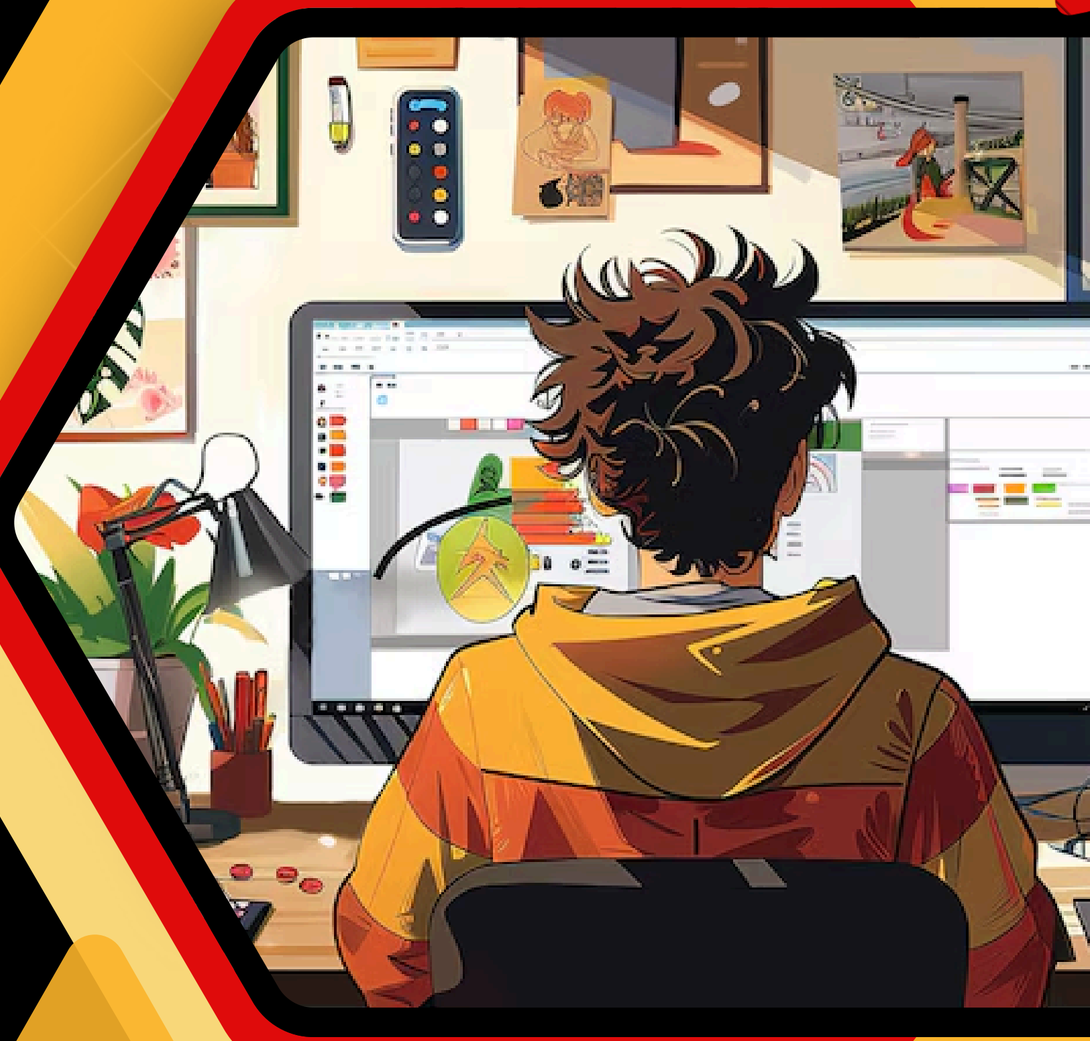
AI AND DATA SCIENCE

Task 2



Date: 3-12-2025

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Hw - Week 2

- OOP
- Models, Package, Sub-Package

OOP

Create a system for an online learning platform:

1 - Create a parent class User with:

- private attribute: _password
- public attributes: name, email
- method show_info()

2 - Create subclasses:

- Student
- Instructor

3 - Override show_info() in each child class (Polymorphism).

4 - Add method set_password() and check_password() (Encapsulation).

input templet

```
> class User: ...


> class Student(User): ...


> class Instructor(User): ...


  s = Student("Ali", "ali@email.com", "1234", "Beginner")
  i = Instructor("Mona", "mona@email.com", "abcd", "Machine Learning")

  print(s.show_info())
  print(i.show_info())
  print(s.check_password("1234"))
```

output

- Students and instructors show different info.
- Password must be accessed/checked only through methods.

```
PS C:\Users\pc> & C:/Users/pc/AppData/Local/Prog
Student: Ali | Level: Beginner
Instructor: Mona | Specialty: Machine Learning
True
PS C:\Users\pc>
```

MODELS & PACKAGE

Create a simple ML-like project folder structure

- regression.py: create a class Linear Regression Model with: fit(), predict() methods
- classification.py: create class KNNModel with: train(), predict()
- metrics.py: function accuracy_score()
- main.py: import both models and test them.

```
ml_project/
    models/
        __init__.py
        regression.py
        classification.py
    utils/
        __init__.py
        metrics.py
    main.py
```

MODELS & PACKAGE

main.py

```python
from models.regression import LinearRegModel
from models.classification import KNNModel
from utils.metrics import accuracy_score

reg = LinearRegModel()
reg.fit([1, 2, 3], [10, 20, 30])
print(reg.predict([5, 6]))

knn = KNNModel()
knn.train([1, 2, 3], ["A", "A", "B"])
pred = knn.predict([10, 11])
print(pred)

score = accuracy_score(["A", "A"], pred)
print("Accuracy:", score)
```

output

```
PS C:\Users\pc> & C:/Users/pc/
[20.0, 20.0]
['class1', 'class1']
Accuracy: 0.0
PS C:\Users\pc>
```

MODELS & PACKAGE

Build a package called school_system

Tasks:

- student_model: class Student(id, name, courses)
- teacher_model: class Teacher(id, name, specialty)
- course_model: class Course(id, title, teacher)
- Use them inside main.py.

```
school_system/
    students/
        __init__.py
        student_model.py
    teachers/
        __init__.py
        teacher_model.py
    courses/
        __init__.py
        course_model.py
    main.py
```

MODELS & PACKAGE

main.py

```python
from students.student_model import Student
from teachers.teacher_model import Teacher
from courses.course_model import Course

t1 = Teacher(1, "Dr. Ahmed", "AI")
s1 = Student(10, "Omar")

c1 = Course(100, "Machine Learning", t1)

s1.enroll(c1)

print(s1.name, "enrolled in:", s1.courses)
```

output

```
Omar enrolled in: ['Machine Learning']
```

دمتم سالمين