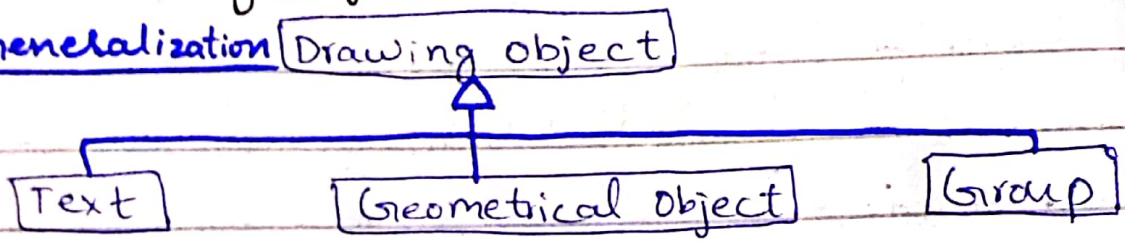
Q1) ——————— ?

- Files contains records.

[redacted] **Composition**

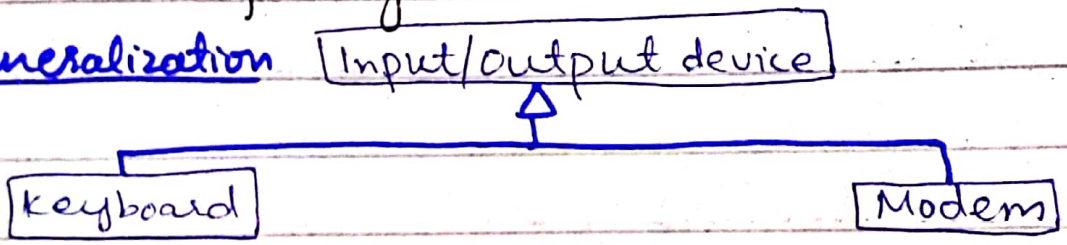
- A drawing object is text ——— ?

Generalization



- Modems & keyboards ——— ?

Generalization

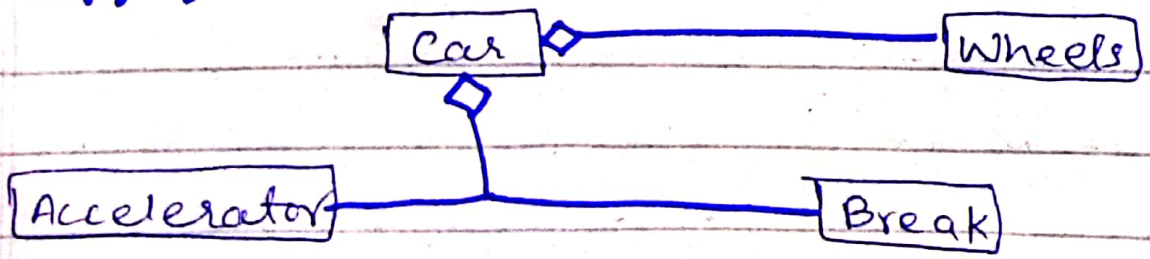


- Object classes may have several attributes.

[redacted] **Composition**

- Car has accelerator ——— ?

Aggegation



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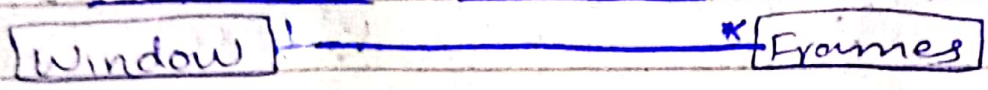
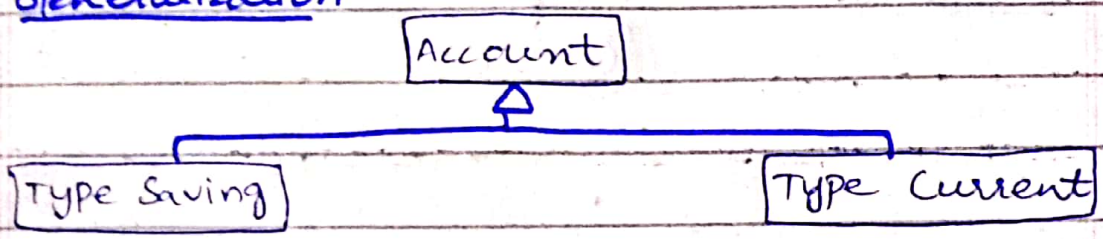
- Window is composed of ——?

