TMS

TASK MANAGEMENT SYSTEM

COMP2021
Object-Oriented Programming
(Fall 2023)

TMS

AGENDA

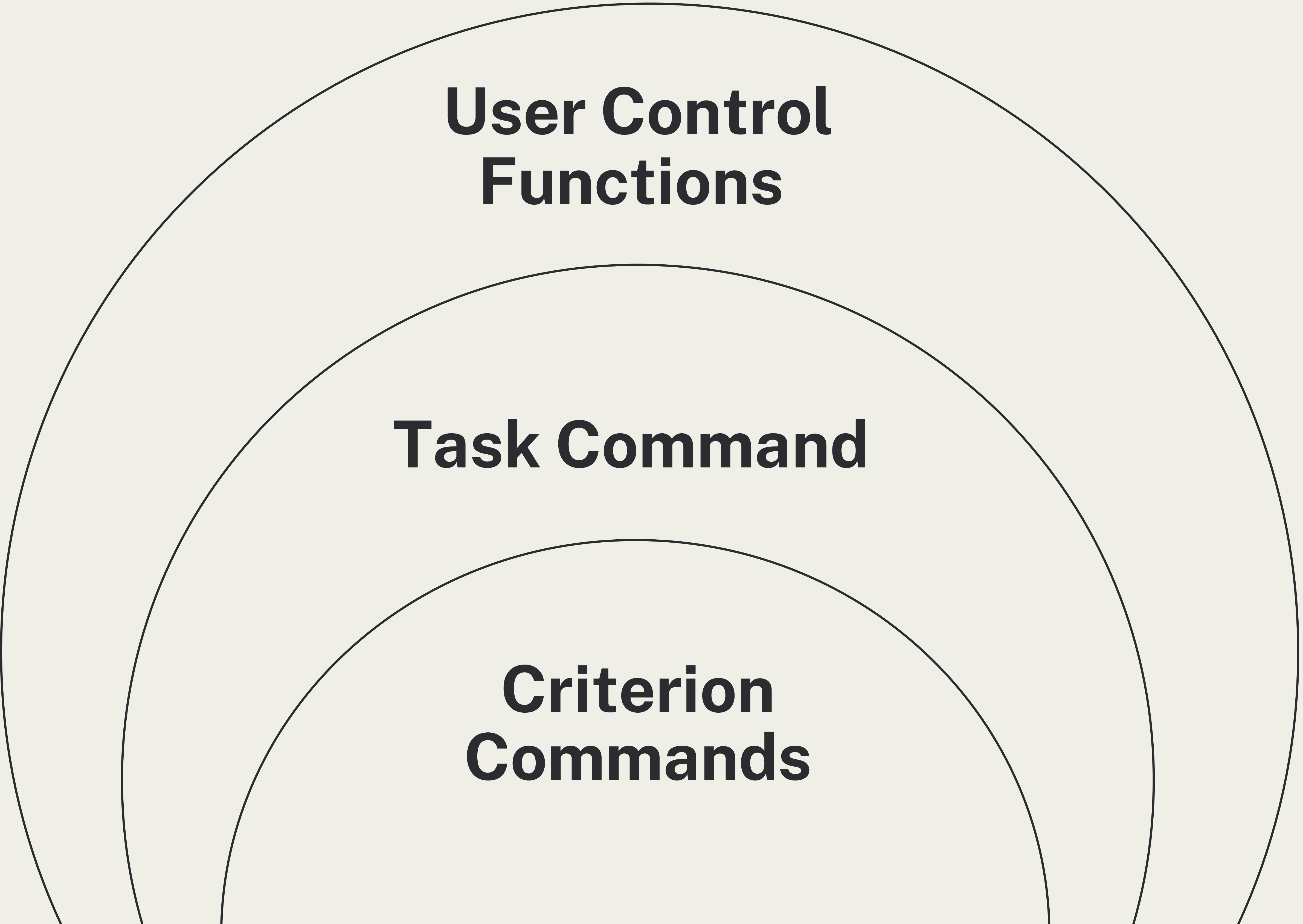
- Task Management System Overview
- Code Architechure
- Object Oriented Programming
- Encapsulation, Polymorphism, Abstraction and Inheritance
- Fault Detection
- Help System

TMS FUNCTIONALITY

- Task Creation
- Display Existing Task
- Task Filtering
- Task Property Manipulation
- Loading and Saving Task
- Delete Task

TMS

CMD



User Control Functions

- Saving existing tasks and criteria
- Loading tasks and criteria
- Shut Down TMS
- Help Menu

Task Command

- Primitive and Composite Task Creation
- Printing Task
- Changing Task Property
- Delete Existing Tasks
- Reporting task Duration

Criterion Commands

- Basic and Composite Selection Criteria Creation
- Printing Selection Criteria
- Filtering and Retrieving task using Selection Criteria

COMMAND SYNTAX

8

Task CMD

- *CreatePrimitiveTask*
- *CreateCompositeTask*
- *DeleteTask*
- *ChangeTask*
- *PrintTask*
- *PrintAllTasks*
- *ReportDuration*
- *ReportEarliestFinishTime*

