

SUPER TYPES, SUB TYPES AND BUSINESS RULES

P R E P A R E D B Y : L U I S M E I N G

OBJECTIVES:

01

Supertypes and Subtypes

1.1: Supertypes

1.2: Subtypes

1.3: Example

02

Business Rules

2.1: Structural Rules

2.2: Procedural Rules





Supertypes

- This may be the case when a group of instances has special properties, such as attributes or relationships that exist only for that group

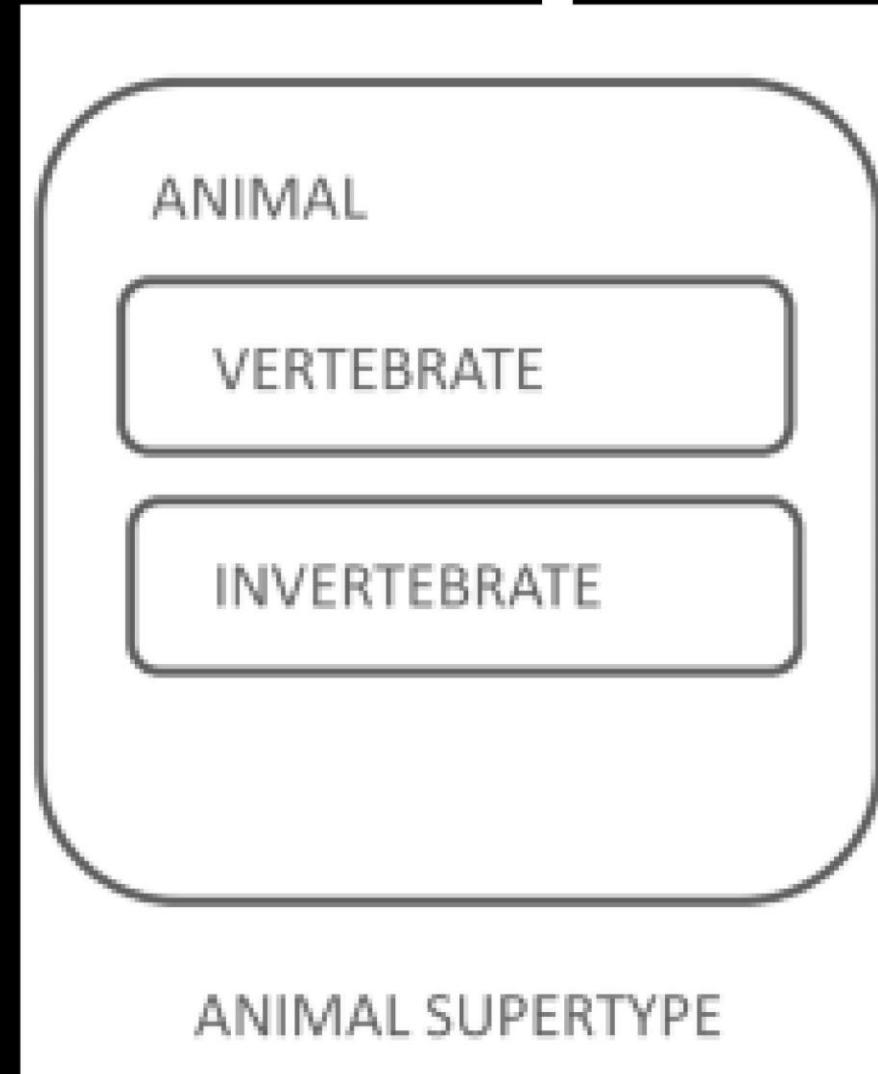


Supertypes

- imagine it like inheritance
- supertypes give the commonly shared attributes of all those that qualify for the entity

