

ERD03

1. Entities

- car
- engine
- tire
- customer
- engineFactory
- supplier
- battery
- tireFactory
- cylinder

2. Attributes

car

- type
- price

engine

- powerRating

tire

- brandName

customer

- name

engineFactory

- location

supplier

- supplierCode

Battery

- capacity

tireFactory

- brand name

cylinder

- volume

3. Relations

- a `car` has **exact one** `engine`
- a `car` has **one or zero** `batteries`
- a `car` has **one or zero** `customers`
- a `car` has **many** `tires`
- an `engine` has **one or zero** `cars`
- an `engine` has **exact one** `engineFactory`
- an `engine` has **zero or many** `cylinders`
- a `tire` has **one or zero** `cars`
- a `tire` has **exact one** `tireFactory`
- a `customer` has **one or many** `cars`
- an `engineFactory` has **one or many** `engines`
- a `supplier` has **one or many** `cylinders`
- a `battery` has **one or zero** `cars`
- a `tireFactory` has **one or many** `tire`
- a `cylinder` has **one or zero** `engines`
- a `cylinder` has **exact one** `supplier`

4. Cardinalities

- (car, engine) \Rightarrow 1:c
- (car, battery) \Rightarrow c:c
- (car, customer) \Rightarrow c:m
- (car, tire) \Rightarrow m:c

- (cylinder, engine) => **c:mc**
- (cylinder, supplier) => **1:m**
- (tire, tireFactory) => **1:m**
- (engineFactory, engine) => **m:1**

4a. ERD Diagram with yEd