4

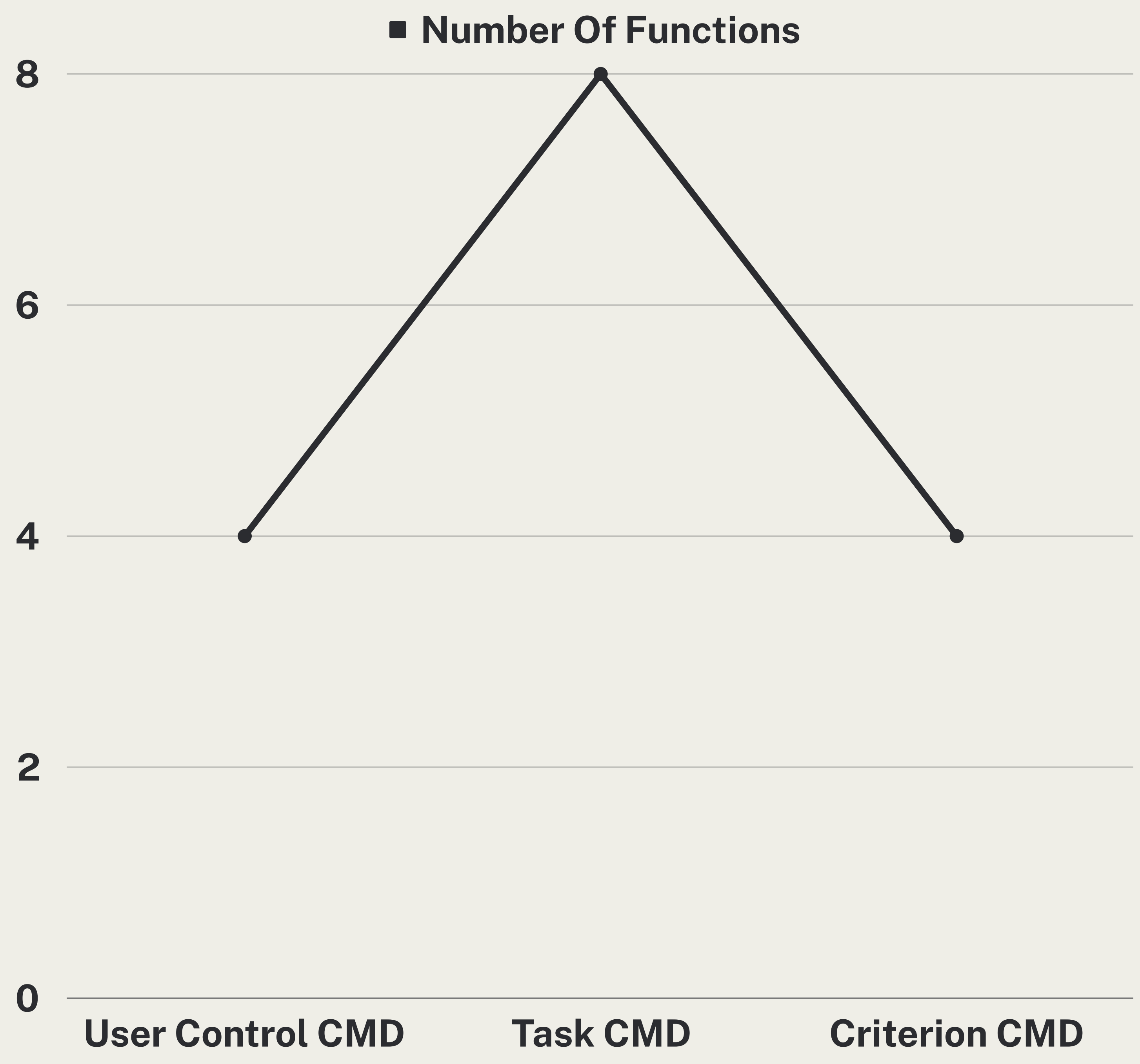
User Control Functions

- Search
- Store
- Load
- Quit

4

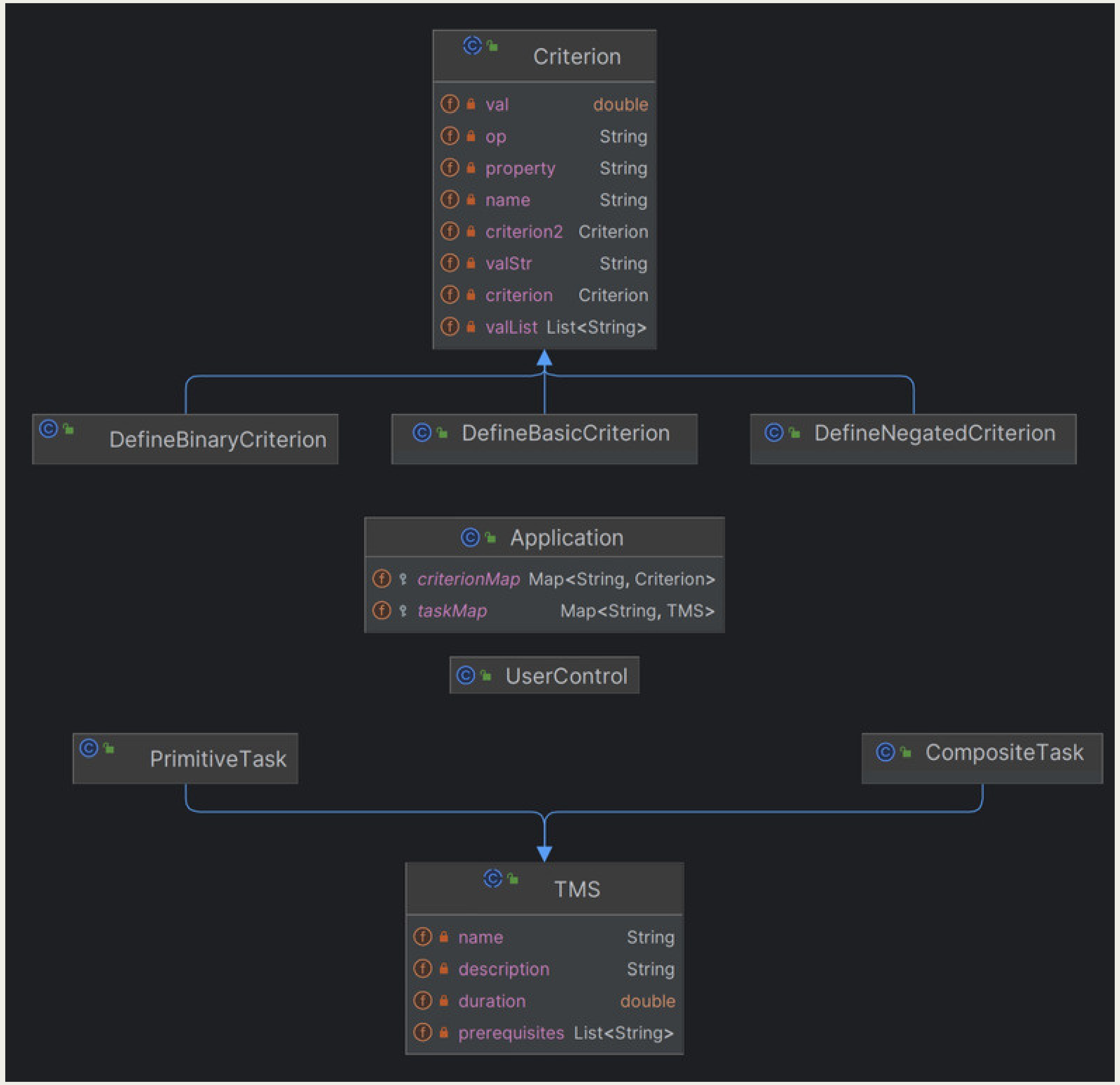
Criterion CMD

- DefineBasicCriterion
