Universidad de Oviedo

School of Computer Science

SOFTWARE ARCHITECTURE

Software Architecture

Lab. 03
UML diagrams
PlantUML

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UML

Unified Modeling Language

- Before UML there were several proposals
- UML notation unifies them
- Proposed by OMG (Object Management Group)
- Current version UML 2.5.1 (2017)
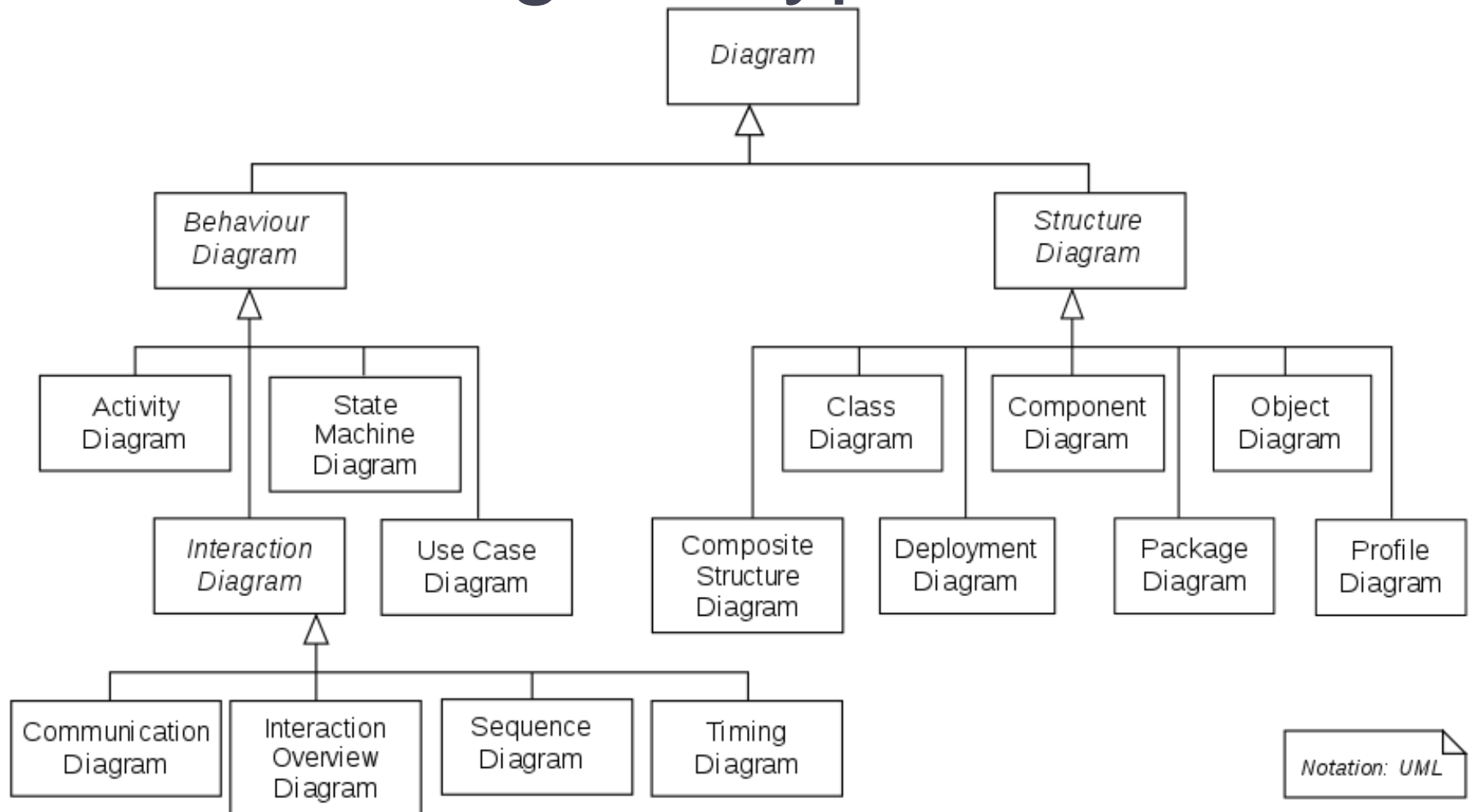
Model = abstraction of a problem

