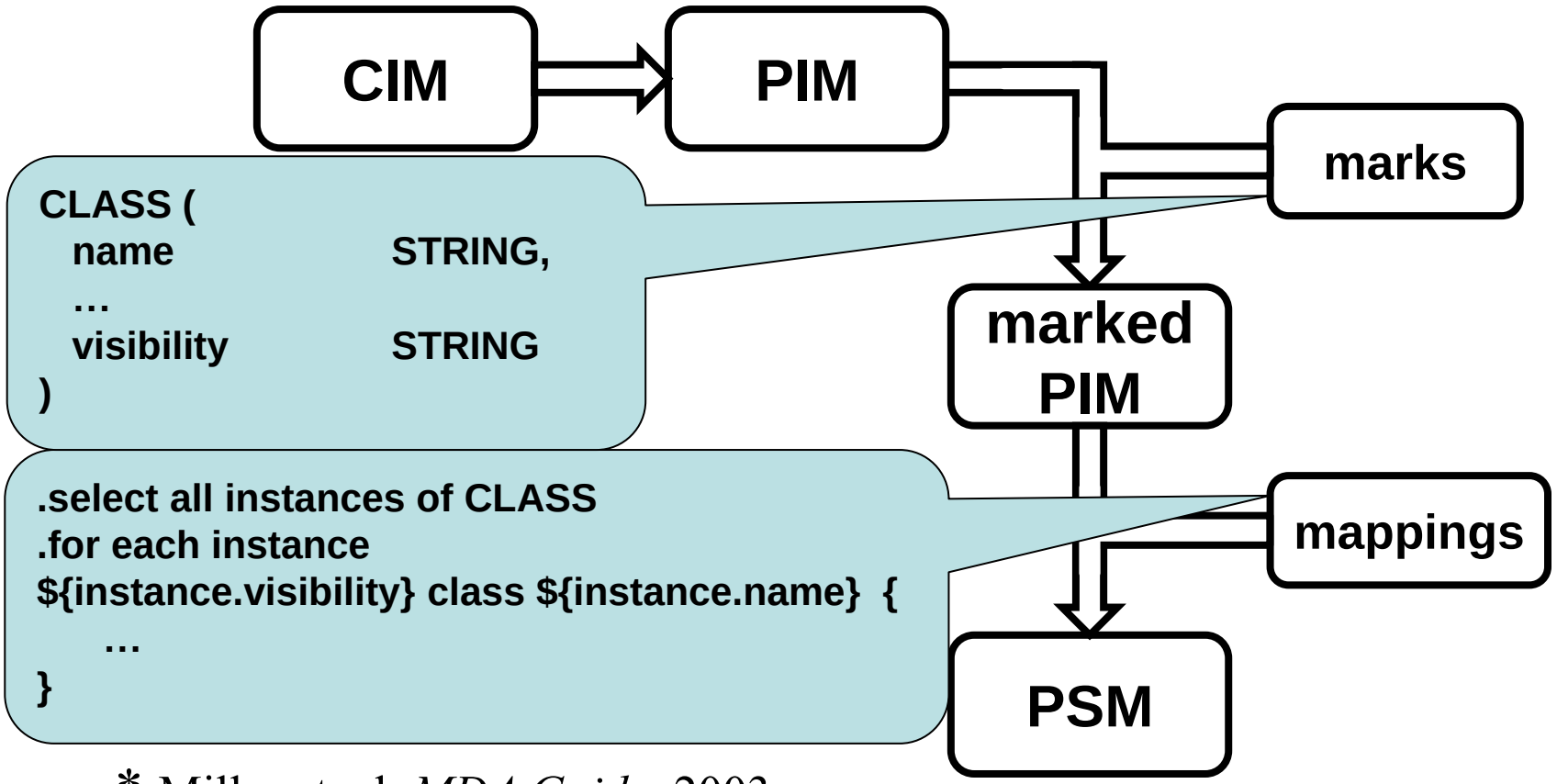
Motivating example

It is important that a flight can have more than one flight number to enable code sharing, a multimillion-pound business that affects an alliance of airlines.