- DefineNegatedCriterion
- DefineBinaryCriterion
- PrintAllCriteria



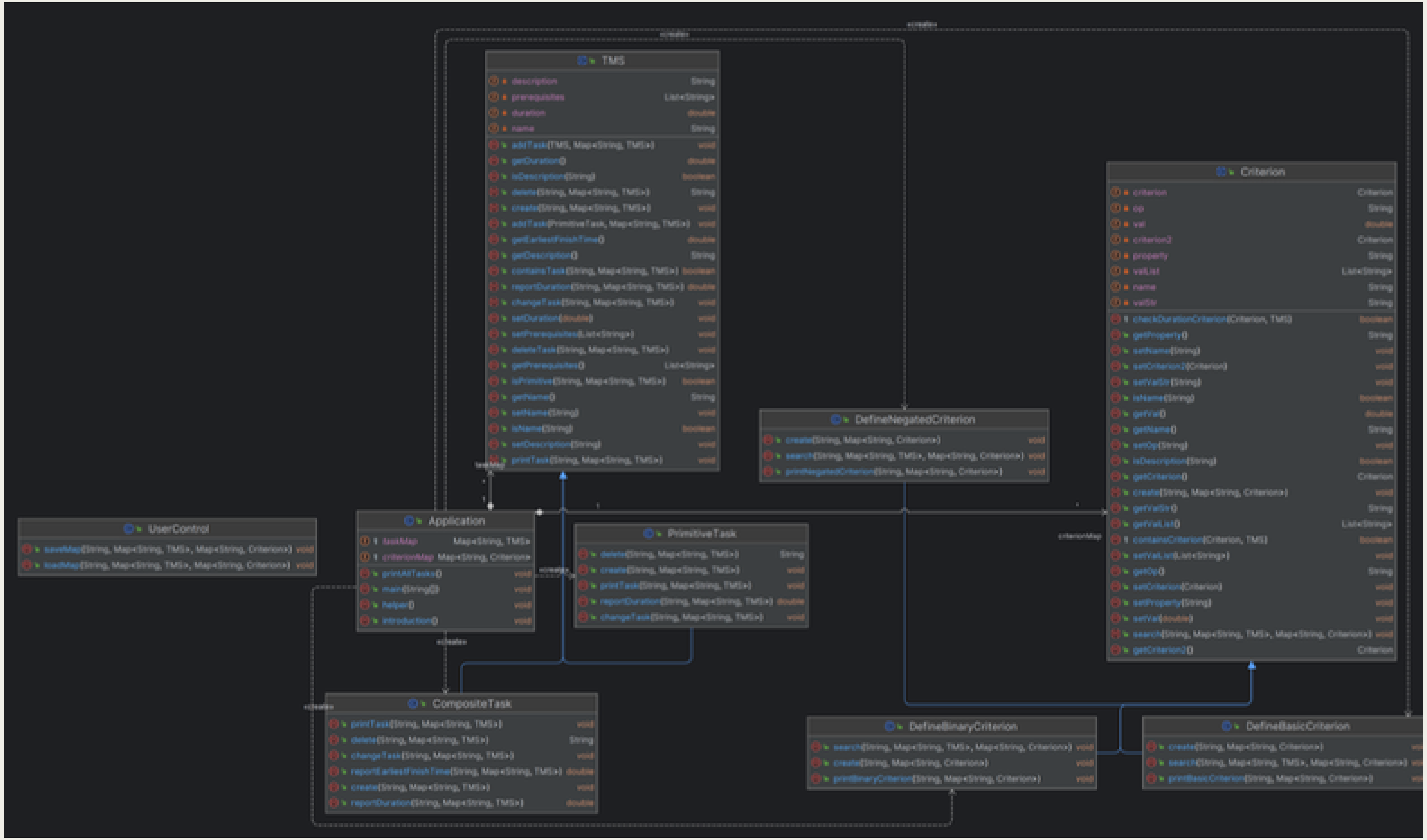
CODE ARCHITECTURE

Task Management Application, Java Architechure (Simplified Version)