Association



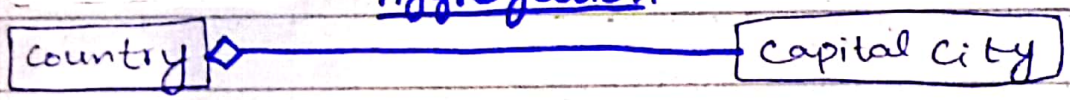
- An account is either type ——?

Generalization



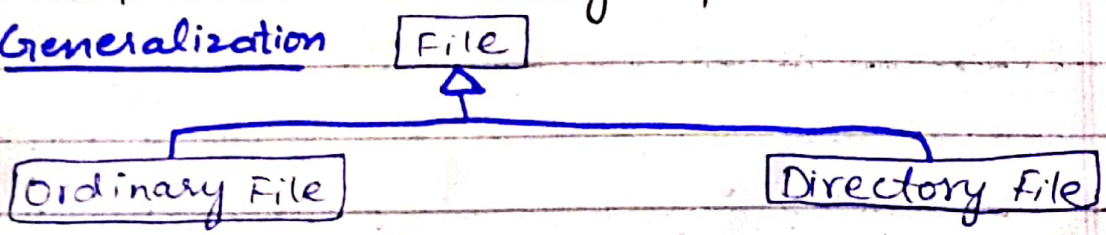
- A country has a capital city.

Aggregation

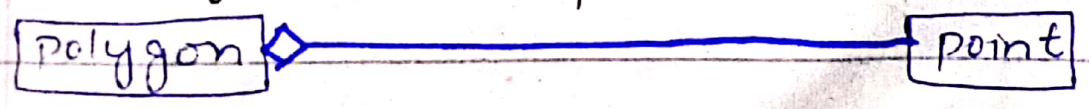


- A file is ordinary file or ——?

Generalization



- A polygon is composed ——?



Aggregation

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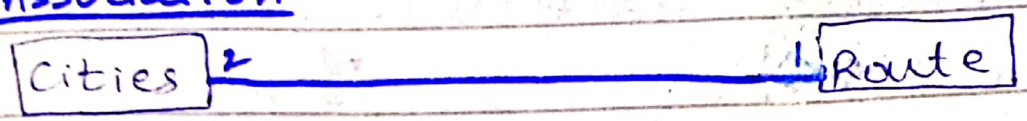
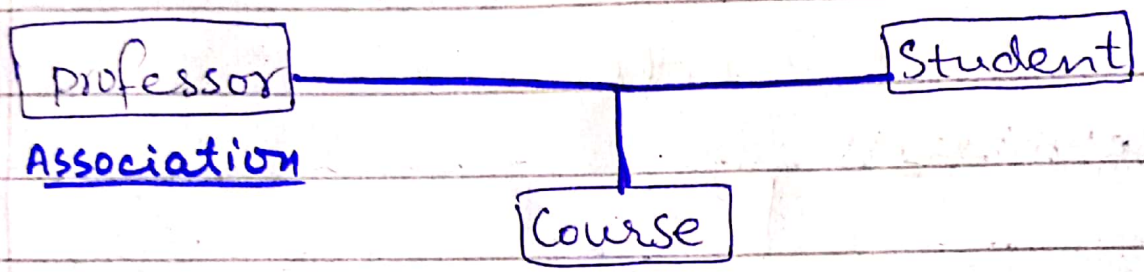
- A route connects two cities.

Association



- A student takes a course —?



