INSO 4101

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HW 4

**Domain: University**

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1. Student(student number, name, last name, major):
   1. is a person which is taking classes and currently enrolled in the university system. A student is an **atomic entity** in this domain. Some of its attributes would be: student number, name, last name, major, etc.
2. Professor(classes he teaches in this semester, name, last name, expertise subject):
   1. is a person which teaches and currently works in the university system. A professor is also an **atomic entity** in this domain. Some of its attributes would be: Set of classes he teaches in this semester, name, last name, expertise subject, etc.
3. Class(subject, name, number):
   1. A class is an entity which contains knowledge of a particular subject or area. A class is an **atomic entity**. Some of its attributes are: subject, name, number, etc.
4. Dean(name, last name, department, service period):
   1. is a person which serves as the head of a department and serves as an administrator. A Dean is an **atomic entity** in this domain. Some of its attributes are: name, last name, department, service period, etc.
5. Classroom(students, professor(s), department, class):
   1. is an entity in which students and a professor interact, i.e. where they gather to share knowledge. A class is a **composite entity** that consists of students, professor(s), department, class, etc.
6. Department(students, professors, classroom):
   1. an entity is which gathers people which have a certain subject in common to impart knowledge. A Department is a **composite entity** that consist of students, professors, classroom, etc.
7. Institute(students, professor, classroom, labs):
   1. similar to department, an entity which gathers people which have a certain in common research a certain subject. An Institute is a **composite entity** that consist of students, professor, classroom, labs, etc.
8. Library(students, books, study rooms):
   1. a library is an entity that allows students to have an environment to study. A library is a **composite entity** which has students, books, study rooms, etc.
9. Grade(numerical scale, categorical scale, pass):
   1. a grade is a numerical or categorical value obtained when taking a test, project or homework. A grade is an atomic entity. Some of its attributes are: numerical scale, categorical scale, pass, etc.
10. Test(class, grade, student name, professor):
    1. a test is an entity which a student takes in order to prove his knowledge on some subject. A test is a **composite entity**. Some of its components are: class, grade, student name, professor, etc.

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1. take\_test: Test Student 🡪 Grade
   1. This function will tell you the grade a student will get.
   2. this function receives as argument a test or the kind of test he or she is taking and a student entity and maps it to a specific grade entity.
2. classes\_enrolled: Student 🡪 Class**-set**
   1. This function will tell the classes a student is enrolled
   2. The function receives as argument a student and maps it to the set of classes he/she is taking.
3. recommend\_prof: Professor Department 🡪 **Bool**
   1. This function will tell you whether a professor is good or not.
   2. The function will receive as argument a professor and the department to which he or she belongs and it will produce a Boolean value, whether he/she is good or not.
4. classes\_offered: Department 🡪 Class**-set**
   1. This function will give you the set of classes offered by a certain department.
   2. The function receives as argument the department and produces the set of classes the department offers.
5. drop: Student Class Grade**-set** 🡪 **Bool**
   1. This function will tell you whether a student should drop a course or not.
   2. The function receives as argument a student, class and the set of grades obtained and outputs a Boolean value as to whether he/she should drop
6. valid\_course: Class**-set**  **🡪**  **Bool-set**
   1. This function will tell you which classes are valid for you to take.
   2. The function receives as argument a set of classes and maps a one to one function as to whether the courses are valid or not.

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**Events:**

1. When a student fails a test of a particular class he or she is taking. Such an event occurs when the student takes an exam and was not prepared for such an exam.

Both the student and the professor are the main cause of the event.

1. A student receives funding from federal aid. This happens when a student is confirmed to be enrolled in several classes and a transfer of money is approved.

The entity that triggers this event is the student applying for federal aid and enrolling full time.

1. The event that classes have been cancelled. This event occurs when the student or professor is notifies that classes have been cancelled for a specific event for the day. The main cause of this event is usually another event within the university system.
2. The event that a professor asks a question to the class. This could occur for several reasons. Usually it is due to lack of student understanding or involvement in the professor class.

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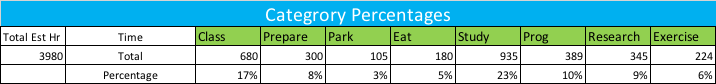
1. A professor wants to assign a grade to a student using the grading system provided by the university. The system will interact with professor by providing signal that his or her task has been completed
2. A student searching for a research fellowship. A student will be searching for such fellowships and making decisions based on the information provided.
3. A student taking an exam. A student will try to will behave according to the rules of the university when taking the exam. A proctor will be present to ensure this behavior is being followed.
4. A professor during office hours. A professor shall uphold ethics behavior established by the university. He or she must be as respectful to the student and try to help him or her as much as possible as established by the university.

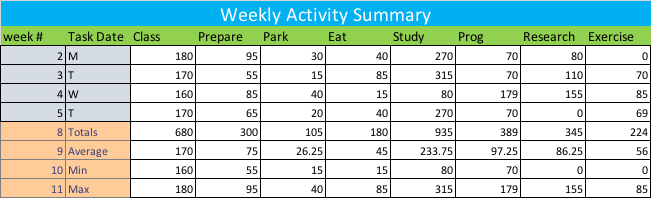
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1. Some examples of entities and functions that manifest physical phenomena:
   * 1. Students: We hear and see students in this domain, i.e. they are physical objects
     2. Professors: We hear and see students in this domain, i.e. they are physical objects
     3. Test: We can touch and see tests in this domain, sadly.
     4. Classroom: We can pinpoint a location to such an entity
     5. Institute: Similar to a classroom we can pinpoint a location to it, as well as touch it.
2. Some examples of entities and functions that designate concepts:
   * 1. Subject: We have a concept of what the subject of the course is. However, we cannot touch it or see it.
     2. Course: is a concrete concept. It is not a specific course per se (generic). We have an idea of what “a course” is but we cannot touch or see it
     3. Graduating: we have an idea of what the function of graduating is, however it is not a physical object within the domain.

**Log:**

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