- It can have different diagrams
- Diagram = partial graphic representation of a model
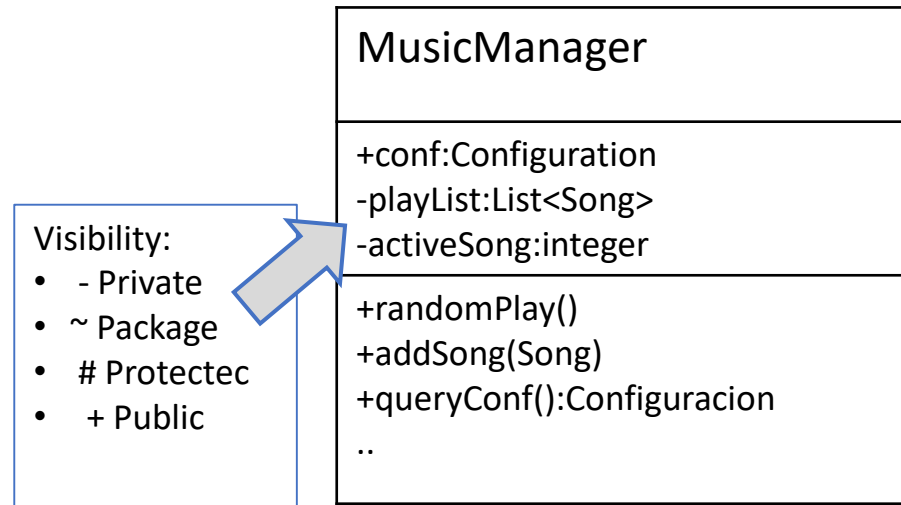
OCL = Object Constraint Language