Association

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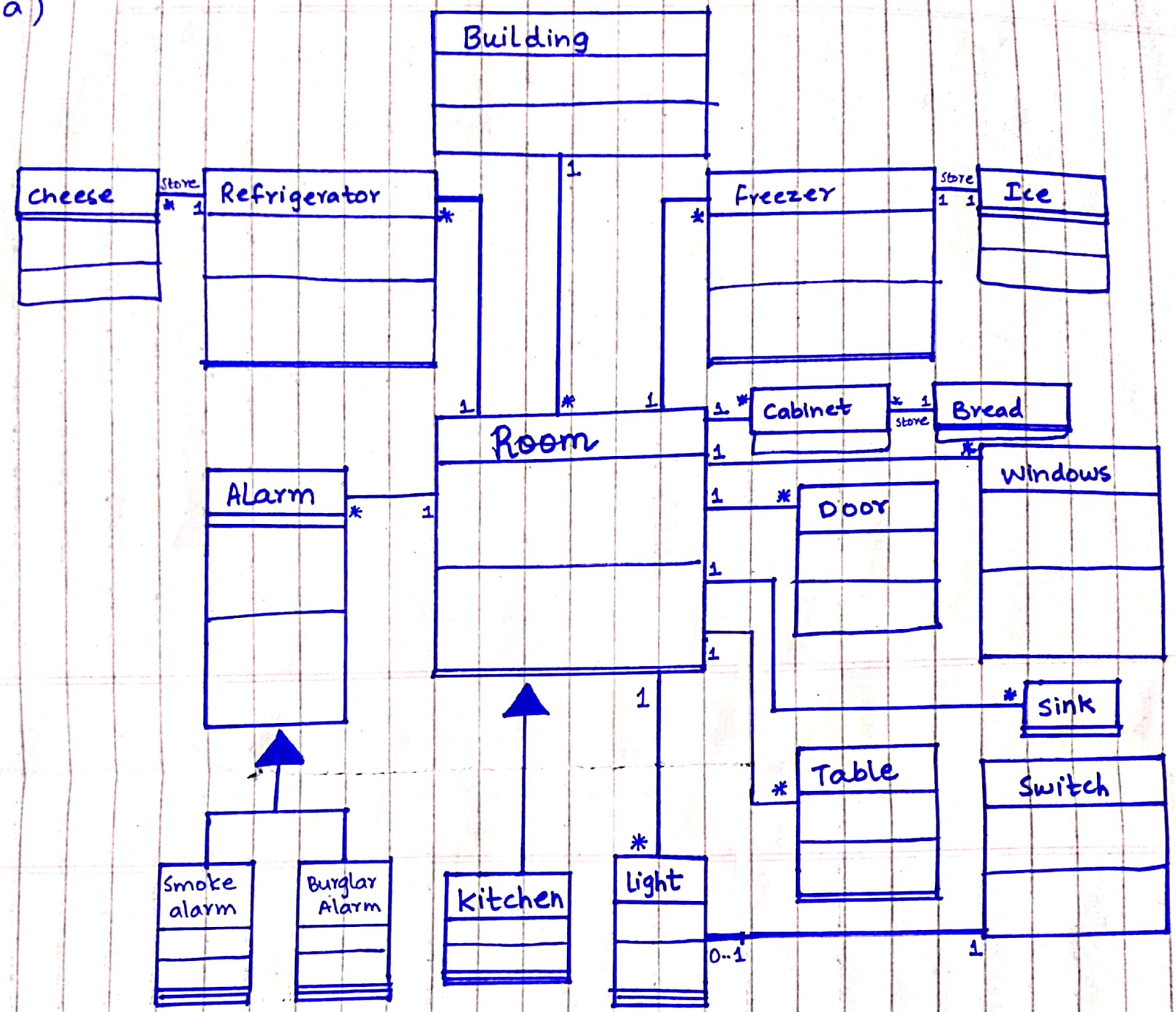
2(a)



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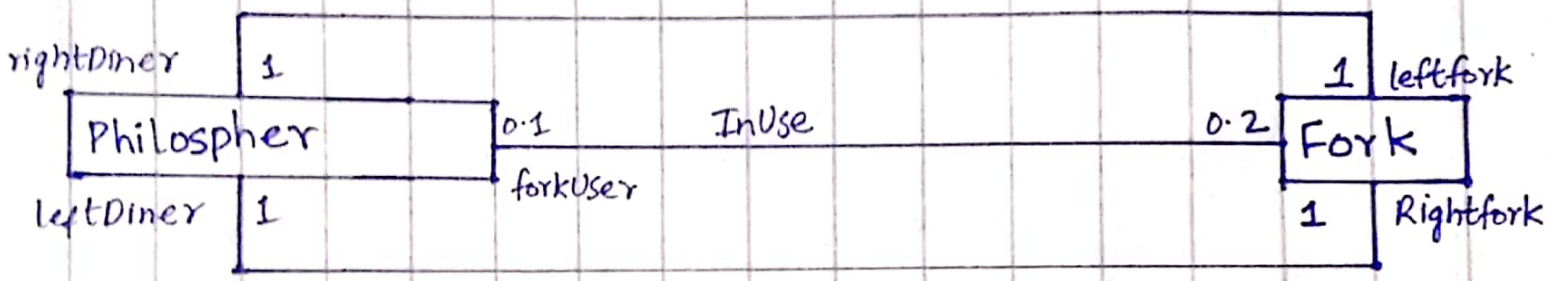
2(b)



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(02)(c) ——————?