CODE ARCHITECTURE

Task Management Application, Java Architechure (Full Version)


«create»
«create»
TMS
description String
prerequisites List<String>
duration double
name String
addTask(TMS, Map<String, TMS>) void
getDuration() double
isDescription(String) boolean
delete(String, Map<String, TMS>) String
create(String, Map<String, TMS>) void
addTask(PrimitiveTask, Map<String, TMS>) void
getEarliestFinishTime() double
getDescription() String
containsTask(String, Map<String, TMS>) boolean
reportDuration(String, Map<String, TMS>) double
changeTask(String, Map<String, TMS>) void
setDuration(double) void
setPrerequisites(List<String>) void
deleteTask(String, Map<String, TMS>) void
getPrerequisites() List<String>
isPrimitive(String, Map<String, TMS>) boolean
getName() String
setName(String) void
isName(String) boolean
setDescription(String) void
printTask(String, Map<String, TMS>) void
taskMap
Criterion
criterion Criterion
op String
val double
criterion2 Criterion
property String
valList List<String>
name String
valStr String
checkDurationCriterion(Criterion, TMS) boolean
getProperty() String
setName(String) void
setCriterion2(Criterion) void
setValStr(String) void
isName(String) boolean
getVal() double
getName() String
setOp(String) void
isDescription(String) boolean
getCriterion() Criterion
create(String, Map<String, Criterion>) void
getValStr() String
getValList() List<String>
containsCriterion(Criterion, TMS) boolean
setValList(List<String>) void
getOp() String
setCriterion(Criterion) void
setProperty(String) void
setVal(double) void
search(String, Map<String, TMS>, Map<String, Criterion>) void
getCriterion2() Criterion
criterionMap
DefineNegatedCriterion
create(String, Map<String, Criterion>) void
search(String, Map<String, TMS>, Map<String, Criterion>) void
printNegatedCriterion(String, Map<String, Criterion>) void
UserControl
saveMap(String, Map<String, TMS>, Map<String, Criterion>) void
loadMap(String, Map<String, TMS>, Map<String, Criterion>) void
Application
taskMap Map<String, TMS>
criterionMap Map<String, Criterion>
printAllTasks() void
main(String[]) void
helper() void
introduction() void
«create»
PrimitiveTask
delete(String, Map<String, TMS>) String
create(String, Map<String, TMS>) void
printTask(String, Map<String, TMS>) void
reportDuration(String, Map<String, TMS>) double
changeTask(String, Map<String, TMS>) void
«create»
«create»
CompositeTask
printTask(String, Map<String, TMS>) void
delete(String, Map<String, TMS>) String
changeTask(String, Map<String, TMS>) void
reportEarliestFinishTime(String, Map<String, TMS>) double
create(String, Map<String, TMS>) void
reportDuration(String, Map<String, TMS>) double
DefineBinaryCriterion
search(String, Map<String, TMS>, Map<String, Criterion>) void
create(String, Map<String, Criterion>) void
printBinaryCriterion(String, Map<String, Criterion>) void
DefineBasicCriterion
create(String, Map<String, Criterion>)
search(String, Map<String, TMS>, Map<String, Criterion>)
printBasicCriterion(String, Map<String, Criterion>)

WHAT IS OOP?

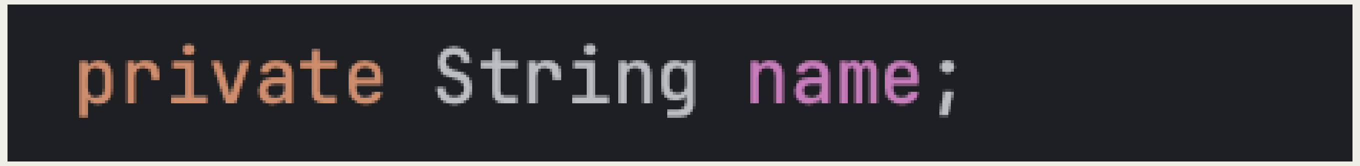
- Object-oriented programming (OOP)
- Programming paradigm that organizes code into objects, which are instances of classes.
    - Classes - Templates that define structure & behaviour of objects.
    - Objects - Instances of Classes.
- The 4 core : Encapsulation, Polymorphism, Abstraction, Inheritence