Arlow et. al. *Literate Modelling – Capturing Business Knowledge with the UML*, 1999

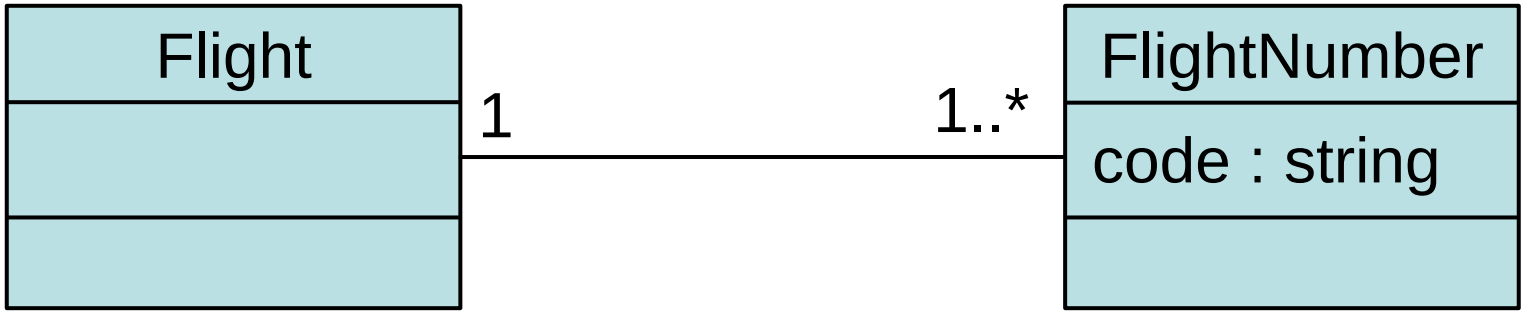


Model-Driven Architecture*



* Miller et. al. *MDA Guide*, 2003

Marks and mappings




```
public class Flight {
    …
}
```

```
private class FlightNumber {
    …
}
```