A class diagram in UML is a type of Static structure diagram that describes the structure of a system by showing the system's classes, attributes, operations and the relationships among objects.

Relationship includes:-

Generalization

Association

Aggregation

Composition

Dependency.

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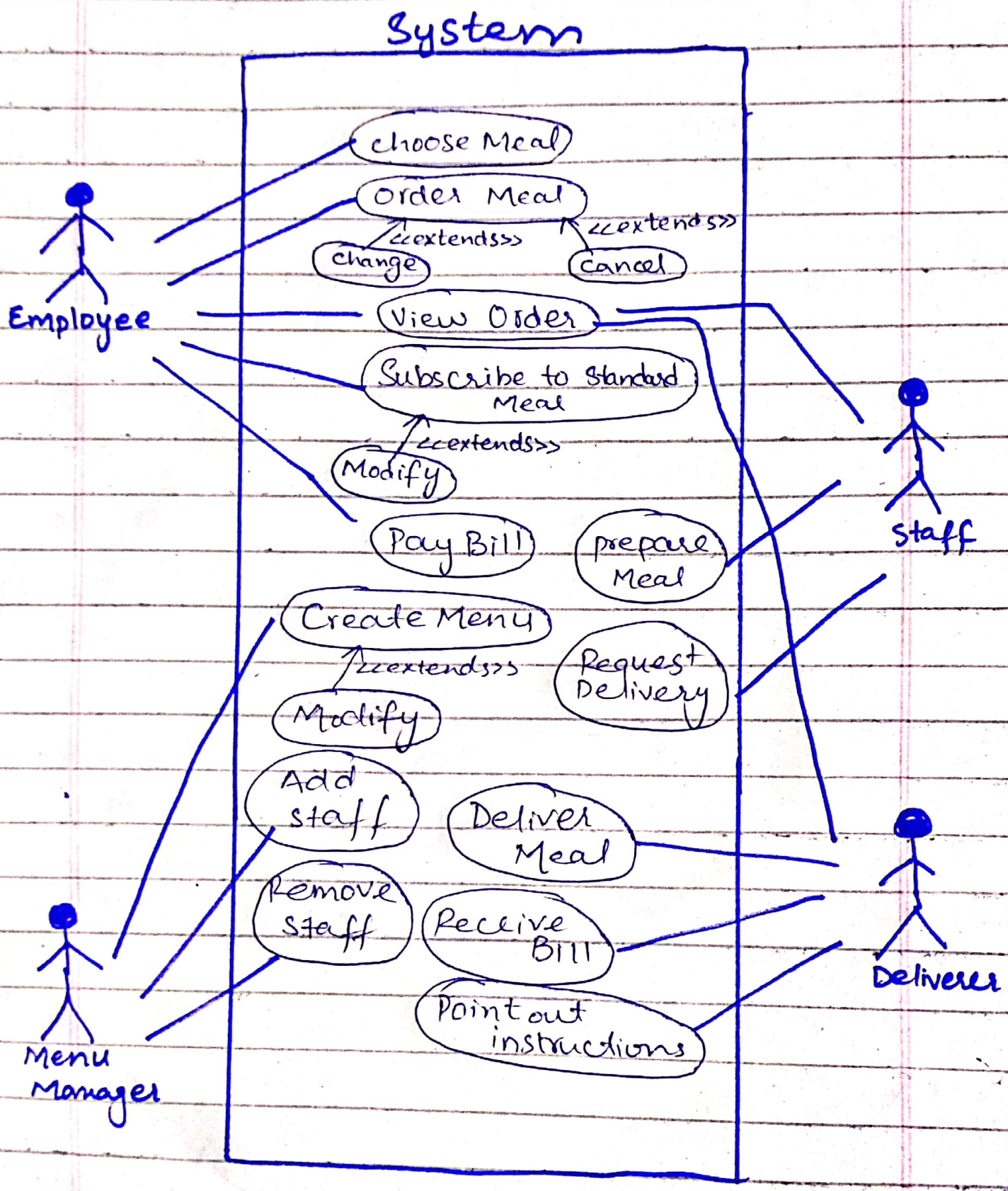
(Q3) Use Case Diagram