ENCAPSULATION

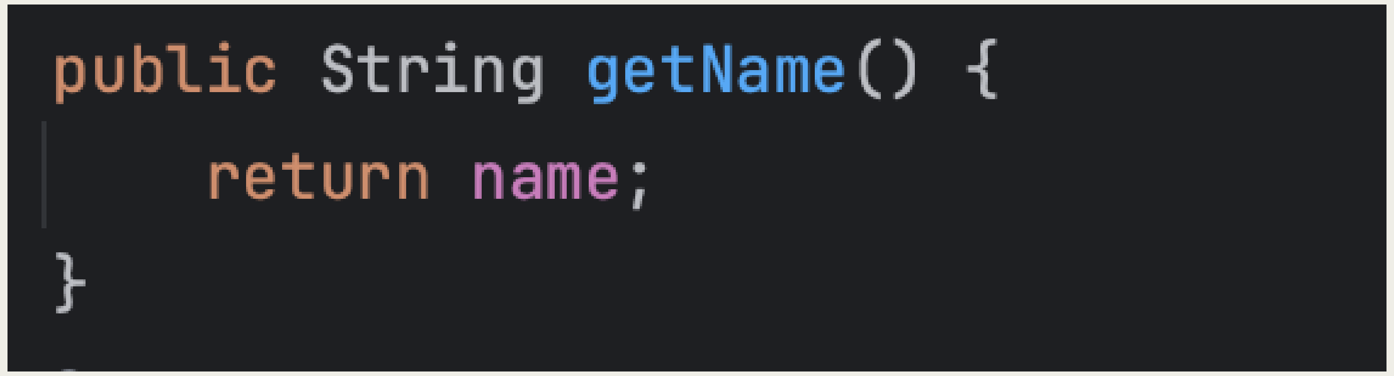
- One of the fundamental concepts of object orientated programming.

- This technique is used to hide an object’s internal representation or state from the outside.

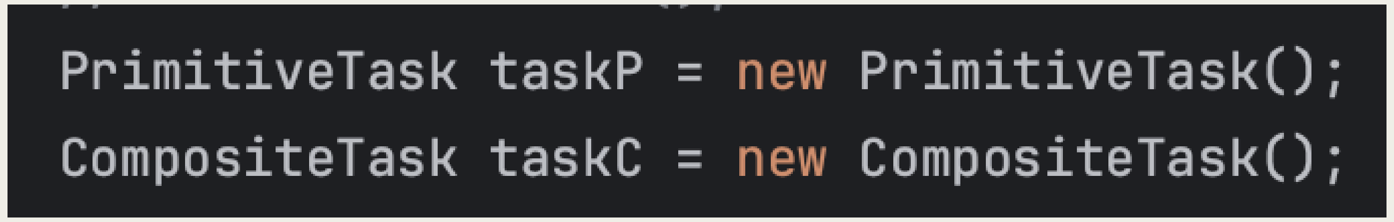
- Information hiding.



```
private String name;
```



```
public String getName() {
    return name;
}
```



```
PrimitiveTask taskP = new PrimitiveTask();
CompositeTask taskC = new CompositeTask();
```

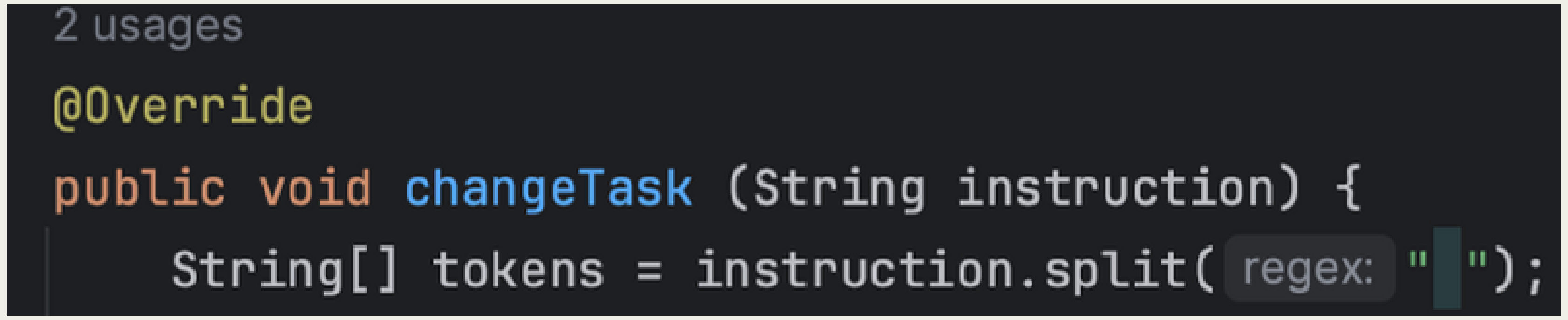
POLYMORPHISM

- Polymorphism refer the the idea around multiple forms.

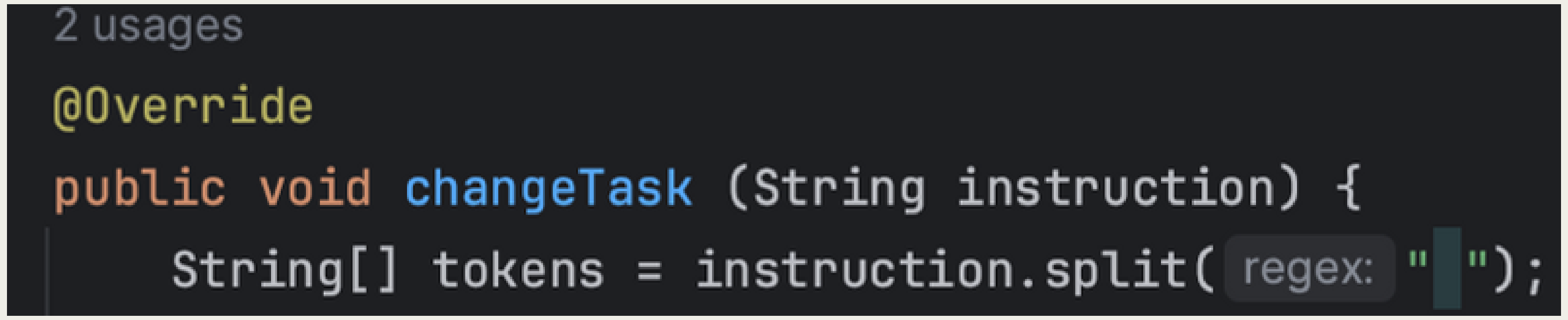
- The ability of different classes to be treated as objects of a common base class.