1.1 Supertypes

Example of Supertypes

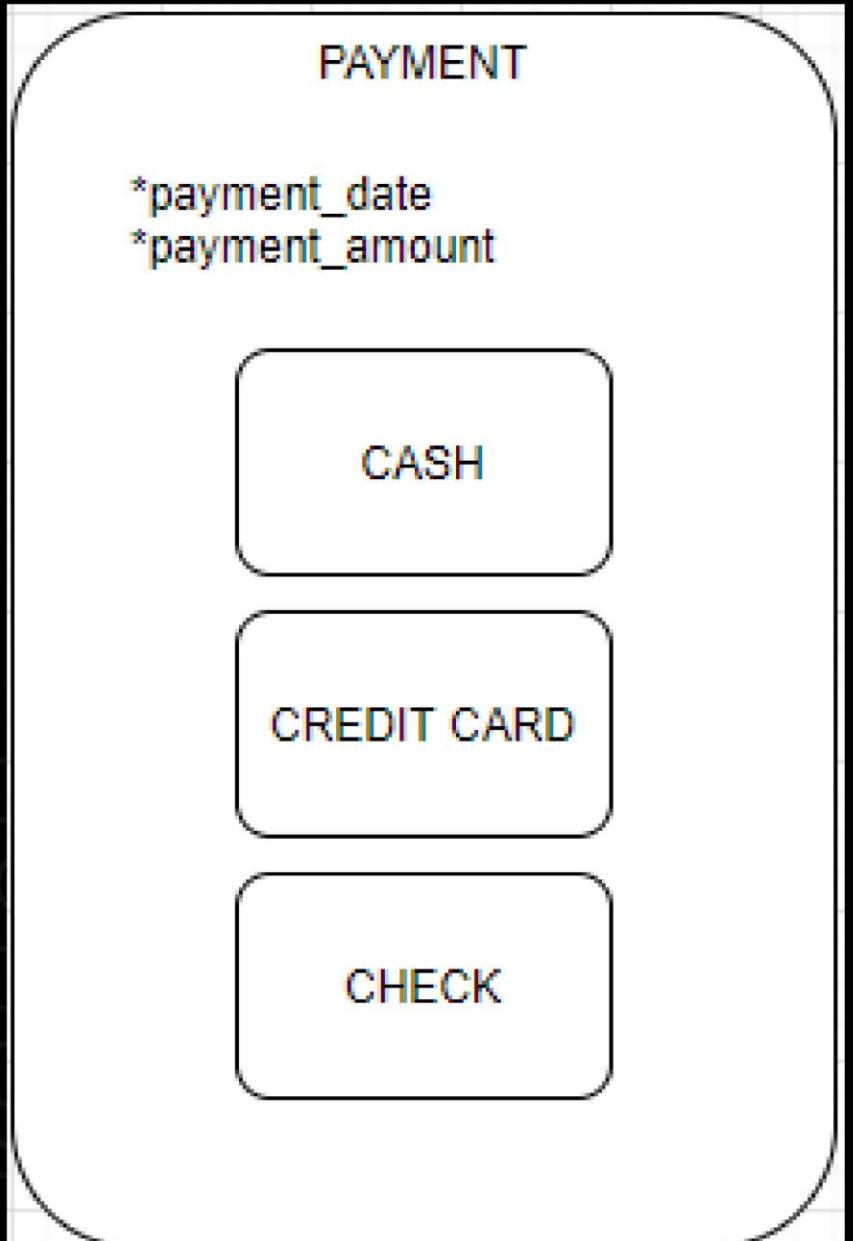




Example of Supertypes

- Customers can pay by cash, by check, or by credit card. All payments have some common attributes: payment date, payment amount, and so on. But only credit cards would have a “card number” attribute. And for credit card and check payments, we may need to know which CUSTOMER made the payment, while this is not needed for cash payments.

1.1 Supertypes



- The supertype is **PAYMENT**
- What are the others then?