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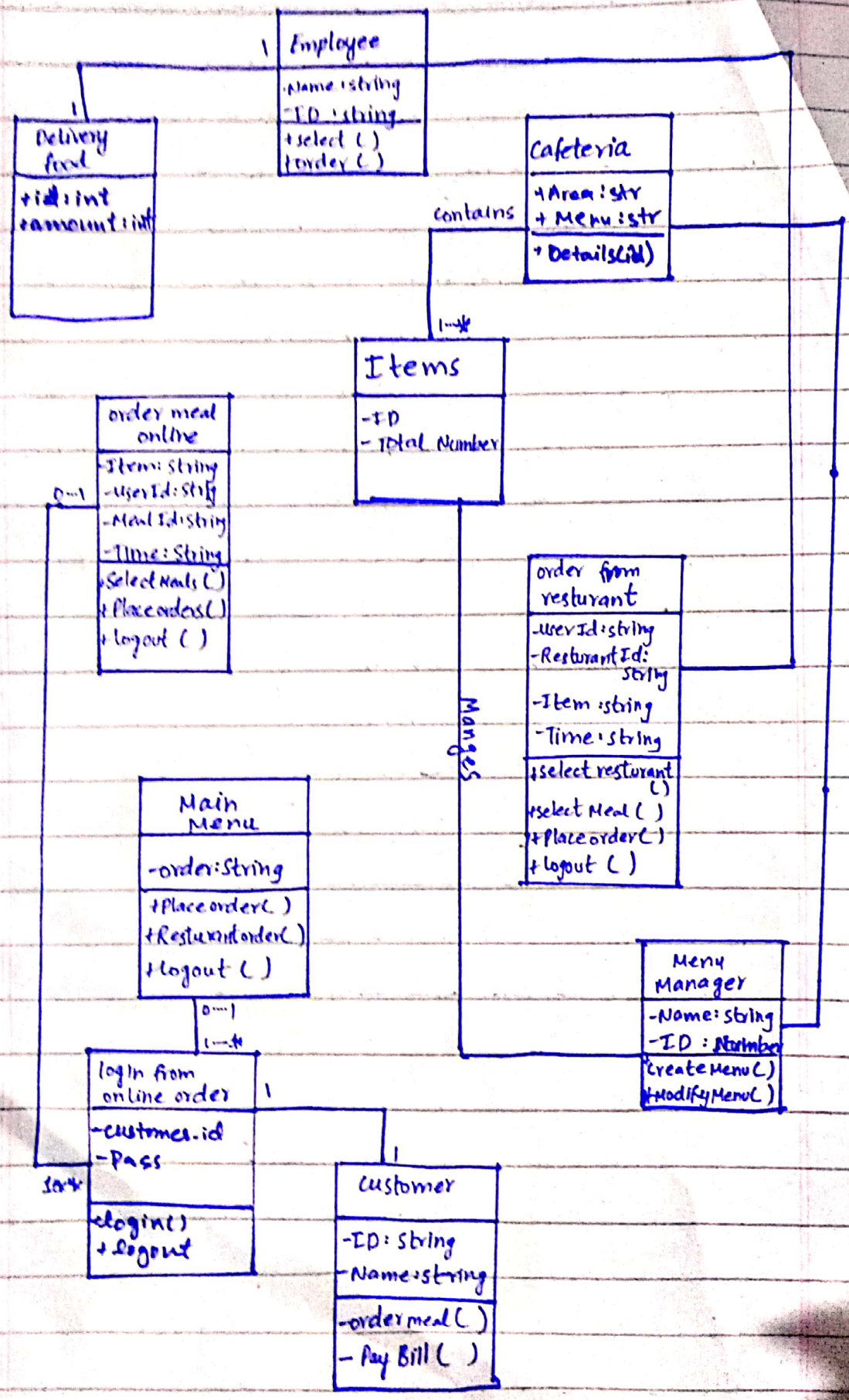
(Q3) Class Diagram