- Constraints between objects using formal language

14 UML Diagram types

```
                              Diagram
                                 △
         ┌───────────────────────┴───────────────────────┐
    Behaviour                                        Structure
    Diagram                                          Diagram
        △                                                △
  ┌─────┴─────┐                    ┌──────────┬───────────┼──────────┬──────────┐
Activity   State                 Class    Component              Object
Diagram    Machine               Diagram  Diagram                Diagram
           Diagram
    │         │
Interaction  Use Case      Composite    Deployment    Package    Profile
Diagram      Diagram       Structure    Diagram       Diagram    Diagram
    △                      Diagram
┌───┬───┴───┬───┐
Communication  Interaction  Sequence  Timing
Diagram        Overview     Diagram   Diagram
               Diagram
```
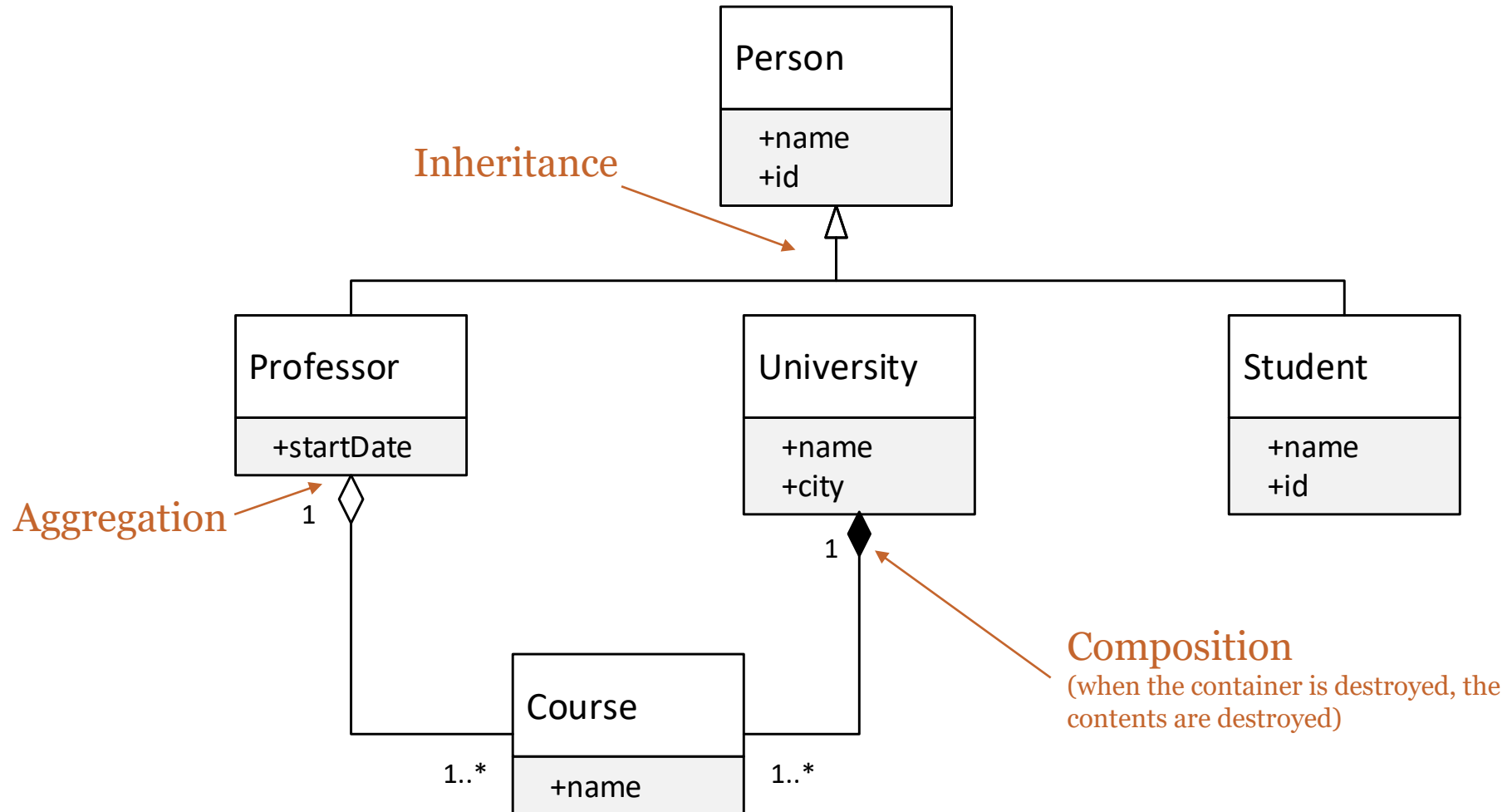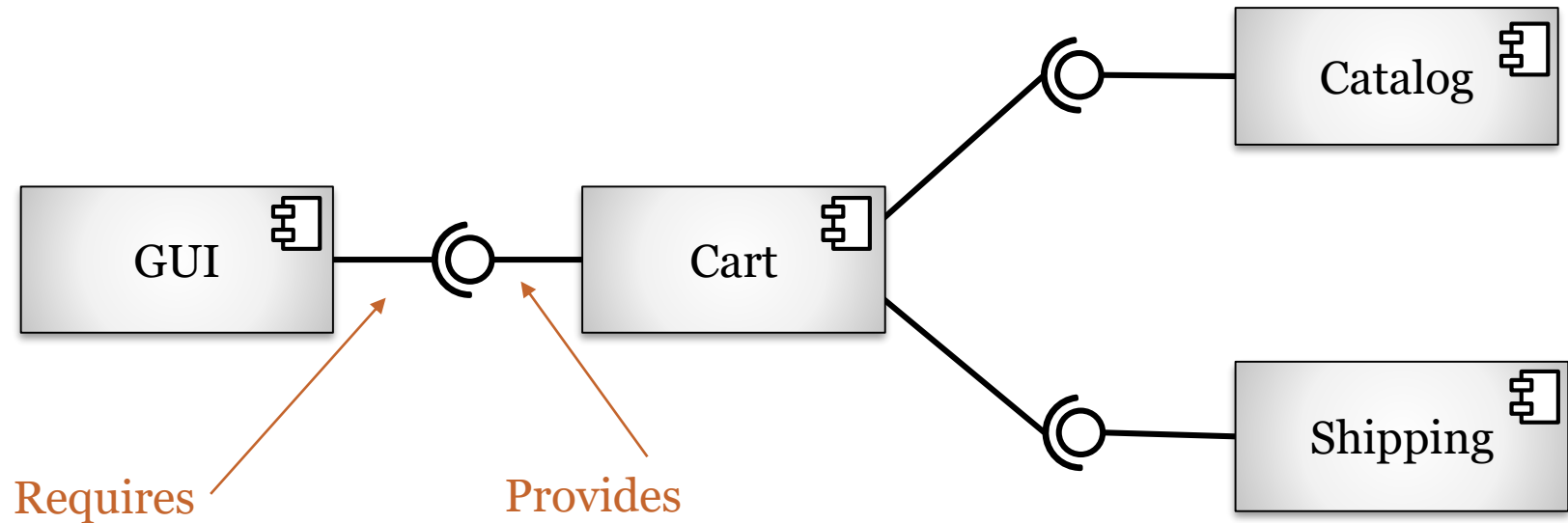
Notation: UML

