DEPARTMENT OF COMPUTER ENGINEERING

2022 FALL CSE341 PROGRAMMING LANGUAGES

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HOMEWORK 4

PART 1

ROOMS

ID	CAPACITY	EQUIPMENT	ACCESS FOR HANDICAPPED
z23	100	smart_board projector	YES
z10	80	projector	NO
z06	60	-	NO
z11	40	smart_board	YES

SCHEDULE

ROOM \ CLOCK	Z23	Z10	Z06	Z11
8	241			
9	241			241-102
10		341-233		241-102
11	102	341-233		101
12	102		233	101
1			233	
2	341			
3				
4				
5				

STUDENTS

ID	COURSES	IS HANDICAPPED?
s1	102 233	YES
s2	341	NO
s3	101	NO
s4	233 241	YES
s5	102	NO

COURSE

ID	INSTRUCTOR	CAPACITY	NEEDS
101	mg	30	smart_board
102	gk	40	projector smart_board
241	ysa	50	projector
233	ez	60	-
341	yg	80	projector

INSTRUCTOR

ID	COURSES	PREFERENCES
mg	101	projector
gk	102	projector smart_board
ysa	241	projector smart_board
ez	233	projector
yg	341	**projector**

CHECK WHETHER THERE IS ANY SCHEDULING CONFLICT

check_scheduling_conflict takes 2 courses and writes information if there is any conflict.

```
| ?- check_scheduling_conflict(341, 233).
There is conflict in z10 at 10 for courses 341 and 233
There is conflict in z10 at 11 for courses 341 and 233
```

```
| ?- check_scheduling_conflict(341, 102).

no
| ?- add_occupancy(z23, 102, 2).

yes
| ?- check_scheduling_conflict(341, 102).
There is conflict in z23 at 2 for courses 341 and 102
```

```
| ?- check_scheduling_conflict(241, 102).
There is conflict in z11 at 9 for courses 241 and 102
There is conflict in z11 at 10 for courses 241 and 102
```

CHECK WHICH ROOM CAN BE ASSIGNED TO A GIVEN CLASS

```
| ?- check_room(341,X).

X = z23 ? a

X = z23

X = z10

no
```

Course 341 needs 80 capacity and a projector, there is no handicapped student who takes 341 so rooms z23 and z10 are proper for it.

```
| ?- check_room(233,X).

X = z23 ? a

no
| ?-
```

Course 233 needs 60 person capacity and it has no needs. z23, z10, and z06 looks good for it but there is a handicapped student who takes 233 so it needs to be at room with access to handicapped students. Only room for it is z23.

```
| ?- check_room(101,X).

X = z23 ? a

X = z23

X = z11

X = z11
```

Course 101 needs 30 person capacity and a smart_board. z23 and z11 are proper classes for it.

```
| ?- check_room(102,X).

X = z23 ? a

no
```

Course 102 needs 40 person capacity, smart_board, and a projector. Only room which is proper is z23.

```
| ?- check_room(241,X).

X = z23 ? ;

no
```

Course 241 needs 50 person capacity and a projector. Rooms z23 and z19 looks proper but there is a handicapped student who takes this course so only z23 is proper for 241 because it is accessible for handicapped students.

CHECK WHICH ROOM CAN BE ASSIGNED TO WHICH CLASSES

```
| ?- check_room(Course, Room).

Course = 101
Room = z23 ? a

Course = 101
Room = z23

Course = 101
Room = z11

Course = 101
Room = z11

Course = 102
Room = z23

Course = 241
Room = z23

Course = 233
Room = z23

Course = 341
Room = z23

Course = 341
Room = z23

Course = 341
Room = z10

no
```

CHECK WHETHER A STUDENT CAN BE ENROLLED TO A GIVEN CLASS

```
| ?- check_enrol(s1, 101).

true ? ;
```

No info has been given, student s1 can take course 101.

```
| ?- check_enrol(s1, 241).
There is conflict in z11 at 9 for courses 241 and 102
There is conflict in z11 at 10 for courses 241 and 102
```

According to info, there is a conflict between 241 and 102 course which is taken by the student so student can’t take this class.

```
| ?- check_enrol(s1, 341).
There is conflict in z10 at 10 for courses 341 and 233
There is conflict in z10 at 11 for courses 341 and 233

true ?
```

According to info, there is a conflict between 341 and 233 course which is taken by the student so student can't take this class.

```
| ?- check_enrol(s2, 241).

true ?

yes
```

No info has been given, student s2 can take 241 course.