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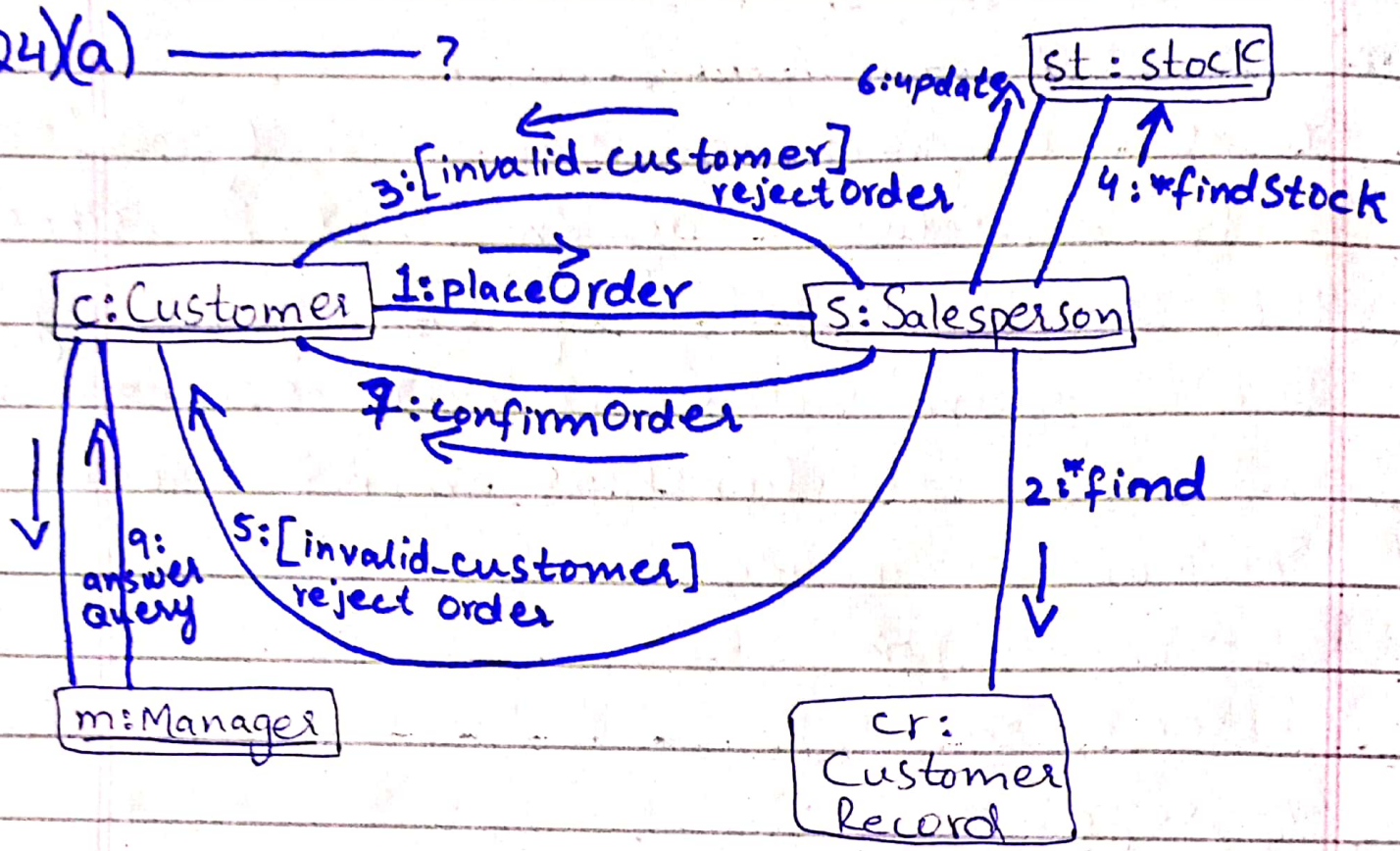
(Q4)(a) ——— ?