Subtypes

- Sometimes it makes sense to subdivide an entity, especially for the rare cases of special attributes in other instances

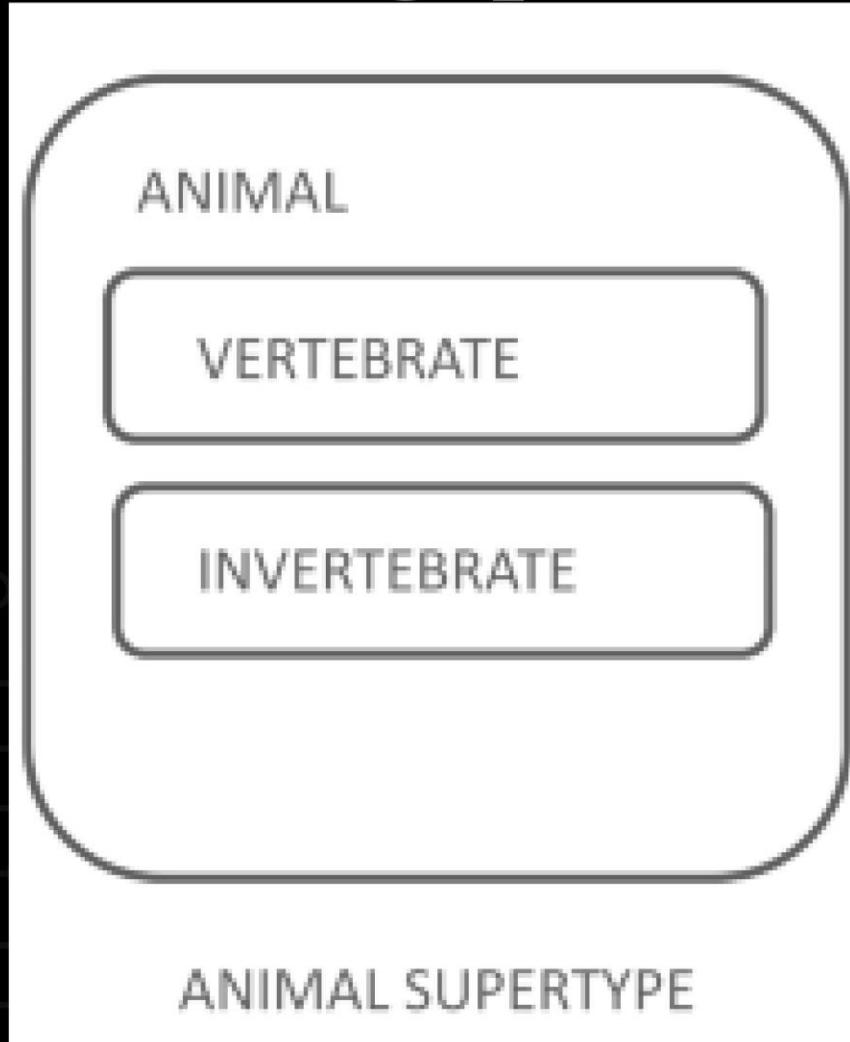


Subtypes

- This may be the case when a group of instances has special properties, such as attributes or relationships that exist only for that group.