- It allows objects of various classes to be used interchangeably based on their shared interface or base class.

- The concept of polymorphism allows classes to be overriden



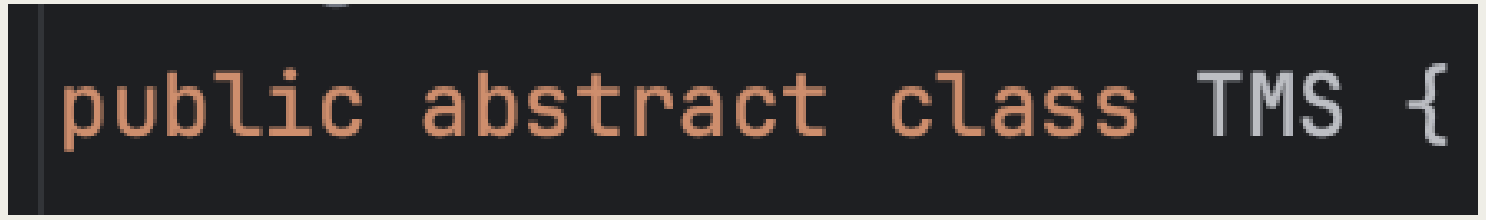
```
2 usages
@Override
public void changeTask (String instruction) {
    String[] tokens = instruction.split( regex: " ");
```



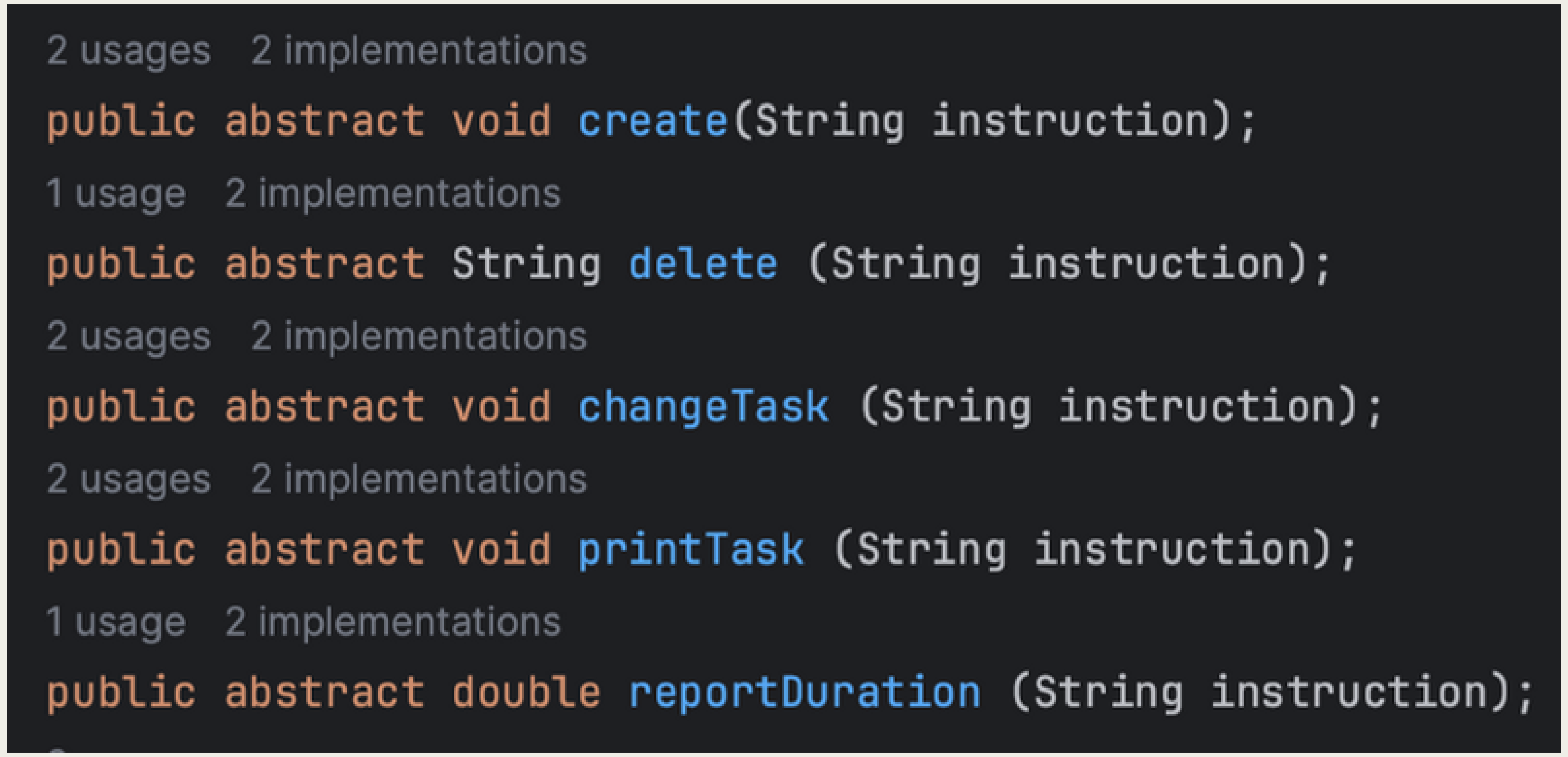
```
2 usages
@Override
public void changeTask (String instruction) {
    String[] tokens = instruction.split( regex: " ");
```

ABSTRACTION

- Simplifies complex systems
- Focuses on essential properties and behaviors.
- Class cannot be instantiated.
- Simplifies design and maintenance.
- Promotes modular and reusable code.