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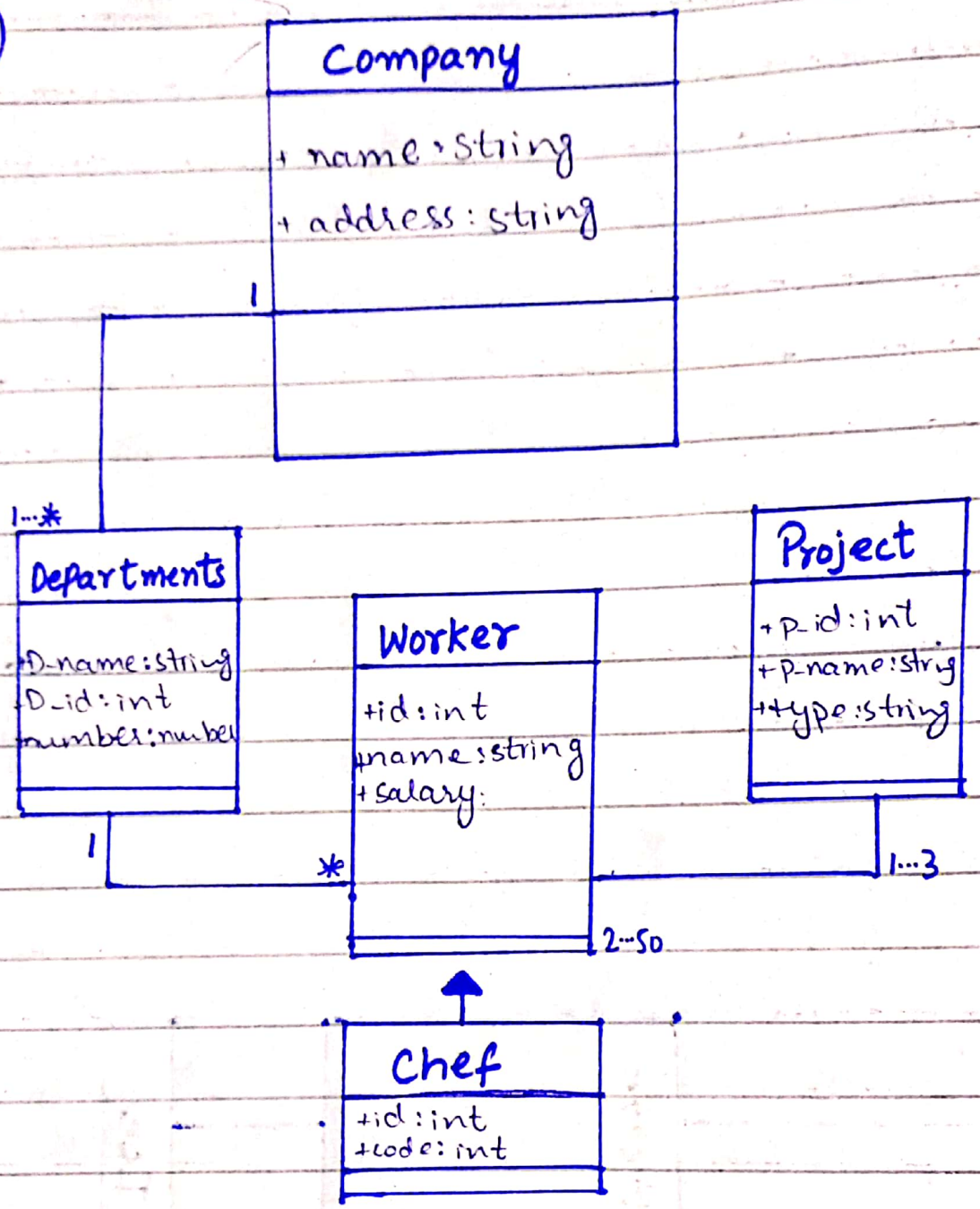
(Q4)(b)



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(Q5)(a)

Grasp Patterns

They describe fundamental principle of object design and responsibility assignment, expressed as patterns. With this point of view, assigning responsibilities to objects is a large part of basic object design.

Grasp pattern have notable benefits:

Grasp helps us in deciding which responsibity should be assigned to which object /class. Identify the objects and responsibilities from the problem domain, and also identify how objects interact with each other.

there are nine grasp patterns. Two of them are discussed below:-

- Creator
- Indirection
- low Coupling
- Information Expert
- Polymorphism.

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1) Information Expert:-

- Problem: What is a general Principle of assigning responsibities of object?
- Solution: Assign a responsibility to the information expert – the class that has the information necessary to fulfill the responsibilities.

- This is general principle and Probably the most used of any grasp pattern.
- This generally is key to loose coupling and high cohension, but not always so.

2) Polymorphism:-

With respect to implementation, this usually means the use of a super (parent) class or interface.

– coding to an interface is generally preferred and avoids committing to a particular class hierachy.