1.2 Subtype

Subtypes



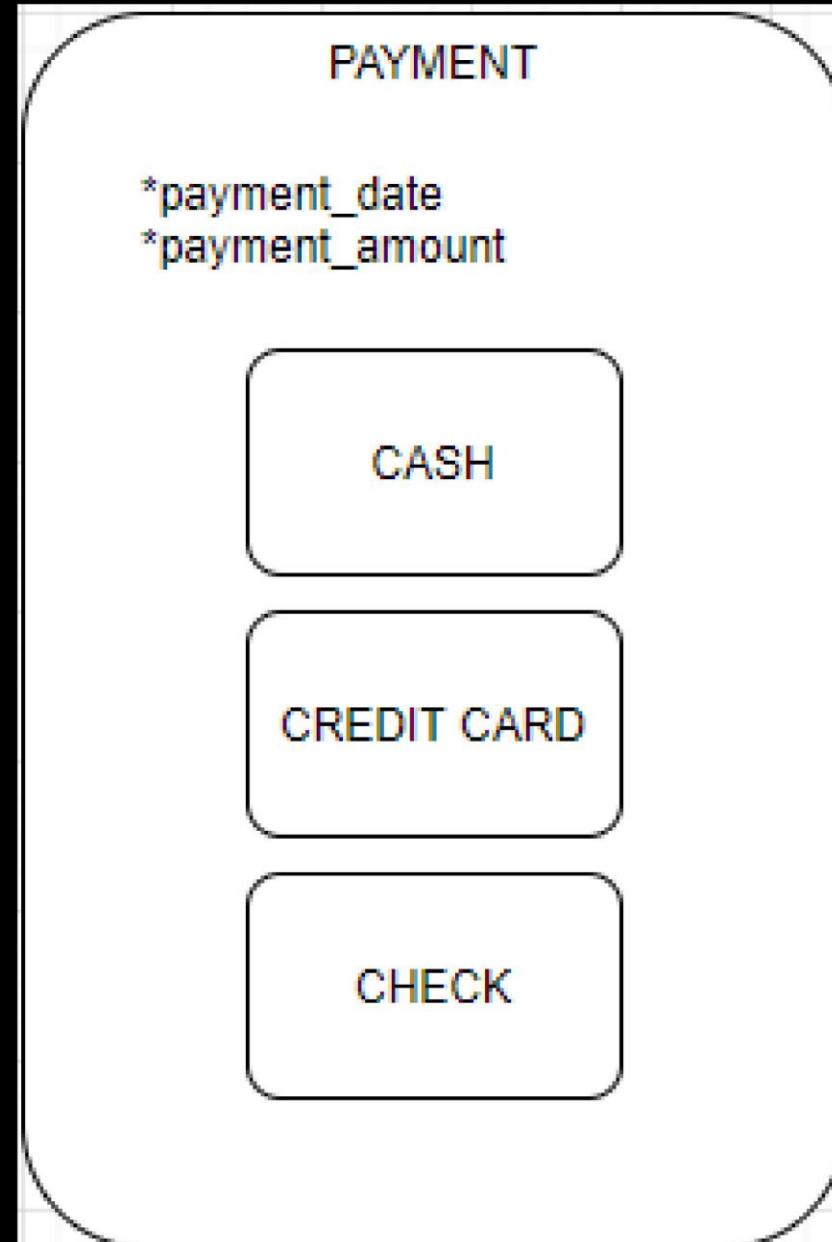
- In this case, the entity (ANIMAL) is called a “supertype” and each group (VERTEBRATE, INVERTIBRATE) is called a “subtype”

1.2 Subtype

Characteristics of a Subtypes

- Inherits all attributes of the supertype
- Inherits all relationships of the supertype
- Usually has its own attributes or relationships
 - Is drawn within the supertype
 - Never exists alone
 - May have subtypes of its own

