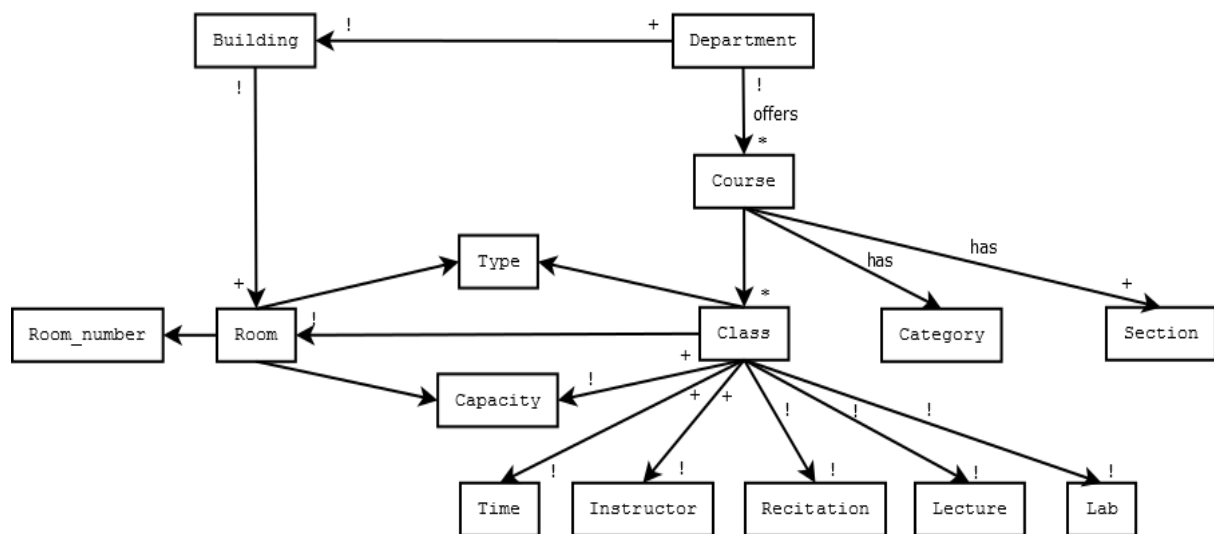# Requirement Analysis

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Presented to Dr. Mohammad Jaber

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I)   Data Model

1- Domains:

Department: all the departments of the Faculty of Arts and Sciences.

Course: List of all the courses

Class: Needs to be scheduled in a room during a certain time slot:

➔ Class={Lecture, Lab, Recitation}

Lecture: ordinary lecture for a course.

Lab: usually more than one hour practice session.

Recitation: usually one hour practice session.

Room: defined by the building it belongs to and its number.

Time: 5 tuples (starting time, duration in minutes) representing every day of the week. Example: [(10, 50), NULL, (10, 50), NULL, (10, 50)], [(8, 170), NULL, NULL, NULL, NULL]… Instructor: AUB Instructors.

SectionNumber: Number of the section in the course

Category= {Freshman, Sophomore, Junior, Senior, Grad, Elective}

Capacity: max number of student that a course or a room can handle.

Type: type of the room. Example: Biology lab, U-chat Room…

2- Relations:

Room: course-room assignment

Time: time-slot assigned to a class

Teaches: The instructor of the course

Class-capacity: the max number of students that is expected to register in the class

Room-capacity: the max number of students a room can handle

Class-type: the type of the class

Room-type: types of classes that can be given in that room

3- Constraints:

a- *Strong constraints*:

- Every class needs to be scheduled in a room that has a capacity at least equals to its capacity and a compatible type.

$\forall x/x \in CLASS; capacity(x) \leq room-capacity(r);$ withr=room(x)

- Every instructor cannot teach more than 1 class at the same time.

$\forall x / x \in CLASS; class-type(x)=room-type(r);$ withr $=$ room(x)

- Every room cannot have more than 1 class at time.

$(\forall i/i \in INSTRUCTOR)(\forall c1,c2/c1,c2 \in teaches(t)), time(c1)!=time(c2)$

- If 2 classes having the same section, they cannot be scheduled at the same time.

$(\forall r/ r \in ROOM) (\forall c1,c2/ c1,c2 \in room(t)), time(c1)!=time(c2)$

- Two courses given by the same department and having the same category cannot have their classes given at the same time unless there is more than one section for at least one of the courses.

b- *Weak constraints*:

- If a professor is giving two consecutive classes, it preferable that they both in the same location.
- Some professors have constraints that prevent them from teaching in some rooms if they don't meet their needs.

