Question 1
Consider the following query

\[\text{select s.name from students s, courses c, transcripts t where s.ID = t.ID and c.CNO = t.CNO and s.dept = 'CS' and t.grade = 'A'}\]

(a) Write the query as a relational algebra query in the form

\[\Pi_{\text{attributes}} \sigma_{\text{condition}}(s \times c \times t)\]

(b) Write 5 other equivalent RA queries. Try to write queries that allow more efficient processing.

(c) Draw the query trees (query plans without algorithm specification) for the queries you gave in part (b).

Question 2
We have four relations \(r(A,B,C)\), \(s(D,E,F,G)\), \(t(H,I)\), and \(u(A,D,H,J)\). Consider the following query

\[\text{select s.name from r, s, t, u where r.A = u.A and s.D = u.D and t.H = u.H and r.B > 100 and s.E < u.J and s.F < 1000 and t.I between 500 and 5000}\]

(a) Write the query as a relational algebra query in the form

\[\Pi_{\text{attributes}} \sigma_{\text{condition}}(r \times s \times t \times u)\]

(b) Write 5 other equivalent RA queries. Try to write queries that allow more efficient processing.

(c) Draw the query trees (query plans without algorithm specification) for the queries you gave in part (b).