Natural Language Generation: NLG*

1) Text planning

   Which information and in what order

2) Sentence planning

   Which words and sentence structure

3) Linguistic realisation

   *A**n a**ircraft – many aircraft_*

* Reiter and Dale *Building Natural Language Generation Systems*, 2000

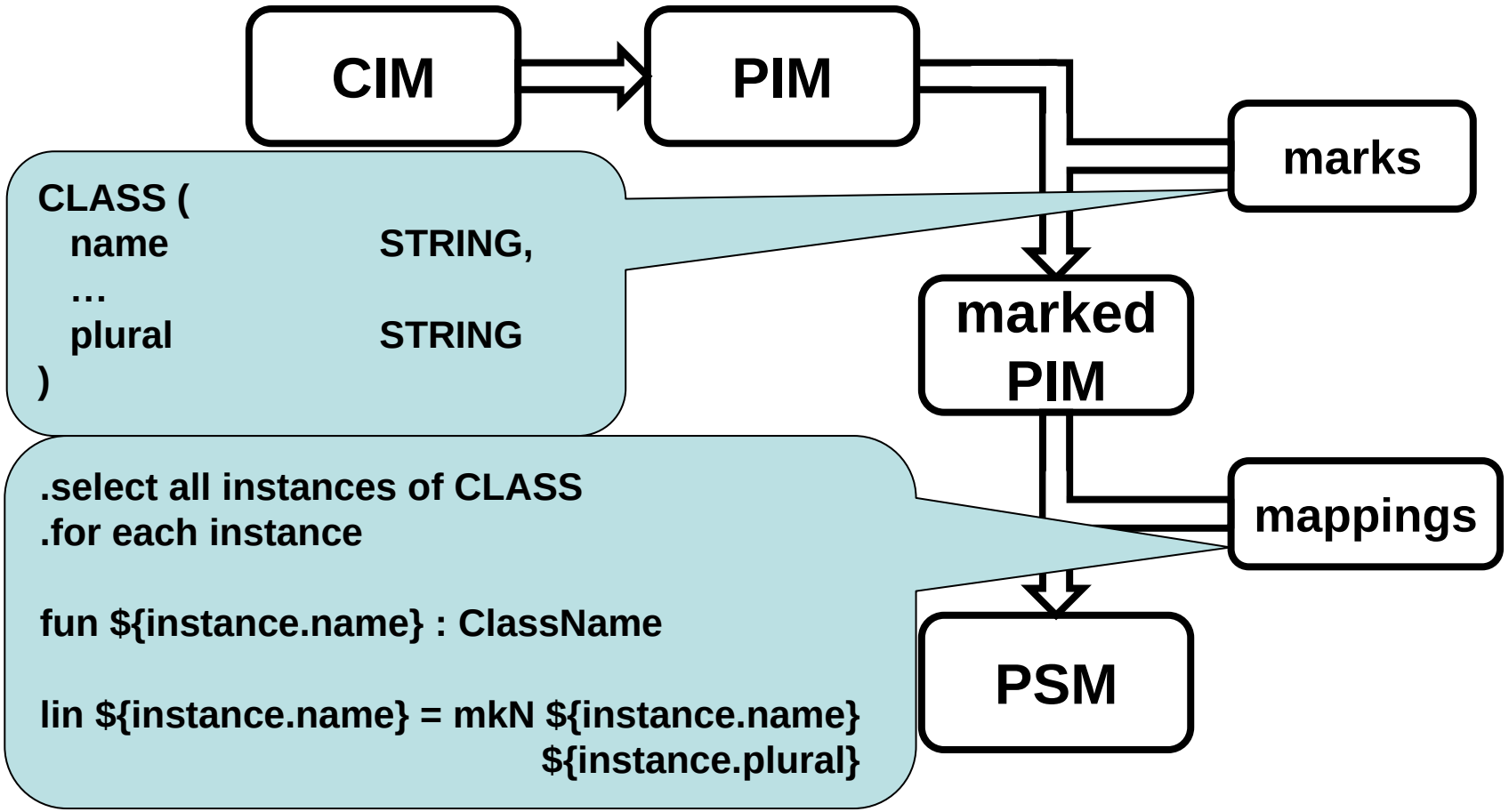
Grammatical Framework*

- Abstract syntax is Text planning:
  - fun Addition : Int ×Int → Int

- Concrete syntax is Sentence planning:
  - lin Addition **x y** = **x** ”+” **y**
  - lin Addition **x y** = **x** ”plus” **y**
  - lin Addition **x y** = ”the sum of” **x** ”and” **y**
  - lin Addition **x y** = ”summan av” **x** ”och” **y**

* Aarne Ranta *Grammatical Framework, Programming with Multilingual Grammars*. 2011

PIM to Grammar



Result

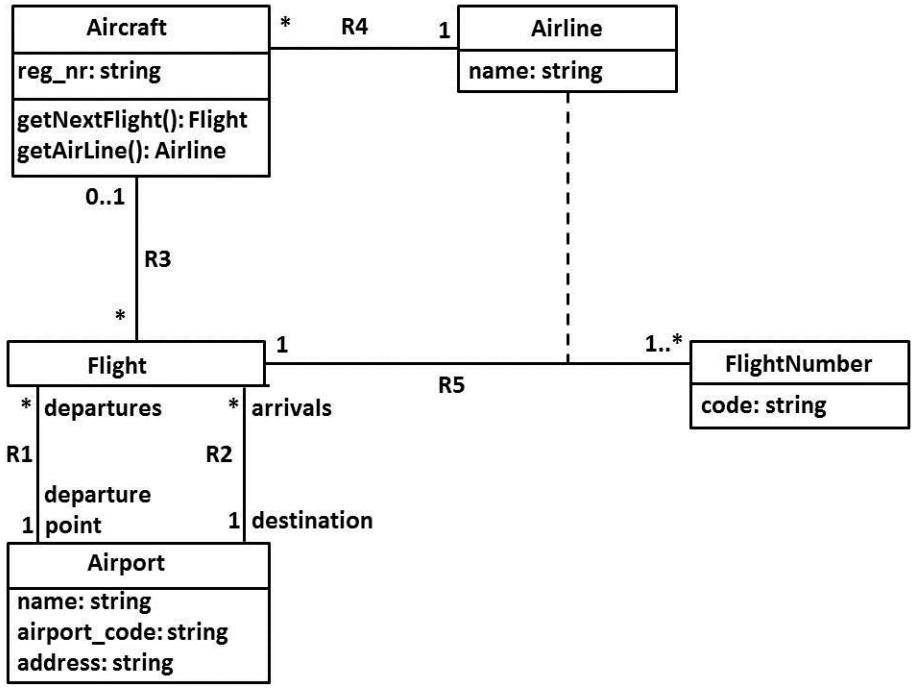
An Airport has a name, an airport code and an address.

An Aircraft can get next Flight and get Airline.

A Flight is identified by one or more Flight Numbers.

The relationship between a Flight and a Flight Number is specified by an Airline.

A Flight can have more than one Flight Number since code sharing is a multimillion-pound business, affecting an alliance of airlines.



Conclusion

- Grammars are generated in the same way as code
- putting NLG within an MDA-context

- The grammars give text and sentence planning
- GF takes care of linearisation
- Tailored lexicon for our specific needs

Future work