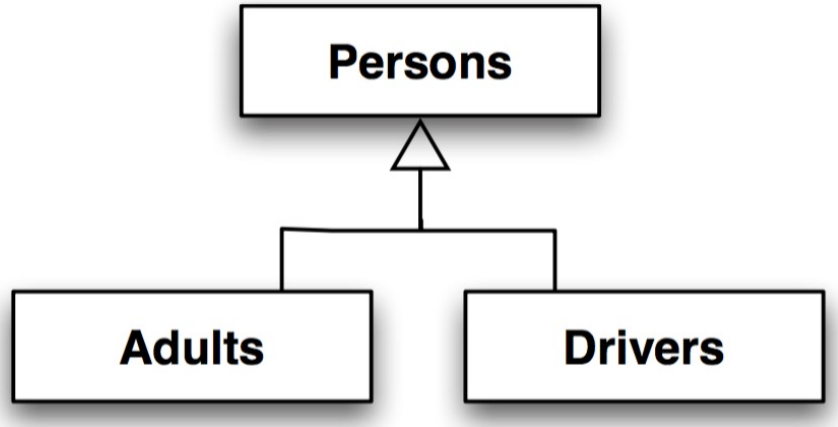
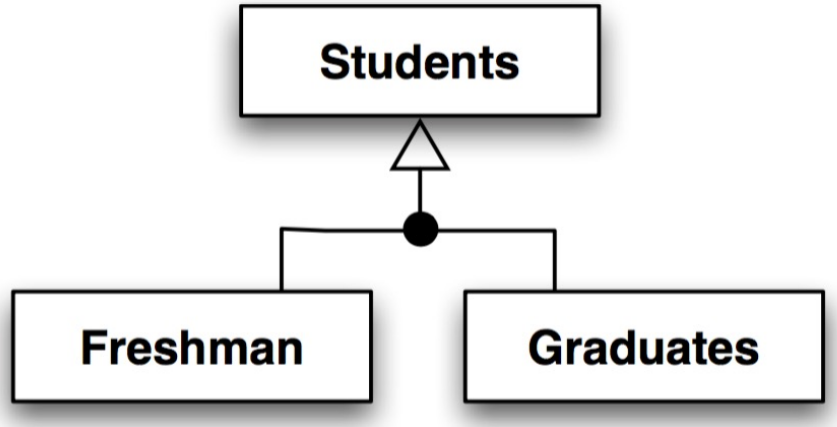
Class Hierarchy



Overlapping subsets

Adults and Drivers are **not disjoint** sets
An adult can be a driver

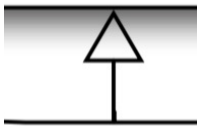


Non overlapping subsets

Freshman and graduates are **disjoint** sets
A freshman cannot be a graduate

Both refinements are **subsets**.
I.e., the sub-classes **do not include all** persons/students
- A Person can be a teenager
- A Student can be a second-year student

This is denoted by a single-line below the triangle



Class Hierarchy

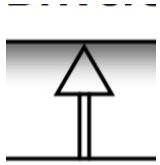
CarDrivers and TruckDrivers are **not disjoint** sets

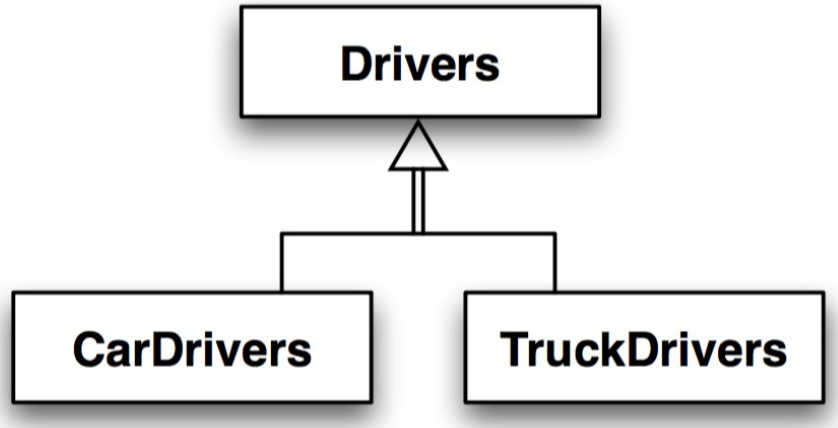
Adults and Childrens are **disjoint** sets

Both refinements are **coverings**
I.e., the sub-classes **do include all** drivers/students

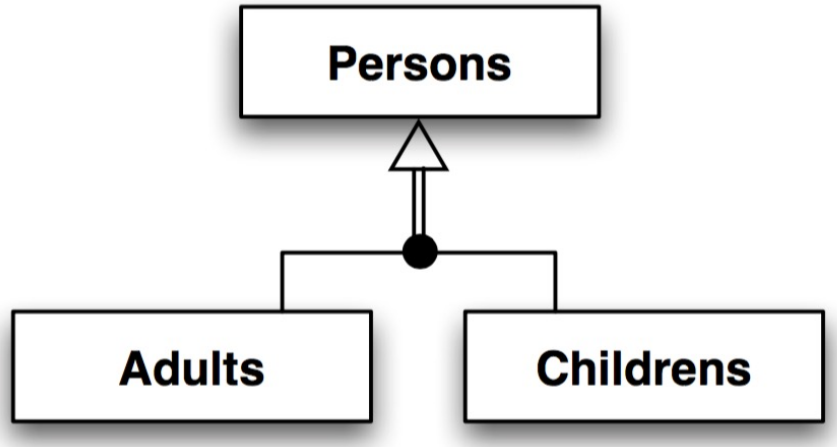
- A Driver can only be a Car- or Truck-driver
- A Person can only be an Adult or Child

This is denoted by a double-line below the triangle





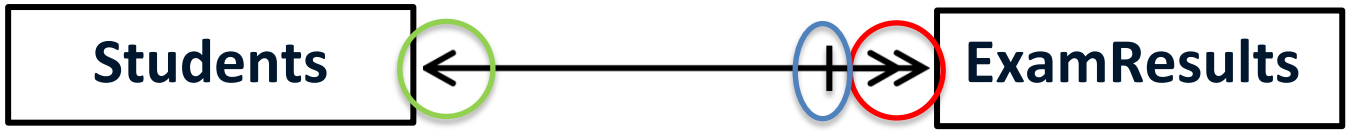
Overlapping cover



Non overlapping cover

Cardinality

- **Constraints on relationships**
  - Constraints on the number of edges between instances of classes
    - How many supervisors can a specific student have?
- **Minimal Cardinality:** 0 or 1
- **Maximal Cardinality:** 1 or many



A student can pass zero or several exams
An exam result is precisely for one student only

Algorithm for the Logical Design

- **Step I**: Translate all classes not involved in hierarchies
- **Step II**: Translate all hierarchies
- **Step III**: Translate multivalued attributes into tables
- **Step IV** : Translate N-N relationships
- **Step V** : Translate 1-N relationships
- **Step VI** : Translate 1-1 relationships
- **Step VII** : Add other possible constraints