National University of Computer & Emerging Sciences, Karachi
Fall-2024 School of Computing (BSCS, BSSE, BSCY, BSAI)

Assignment # 03

Subject: Database Systems -CS2005	**Post Date: 23/10/2024**
Total Marks: 20	**Due Date: 31 /10/2024**
Course Instructors: Dr. Zulfiqar, Dr. Anam Qureshi, Omer Qureshi, Basit Jasani, Abeer Gauher, Atiya Jokiyo, Fizza Aqeel, Javeria Farooq, Zain Noreen, Alina Arshad	

Instructions to be strictly followed.

- It should be obvious that submitting your work after the due date will result in zero points being awarded.
- Plagiarism (copying/cheating) and late submissions result in a zero mark.

Question #01: Marks /10

Consider the schema:

Students (sid, sname, age, grade)

Courses (cid, cname, credits)

Enrollments (sid, cid, semester, grade)

Write each of the following queries in RA.

1. Find the names of students enrolled in 'Database Systems'
2. Find student IDs of students with a grade above 90.
3. Find the names of students who have never taken a course with less than 3 credits.
4. Find the IDs of students who have taken all courses.
5. Find the names of students who have taken at least two courses.
6. Find the names of students who have taken all courses in the Spring semester
7. Find the student IDs of students whose grade is higher than some student named 'Aliyan'
8. Find the student IDs of students whose grade is higher than every student named 'huzaifa'
9. Find the names of students who have enrolled in courses worth exactly 4 credits
10. Find the student IDs of students who have taken the course with the most credits

Question #02: **Marks /10**

Consider a database with the following schema:

Movie (title, year, length, inColor, studioName, producerC)
MovieStar (name, address, gender, birthdate)
StarsIn (movieTitle, movieYear, starName)
MovieExec (name, address, cert, netWorth)
Studio (studioname, presc);

Describe the relations that would be produced by the following relational algebra operations (Textual meaning required) and also provide sql queries of each algebraic expression:

1. π_title (σ_inColor = 0 ∧ year > 1970 (Movie))
2. π_title (σ_(studioName = 'MGM' ∧ year > 1970) ∨ length < 90 (Movie))
3. π_title, length (σ_studioName = 'Disney' ∧ year = 1990 (Movie))
4. π_title, length/60 (σ_studioName = 'Disney' ∧ year = 1990 (Movie))
5. π_producerC (Movie ⋈ StarsIn ⋈ σ_starName = 'Harrison Ford' (StarsIn))
6. π_Star.name, Exec.name (σ_Star.address = Exec.address (MovieStar ⋈ MovieExec))
7. π_producerC (σ_title ≠ 'Star Wars' (Movie))
8. π_producerC (σ_studioName = 'Disney' (Movie)) ∩ π_producerC (σ_studioName = 'MGM' (Movie))
9. π_title (Movie) - π_title (Movie ⋈ MovieExec)
10. S1=ρtitle1,year1,name1(StarsIn)
    S2=ρtitle2,year2,name2(StarsIn)
    (S1) ⋈name1=name2 AND (title1 != title2 or year1!=year2)(S2)