1.2 Subtype





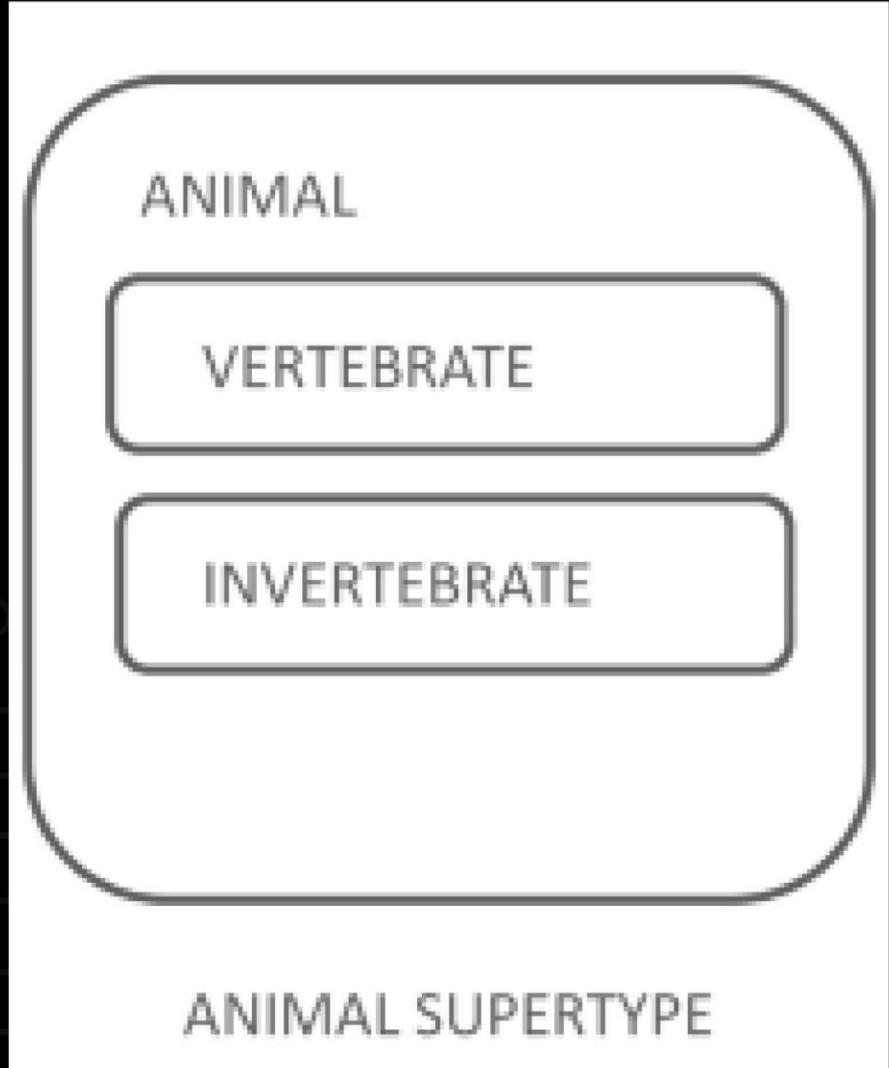
Supertypes and Subtypes

Rules

- **Exhaustive Rule:** This rule states that every entity instance of the super type must be an instance of one of the subtypes.