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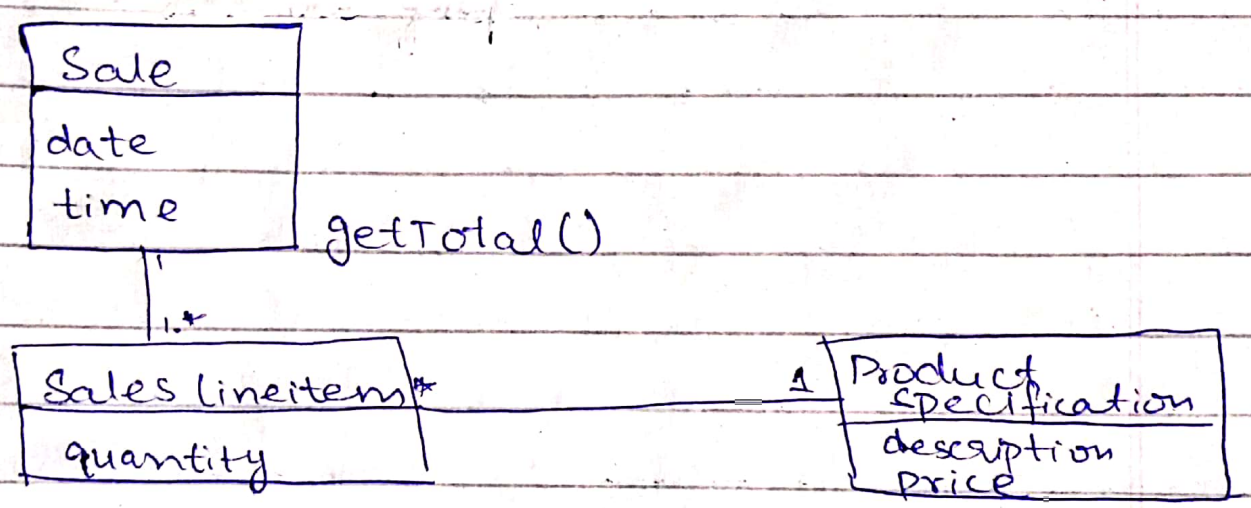
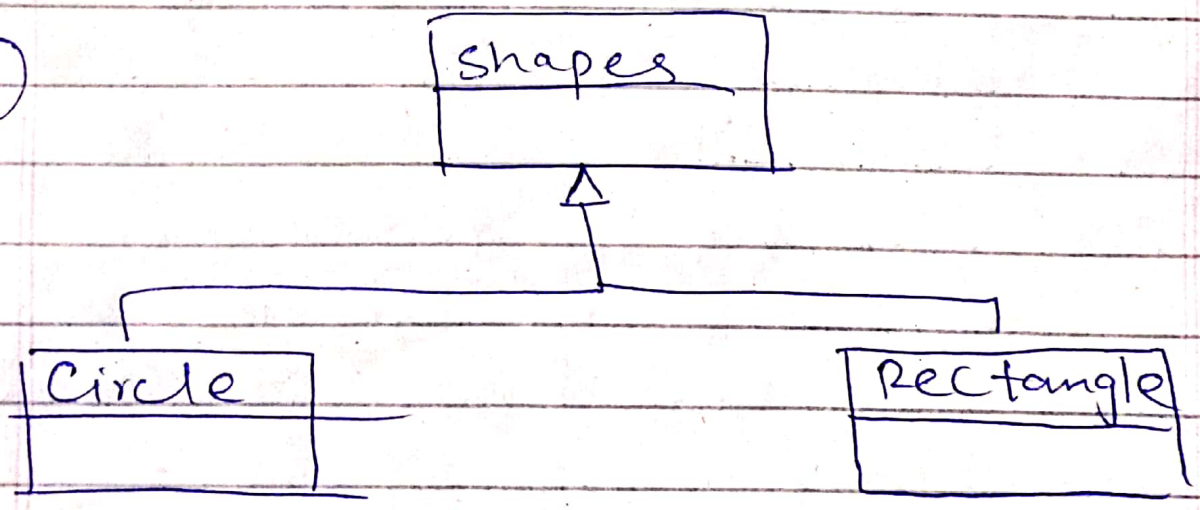
- Code like the following should be raise a red flag!

```
Switch creaturetype
    case batType : print "Screech!"
    case cowType : print "Moooooo!"
    Case humanType : print " let's watch TV!"
    [....]
```

1



2



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(Q5)(b) ——————?

(b) In Software design high cohesion means that class should do one thing & one thing very well. High cohesion is closely related to Single responsibility principle.

Low coupling suggest that class should have least possible dependencies. Also, dependencies that must exist should be weak dependencies.

High cohesion & low coupling give us better designed code that is easier to maintain.

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(Q5)(c) ——————?

(c) Steps of Preparing Domain class Model:

1. Prepare Problem statement for the system being developed.
2. Identify classes and objects.
3. Develop data Dictionary.
4. Identify association between classes.
5. Identify attributes of classes & association classes.
6. Structure objects using inheritance
7. Verify access paths for likely queries
8. Iterate & refine the model

Identifying right classes:-

To identify objects & classes, we first perfom textual analysis to extract all available noun and noun phrases from the given problem statement to identify the right classes.

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