

Object Oriented Programming
Programming Assignment #3

OOP Concepts

Introduction

It is required to implement a software for a college.

The college has departments for example (Computer, Electricity, Mechanical,..etc).

Each department has some courses for example (Math, OOP, Law,..etc)

Also, there are many professors and students in the college.

Requirements

It is required from you to implement a simple system for the college. We will extend this assignment features/requirements in the next assignments in this course.

Implement each entity (College, Department, Course, Professor, Student) as a class with the following attributes/methods...

College

Attributes: departments, students, professors, courses

Methods:

int numberOfDepartments()

int numberOfCourses()

int numberOfProfessors()

int numberOfStudents()

Department findDepartment(String name) // find department with name

Student findStudent(String name) // find student by full name

Professor findProfessor(String name) // find professor by full name

Course findCourse (String name) // find course by its name

Department

Attributes: name, description, max_number_of_students, courses, students

Methods:

int numberOfCourses()

int numberOfStudents()

Course findCourse(String name) // find course by name

boolean isFull() // return true if number of students equals max number of students

boolean enroll(Student s) // assign student to this department. Student can't be enrolled to department if the department is full

Course

Attributes: name, description, max_number_of_students, number_of_lectures, students, professor, department.

Methods:

int numberOfStudents()

boolean assignProfessor(Professor p) // assign professor to course. Course can have only one professor.

void unassignProfessor(Professor p) // design professor from course.

boolean isAssigned() // return true if course is assigned to a professor.

String professorName() // return professor full name

boolean isFull() // return true if number of students equals max number of students

boolean enroll(Student s) // assign student to this course. Student can't be enrolled to a course if the course is full. Student can't be enrolled to a course if he isn't enrolled in its department.

Professor

Attributes: firstName, lastName, telephone, address, salary, courses.

Methods:

String fullName() // return "firstName lastName"

double getRaise(double ratio) // recalculate professor salary

Student

Attributes: firstName, lastName, telephone, address, age, department, courses

Methods:

String fullName() // return "firstName lastName"

Notes:

You should implement constructors for each class.

You should implement getters and setters when needed.

User can't create new colleges. You will have only one college object in your main test class.

You can add more attributes/methods to any class if you need.

The fixed size for any array is 50

All objects names will be unique.

Sample Run (inputs in green)

Welcome to our university!

Operations:

1- College

a) Number of Departments

b) Number of Courses

c) Number of Professors

d) Number of Students

e) Report

2- Department

a) New

b) Number of Courses

c) Number of Students

d) Is Full

e) Enroll

f) Report

3- Course

a) New

b) Number of Students

c) Assign

d) Is assigned

e) Professor Name

f) Is Full

g) Enroll

h) Report

4- Professor

a) New

b) Display Salary

c) Get Raise

d) Report

5- Student

a) New

b) Report

6- Quit

=====

Enter Operation

=====

2a

Department Name:

Computer

Department Description:

Software Programming

Department Max Students:

1

=====

Enter Operation

=====

1a

1

=====

Enter Operation

=====

3a

Course Name:

OOP

Course Description:

Object oriented concepts

Course Max Students:

1

Course Lectures:

10

Department:

Computer

=====

Enter Operation

=====

1b

1

=====

Enter Operation

=====

4a

Professor Firstname:

Mohamed

Professor Lastname:

Amr

Professor Telephone:

0123456789

Professor Address:

Egypt Alexandria

Professor Salary:

3000

=====

Enter Operation

=====

5a

Student Firstname:

Student

Student Lastname:

One

Student Telephone:

0123456789

Student Address:

Egypt Alexandria

Student Age:

20

=====

Enter Operation

=====

2e

Department:

Computer

Student:

Student One

=====

Enter Operation

=====

2c

Department:

Computer

1

=====

Enter Operation

=====

2e

Department:

Computer

False

=====

Enter Operation

=====

3g

course:

OOP

Student:

Student One

=====

Enter Operation

=====

2c

Department:

Computer

1

=====

Enter Operation

=====

4c

Professor:

Mohamed Amr

Raise:

0.1

Salary:3300

=====

Enter Operation

=====

3c

course:

OOP

professor:

Mohamed Amr

=====

Enter Operation

=====

1e

1 Professors

1 Students

1 Departments

1 Courses

=====

Enter Operation

=====

2f

Department:

Computer

Description: Software Programming

Max Students: 1

Students: 1

Status: Full

Courses: 1

=====

Enter Operation

=====

3h

Course:

OOP

Description: Object oriented concepts

Department: Computer

Lectures: 10

Max Students: 1

Students: 1

Status: Full

Professor: Mohamed Amr

=====

Enter Operation

=====

4d

Professor:

Mohamed Amr

Salary: 3300

Courses: OOP

Telephone: 0123456789

Address: Egypt Alexandria

=====

Enter Operation

=====

5b

Student:

Student One

Courses: OOP

Telephone: 0123456789

Address: Egypt Alexandria

Age: 20