1.2 Subtype

Rules of a Subtypes



- Every ANIMAL instance is either a VERTEBRATE OR INVERTEBRATE



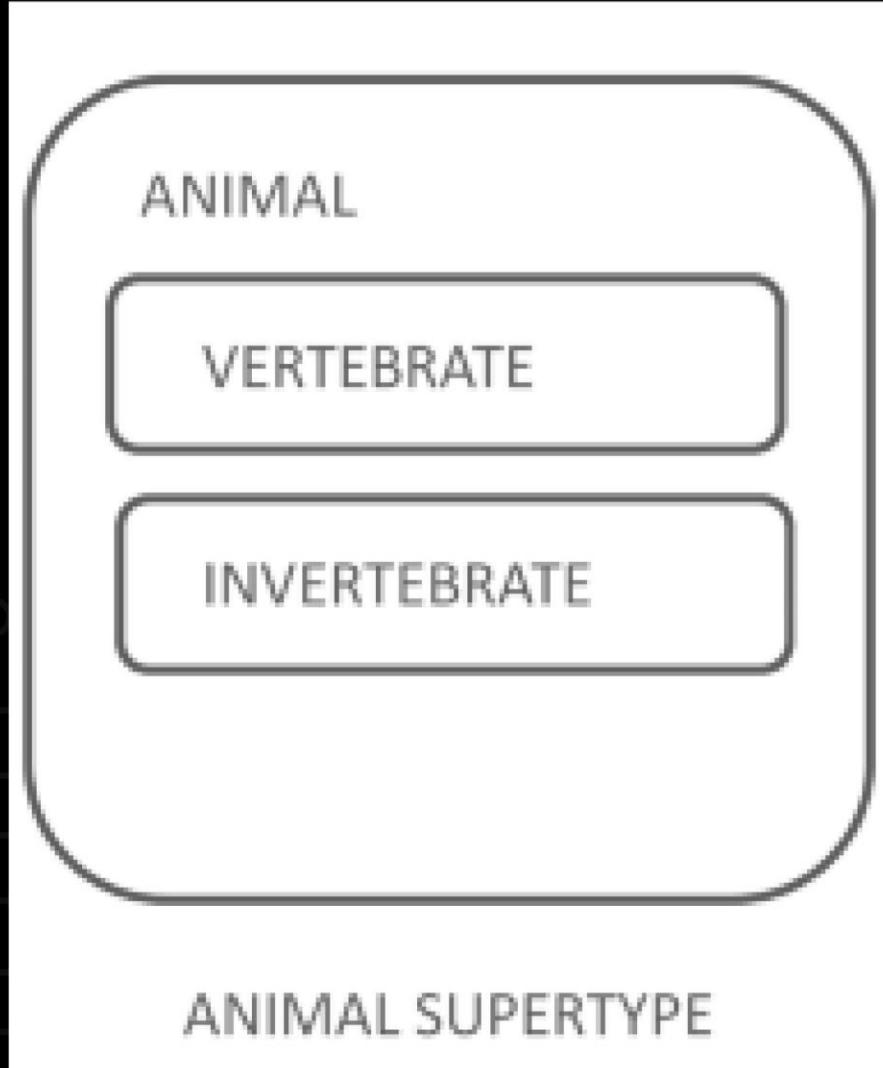
Supertypes and Subtypes

Rules

- **Mutually Exclusive Rule:** This rule states that every entity instance of the super type can be an instance of only one entity subtype and not the other.