Class diagrams

- Models the statis part of the project, without taking into account the time aspect
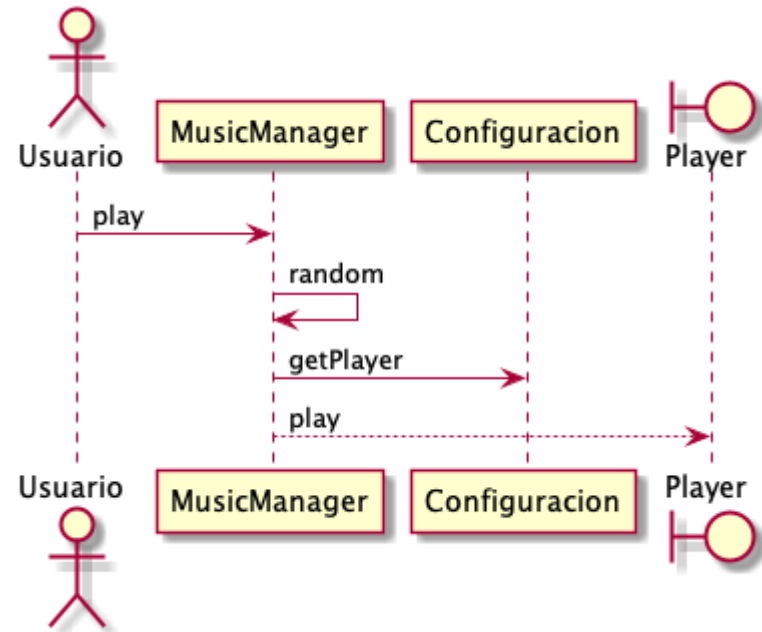- Explains the relationships between the different classes.
- Arc42:8-Concepts

Visibility:
- - Private
- ~ Package
- # Protectec
- + Public

MusicManager
+conf:Configuration -playList:List<Song> -activeSong:integer
+randomPlay() +addSong(Song) +queryConf():Configuracion ..

Example

UML Component diagram

Catalog

GUI

Cart

Shipping

Requires

Provides

Sequence diagram

Models communication between some objects at a given time

Objects can send two types of messages: synchronous or asynchronous
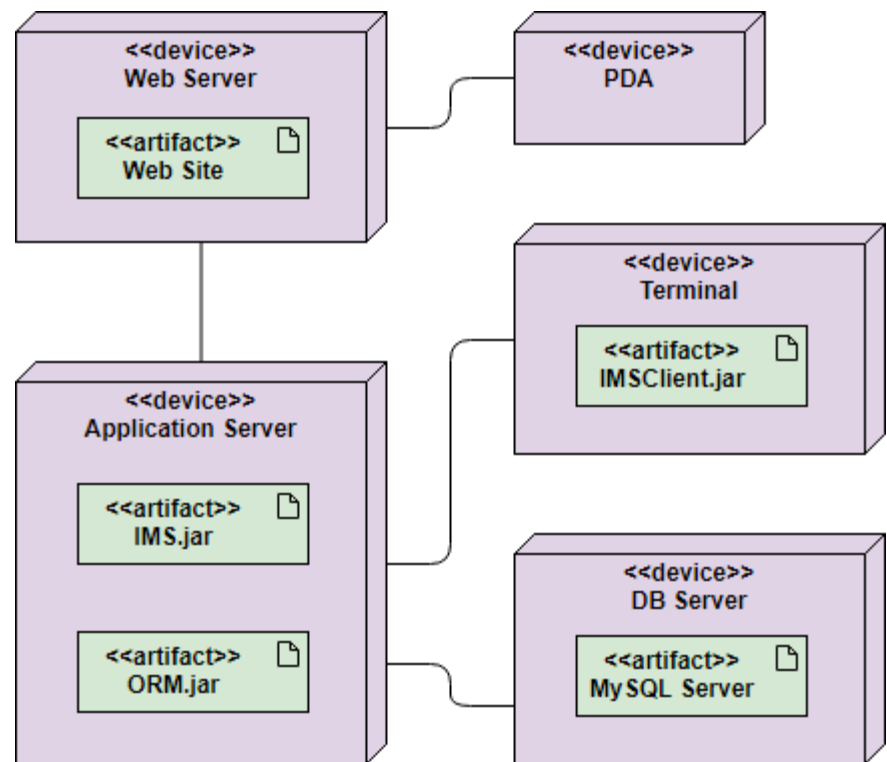
Arc42:6-RuntimeView