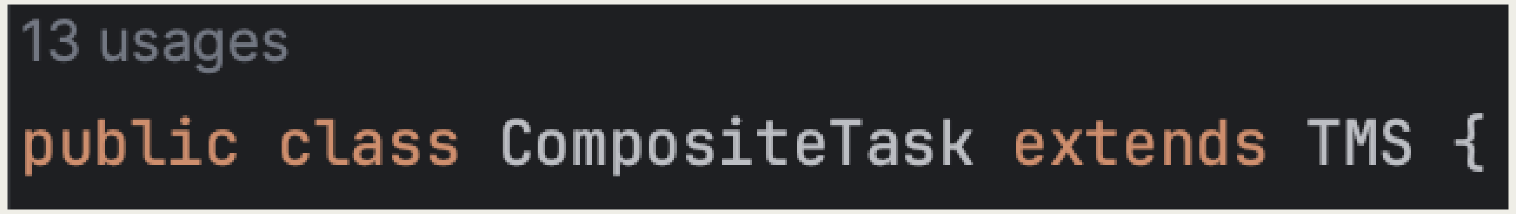
```
public abstract class TMS {
```



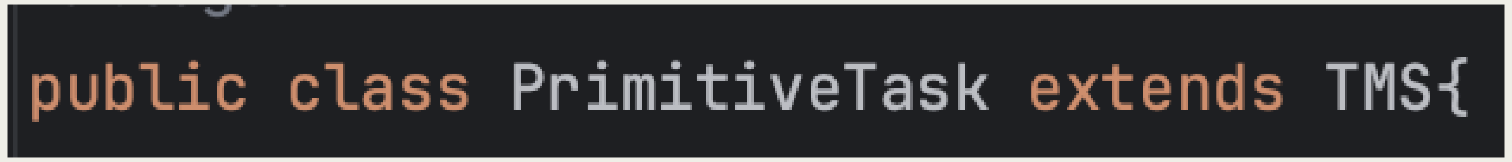
```
2 usages   2 implementations
public abstract void create(String instruction);
1 usage   2 implementations
public abstract String delete (String instruction);
2 usages   2 implementations
public abstract void changeTask (String instruction);
2 usages   2 implementations
public abstract void printTask (String instruction);
1 usage   2 implementations
public abstract double reportDuration (String instruction);
```

INHERITENCE

- Inheritance promotes code reuse by allowing the subclass to use the features (methods and attributes) of the superclass.



```
13 usages
public class CompositeTask extends TMS {
```



```
public class PrimitiveTask extends TMS{
```

COMMAND FAULT DETECTION

Create Task

- Invalid CreateSimpleTask command format.
- Invalid CreateCompositeTask command format.
- Invalid task name.
- Invalid duration format. Please enter a valid numeric value for duration.
- Task with the same name already exists: [task_name]
- Failed to Create Composite Task. Subtask not found: [subtask_name]

Delete Task

- Task not found: [task_name]
- Cannot delete: Subtask [subtask_name] is a prerequisite for another task

COMMAND FAULT DETECTION

Change Task Property

- Task not found: [task_name]
- Invalid property for a primitive task

Print Task

- Invalid input format for PrintTask. Command : “PrintTask TaskName”
- No tasks available.
- taskName + " Not Found"
- There are no criteria defined.

Time Reporting

- The specified task does not exist in the system
- Invalid Command Passed.

COMMAND FAULT DETECTION

Create Criteria

- Invalid DefineBasicCriterion command format.
- Invalid DefineBinaryCriterion command format.
- Invalid DefineNegatedCriterion command format.
- Task with the same name already exists: [task_name]
- Invalid CreateSimpleTask name format.
- Invalid duration op: [Operator]
- Invalid duration value: [Value]
- Key [name2] not found in criterionMap

Search Criteria

- Invalid search command format.
- Criterion with the given name does not exist: [name]
- No tasks match the given criterion.