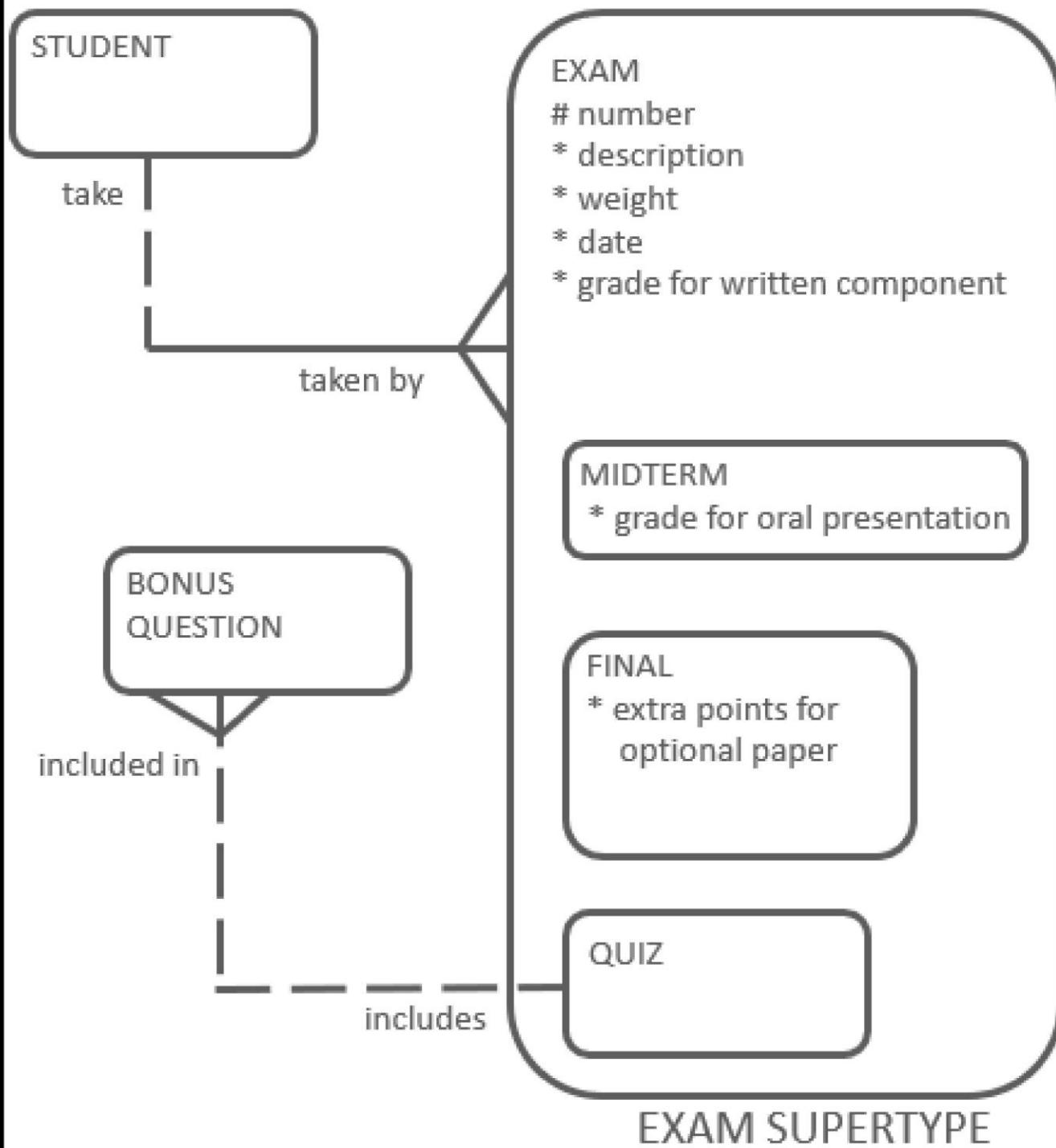
1.2 Subtype

Rules of a Subtypes



- If an instance is an ANIMAL, it will only be part of the VERTEBRATE or INVERTIBRATE, not both

1.3 Example



1.3 Example

Three questions to see if the subtype is correctly identified:

- Is this subtype a kind of supertype?
- Have I covered all possible cases?
(exhaustive)
- Does each instance fit into one and only one subtype? (mutually exclusive)

1.3 Example

Supertypes and Subtypes

CAR

SEDAN

HATCHBACK

OTHER CAR

STAFF

ACADEMIC

ADMINISTRATIVE

OTHER STAFF

VENUE

PRIVATE VENUE

PUBLIC VENUE



Structural Rules

- Structural business rules indicate the types of information to be stored
- Also shows how the information elements are related

2.1 Structural Rules



Structural Rules

- Structural business rules can nearly always be diagrammed in the ERD.





Example of Structural Rules

- All orders at a restaurant must be handled by a staff member (specifically, an order taker). There is no self-service ordering system.
- All teachers at our school must possess a valid teaching certificate

2.1 Structural Rules

Example of Structural Rules

All orders at a restaurant must be handled by a staff member (specifically, an order taker). There is no self-service ordering system.



2.1 Structural Rules

Example of Structural Rules

All teachers at our school must posses a valid teaching certificate

TEACHER

id
* name
* address
*** teaching certificate num**



Procedural Rules

- Procedural rules deal with the prerequisites, steps, processes, or workflow requirements of a business.



Procedural Rules

- Some procedural business rules cannot be diagrammed, but must still be documented so that they can be programmed later.
- Many procedural business rules are related to time: event A must happen before event B.

Example of Procedural Rules

- “Some of our employees are required to attend mandatory training events. These events take place at one of the company’s existing locations, and the employees travel to the location to take part in the training.”
- “Approval for all travel requests to a training event must be signed by the employee’s manager before the employee can register for the event.”

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Example of Procedural Rules

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Example of Procedural Rules

- How would you implement this with programming?
- When a student tries to sign up online for the trigonometry class, a piece of code would “check” to see if that student had taken algebra and geometry.



Example of Procedural Rules

- If the student had taken the subjects, can you think of an additional business rule that a school may want in this scenario?
 - Student achieved a passing grade