Deployment diagrams

Represents the final location of
 the components in an app

Elements:

 Nodes , Components,
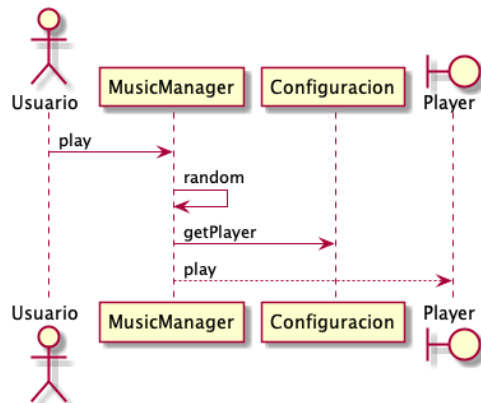 relationships

Arc42: 07.DeploymentView

Fuente:VisualParadigm

Text-based tools

PlantUML

```
@startuml component
actor Usuario
participant MusicManager
participant Configuration
boundary Player
Usuario -> MusicManager: play
MusicManager -> MusicManager: random
MusicManager -> Configuration : getPlayer
MusicManager --> Player : play
@enduml
```
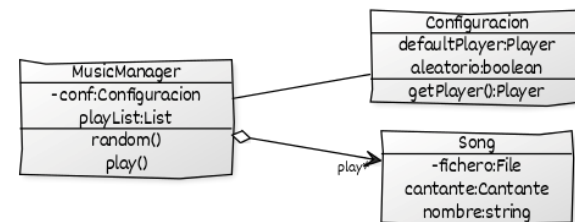

YUML

```
// Cool Class Diagram
[MusicManager|-conf:Configuracion;
playList:List |random();play()]
[MusicManager]<>-play*>[Song|-
fichero:File;cantante:Cantante;nombre
:string]
[MusicManager]-
[Configuracion|defaultPlayer:Player;a
leatorio:boolean|getPlayer():Player]
]
```
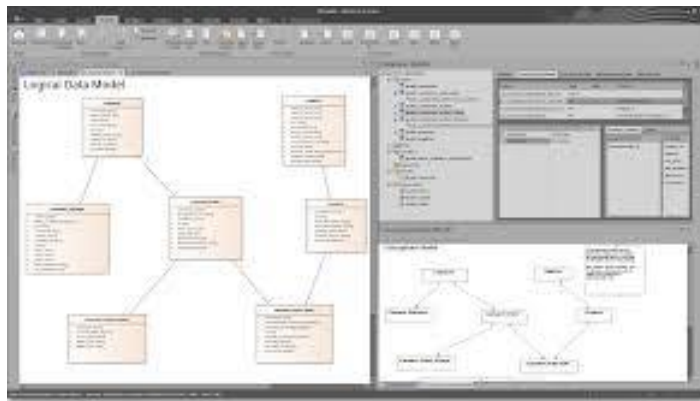
Drawing tools

Powerpoint

MsVisio

UMLet (https://www.umlet.com/)

CASE tools

EnterpriseArchitect

- Reverse Enginering with Java/C++
- Oracle connection for relational databases
- Word, HTML templates

MagicDraw

- ▫ Java based
- ▫ UML diagrams
- ▫ Reverse Engineering Java , C++

Visual Paradigm

- ▫ Commercial (student license)

Modelio

- ▫ Open source
- ▫ Java based
- ▫ Reverse Engineering Java , C++

Diagramming the architecture

Video:

https://www.youtube.com/watch?v=wgpSdpny-0c

Checklist:

https://c4model.com/assets/software-architecture-diagram-review-checklist.pdf

End of presentation