CHECK WHICH CLASSES A STUDENT CAN BE ASSIGNED

```
| ?- check_enrol_all(s1).
There is conflict in z11 at 9 for courses 241 and 102
There is conflict in z11 at 10 for courses 241 and 102
There is conflict in z10 at 10 for courses 341 and 233
There is conflict in z10 at 11 for courses 341 and 233

Other courses can be taken

true ? ;
```

As we have seen, courses 241 and 341 have conflicts so they cannot be assigned but other than them, student can have other classes.

```
| ?- check_enrol_all(s2).
There is conflict in z10 at 10 for courses 233 and 341
There is conflict in z10 at 11 for courses 233 and 341

Other courses can be taken
```

For student s2, there is a conflict for class 233 so he/she can't take this course but can take other ones.

ADDITIONS

Add Room

```
| ?- room(z40, 120, [projector], handicapped).

no
| ?- add_room(z40, 120, [projector], handicapped).

yes
| ?- room(z40, 120, [projector], handicapped).

yes
```

room needs (ID, CAPACITY, EQUIPMENTS, ACCESS_INFO) in order.

If room is accessible for handicapped students, than it is handicapped, otherwise it is not_handicapped.

Add Occupancy

```
| ?- get_occupancy(z40).

no
| ?- add_occupancy(z40, 241, 4).

yes
| ?- get_occupancy(z40).
There is 241 course in room z40 at 4 o'clock

yes
```

get_occupancy → gets a class name and writes if there is any course in that class

add_occupancy → you need to give class, course, and time for the course

Add Course

```
| ?- course(343, hk, 90, [smart_board, projector]).

no
| ?- add_course(343, hk, 90, [smart_board, projector]).

yes
| ?- course(343, hk, 90, [smart_board, projector]).

yes
```

course needs (ID, INSTRUCTOR, CAPACITY, NEEDS) in order.

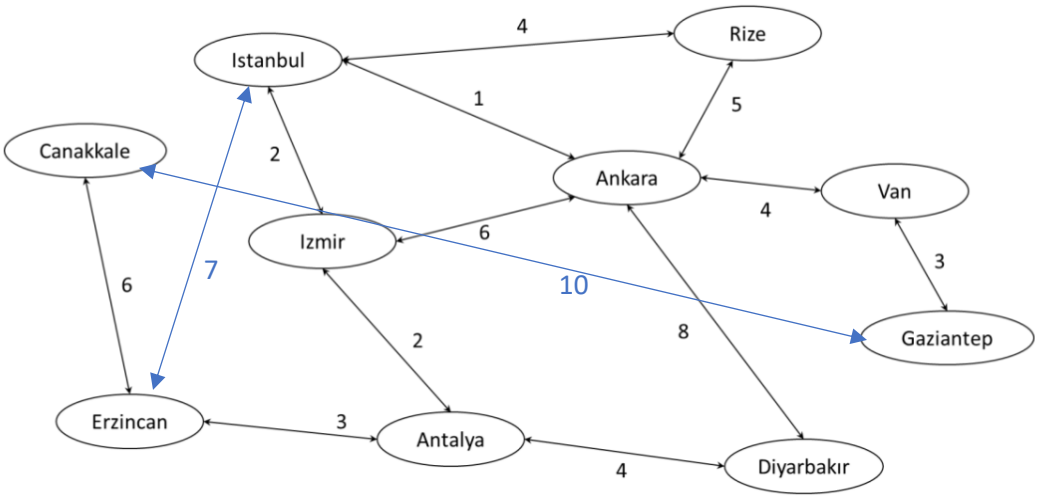
Add Student

```
| ?- student(s10, [343, 233], not_handicapped).

no
| ?- add_student(s10, [343, 233], not_handicapped).

yes
| ?- student(s10, [343, 233], not_handicapped).

yes
```

student needs (ID, COURSES, IS_HANDICAPPED) in order.