4- Use cases:

- As a chairman, I want to request classes so that I can schedule all the courses related to my department.
- As the academic officer in the FAS Dean's Office, I want to access the schedule so that I can edit the time or the location suggested.
- As the academic officer in the FAS Dean's Office, I want to access the rooms' configuration so that I can add a room or change a room type.
- As the academic officer in the FAS Dean's Office, I want to access the professor's constraints configuration so that I can add, remove or change a constraint.
- As the academic officer in the FAS Dean's Office, I want to have the results in a format compatible with banner.

II)   Instance of the data model

- **ARAB201B={ S1->S15}**
  1. L1 = {S1}
       a. L1.Instructor = "Olga Hajjar"
       b. L1.time = (MWF, 10:00, 10:50)
       c. L1.room = "NICELY210"
  2. L2={S2}
  3. L3={S3}
  4. L4={S4}
  5. L5={S5}
  6. L6={S6}
  7. L7={S7}
  8. L8={S8}
  9. L9={S9}
  10. L10={S10}
  11. L11={S11}
  12. L12={S12}
  13. L13={S13}
  14. L14={S14}
  15. L15={S15}

  ARAB201-B has 15 classes to schedule corresponding to 15 sections.

- **BIOL201 = { S1->S7}**
  1. L1 = {S1 -> S7}
       a. L1.instructor="Noel Ghanem"
       b. L1. time = (TTH, 9:30, 10:45)
       c. L1.room = "SLH"
       d. L1.capacity = 84
  2. Lab1= {S1}
       a. L1.instructor="RachaHalabi"
       b. L1. time = (F, 11:00, 1:50)
       c. L1.room = "BIOL210"
       d. L1.capacity = 12
  3. Lab2={S2}
  4. Lab3={S3}
  5. Lab4={S4}
  6. Lab5={S5}
  7. Lab6={S6}
  8. Lab7={S7}

BIOL201 has 8 classes to schedule(one lecture and seven labs) corresponding to 7 sections

- **Course : CHEM200**

  Sections = {S1->S9}

  1. L1 = {S1, S2, S3, S4}
     a. L1.instructor="Pierre Karam"
     b. L1. time = (TTH, 8:00, 8:50)
     c. L1.room = "SLH"
     d. L1.capacity = 120
  2. L2 = {S5, S6, S7, S8, S9}
     a. L2.instructor="Mohamad Hmadeh"
     b. L2. time = (MW, 8:00, 8:50)
     c. L2.room = "SLH"
     d. L2.capacity = 150

  3. Rec1= {S1}
     a. Rec1.instructor="Rand Jaber"
     b. Rec1. time = (F, 8:00, 8:50)
     c. Rec1.room = "CHEM001"
     d. Rec1.capacity = 30
  4. Rec2= {S2}
  5. Rec3 = {S3}
  6. Rec4= {S4}
  7. Rec5= {S5}
  8. Rec6= {S6}
  9. Rec7= {S7}

  CHEM200 has 9 classes(2 lectures and 7 recitations) to schedule corresponding to 9 sections

- **CMPS200= {S1->S6}**
  1. L1 = {S1, S2, S3}
     a. L1.instructor="Marcel Karam"
     b. L1. time = (MWF, 9:00, 9:50)
     c. L1.room = "NICELY212"
     d. L1.capacity = 43
  2. L2 = {S4, S5, S6}
     a. L2.instructor="Ahmad Dhaini"
     b. L2. time = (MWF, 12:00, 12:50)
     c. L2.room = "BLISS205"
     d. L2.capacity = 45
  3. Lab1= {S1}
     a. Lab1.instructor="ReemBallouli"
     b. Lab1. time = (M, 2:00, 5:00)

    c. Lab1.room = "BLISS208"

    d. Lab1.capacity = 15

    e.

4. Lab2= {S2}
5. Lab3={S3}
6. Lab4={S4}
7. Lab5={S5}
8. Lab6={S6}

CMPS200 has 8 classes(2 lectures and 6 LABS) to schedule corresponding to 6 sections

- **PHYS228 L = {S1, S2}**

1. Lab1 = {s1}
   a. Lab1.instructor="VerjouhiBodakian"
   b. Lab1. time = (M, 2:00, 4:30)
   c. Lab1.room = "phys 206"
   d. Lab1.capacity = 12
2. Lab2 = {s2}

PHYS228-L has 2 classes(2 LABS) to schedule corresponding to 2 sections