Cairo University
Faculty of Computers & Artificial Intelligence
Department of Computer Science
Artificial Intelligence Course

Assignment 1

Given the attached knowledge base *"students_courses.pl"* containing students' grades in some courses and courses' prerequisites, you are required to write a Prolog program that solves the tasks explained below.

Task 1:

Get the list of students (IDs & grades in nested lists) who have taken a specific course.

Examples:

```
?- studentsInCourse('Robotics', Students).
Students = [[stud06, 62], [stud09, 29]]
?- studentsInCourse('Algorithms', Students).
Students = []
```

Task 2:

Get the number of students who have taken a specific course.

Examples:

```
?- numStudents('Algorithms', Num).
Num = 0
?- numStudents('Math 1', Num).
Num = 4
```

Task 3:

Get the maximum grade that a specific student was able to obtain.

Examples:

```
?- maxStudentGrade(stud10, MaxGrade).
MaxGrade = 97
?- maxStudentGrade(stud08, MaxGrade).
MaxGrade = 71
```

Task 4:

Show a student's grade digits in a specific course as a list of words.

Examples:

```
?- gradeInWords(stud04, 'Database', DigitsWords).
DigitsWords = [five, nine]
?- gradeInWords(stud07, 'Math 2', DigitsWords).
DigitsWords = [eight]
?- gradeInWords(stud01, 'Programming 1', DigitsWords).
DigitsWords = [nine, zero]
```

Task 5:

Get a list containing the sequence of courses that a student needs to take in order to be able to take the target course. The query must only succeed if the student has already taken and successfully passed a course that can directly or indirectly lead to the target.

Examples:

```
?- remainingCourses(stud01, 'Advanced Algorithms', Courses).
Courses = ['OOP', 'Data Structures', 'Algorithms']
?- remainingCourses(stud07, 'Electronics 2', Courses).
false.
?- remainingCourses(stud02, 'Networks', Courses).
Courses = []
?- remainingCourses(stud05, 'Computer Architecture', Courses).
Courses = ['Electronics 2']
?- remainingCourses(stud08, 'Data Warehouses', Courses).
false.
```

Important Notes: *(Please read these notes carefully to avoid losing grades)*

- **Don’t change** the structure of *"students_courses.pl".*
- Write your solution in a **different file** not in *"students_courses.pl".*
- **Don't use any built-in predicates.**
- Please **submit one .pl file** containing your solution. The file name must follow this structure: **ID1_ID2_DEPARTMENT_GROUP.**
- The number of students in a team must be **exactly 2.**
- **Cheaters will be given a NEGATIVE grade and no excuses will be accepted.**
- The deadline is **after 4 days** of the assignment announcement.