TMS

COMMAND FAULT DETECTION

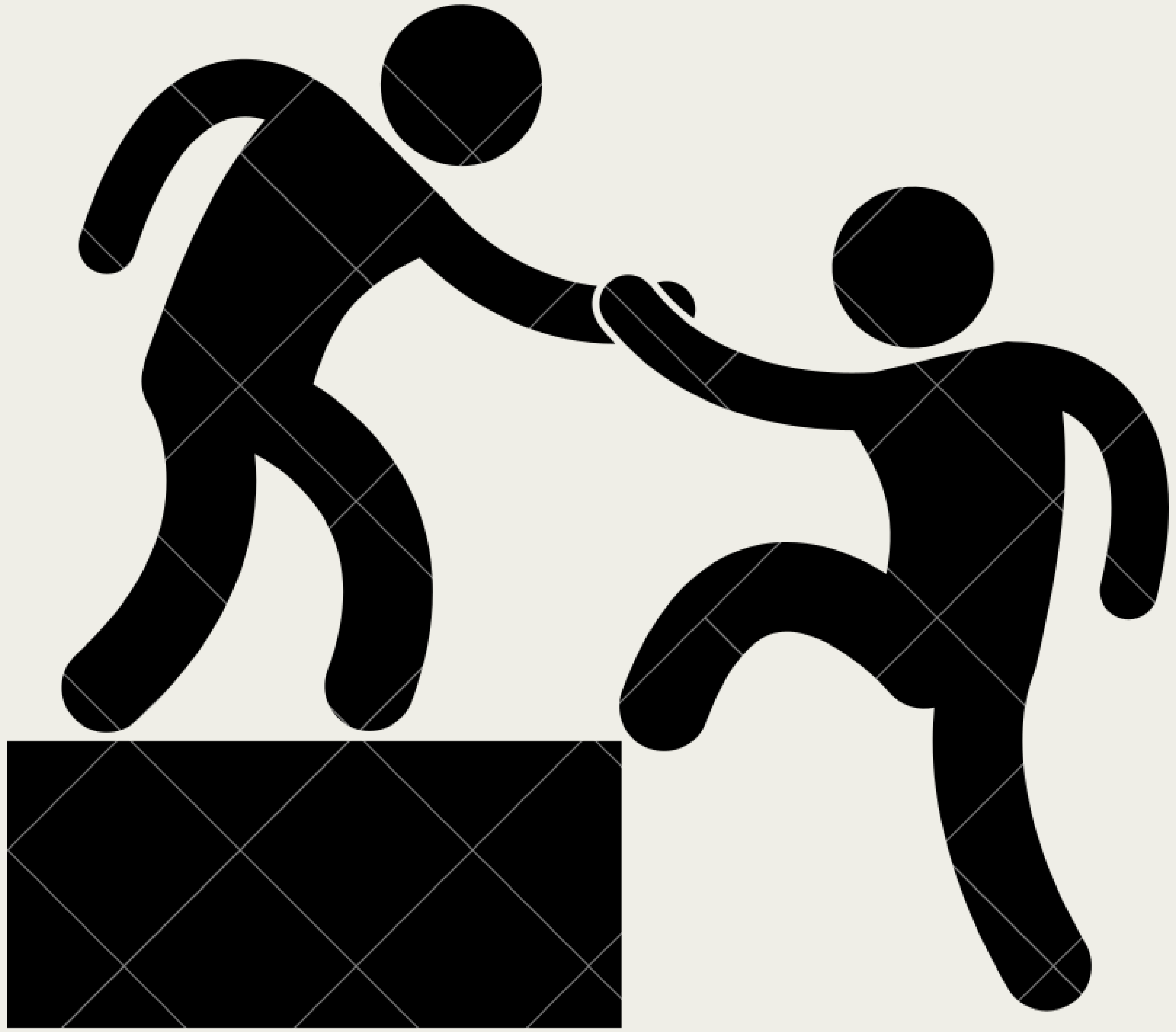
Saving To File

- The file path was not found. Try again
- There is an implementation error.
- Invalid format for Store function

Loading To TMS

- Specified directory is not found or cannot be accessed.
- Invalid Syntax for Load

NEED HELP?

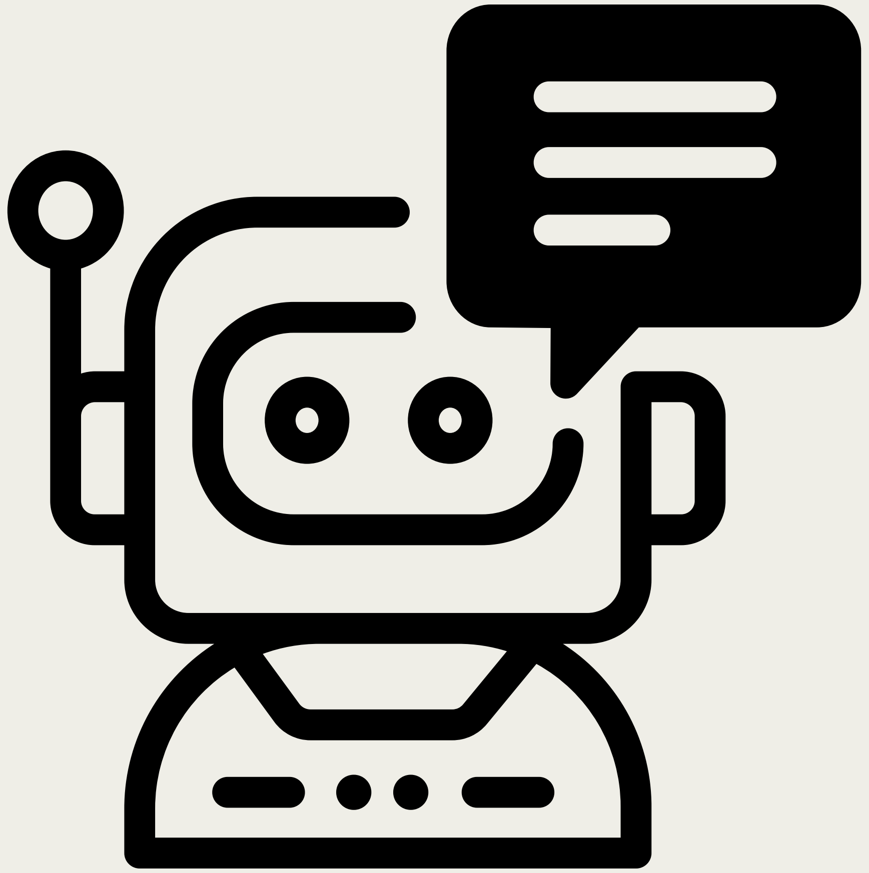


TMS

TMS HELP SYSTEM IS AT YOUR SERVICE

Features

1. Information about the system
2. How to write commands
3. Contact the developers



How To Access

Just type the command “Help” to be forwarded to the help menu

Thank you!

FOR WATCHING OUR PRESENTATION

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TMZ