If student is handicapped, IS_HANDICAPPED part is handicapped, otherwise it is not_handicapped.

PART 2



Blue ones are newly added connections.

```
yes
| ?- route_finder(canakkale, X, Y).

X = erzincan
Y = 6 ? a

X = gaziantep
Y = 10

X = antalya
Y = 9

X = istanbul
Y = 13

X = diyarbakir
Y = 13

X = izmir
Y = 11

X = ankara
Y = 21

X = rize
Y = 26

X = istanbul
Y = 22

X = van
Y = 25

X = izmir
Y = 27

X = istanbul
Y = 30

X = izmir
Y = 32

X = izmir
Y = 24

X = rize
Y = 26

X = gaziantep
Y = 28
```

```
X = istanbul
Y = 29

X = rize
Y = 33

X = istanbul
Y = 13

X = ankara
Y = 17

X = rize
Y = 17

X = ankara
Y = 14

X = ankara
Y = 22

X = van
Y = 26

X = diyarbakir
Y = 30

X = gaziantep
Y = 29

X = rize
Y = 19

X = van
Y = 18

X = diyarbakir
Y = 22

X = gaziantep
Y = 21

X = rize
Y = 22

X = istanbul
Y = 18

X = van
Y = 21
```

```
X = diyarbakir
Y = 25

X = istanbul
Y = 26

X = rize
Y = 22

X = gaziantep
Y = 24

X = izmir
Y = 15

X = rize
Y = 17

X = ankara
Y = 14

X = ankara
Y = 21

X = antalya
Y = 17

X = rize
Y = 26

X = van
Y = 25

X = diyarbakir
Y = 29

X = gaziantep
Y = 28

X = antalya
Y = 33

X = diyarbakir
Y = 21

X = ankara
Y = 29

X = rize
Y = 34
```

```
X = van
Y = 33

X = gaziantep
Y = 36

X = ankara
Y = 22

X = van
Y = 26

X = izmir
Y = 28

X = diyarbakir
Y = 30

X = gaziantep
Y = 29

X = antalya
Y = 30

X = diyarbakir
Y = 34

X = antalya
Y = 34

X = izmir
Y = 36

X = rize
Y = 19

X = van
Y = 18

X = izmir
Y = 20

X = diyarbakir
Y = 22

X = gaziantep
Y = 21

X = antalya
Y = 22
```

```
X = diyarbakir
Y = 26

X = antalya
Y = 26

X = izmir
Y = 28

X = van
Y = 13

X = ankara
Y = 17

X = rize
Y = 22

X = istanbul
Y = 18

X = izmir
Y = 23

X = diyarbakir
Y = 25

X = istanbul
Y = 26

X = izmir
Y = 28

X = erzincan
Y = 33

X = antalya
Y = 30

X = diyarbakir
Y = 34

X = erzincan
Y = 33

X = antalya
Y = 36

X = diyarbakir
Y = 40
```

```
X = izmir
Y = 38

X = izmir
Y = 20

X = rize
Y = 22

X = erzincan
Y = 25

X = antalya
Y = 22

X = diyarbakir
Y = 26

X = erzincan
Y = 25

X = antalya
Y = 28

X = diyarbakir
Y = 32

X = izmir
Y = 30

X = istanbul
Y = 25

X = antalya
Y = 25

X = rize
Y = 29

X = erzincan
Y = 32

X = antalya
Y = 35

X = diyarbakir
Y = 39

X = diyarbakir
Y = 29
```

```
X = erzincan
Y = 28

X = istanbul
Y = 35

X = rize
Y = 39

X = antalya
Y = 29

X = izmir
Y = 31

X = erzincan
Y = 32

X = istanbul
Y = 33

X = rize
Y = 37

X = erzincan
Y = 40

X = istanbul
Y = 39

X = izmir
Y = 41

X = rize
Y = 43

no
| ?-
```

There are too many results but each of them are correct.

For example, for the last result which is rize 43, we need to follow this path:

- Gaziantep 10
- Van 10 + 3 = 13
- Ankara 13 + 4 = 17
- Diyarbakır 17 + 8 = 25
- Antalya 25 + 4 = 29
- Erzincan 29 + 3 = 32
- İstanbul 32 + 7 = 39
- Rize 39 + 4 = 43