**Tutorial 07**

**IE2042 – Database Management Systems for Security Semester 1, 2021**

1. Explain the steps in query processing.
2. What is meant by the best plan?
3. Explain the main optimizing techniques.
4. Consider the following schema.

Sailors(sid,sname,rating,age)

Boats(bid,bname,colour)

Reserves(sid,bid,day)

Select s.sname

From Sailors s, Reserves r, Boats b

Where s.sid=r.sid and r.bid=b.bid and b.colour=’Blue’

* 1. Create the relational algebra expression for the above query.
  2. Draw the graphical representation of the above expressions.

1. Consider the join R R.a=S.b S, given the following information about the relations to be joined. The cost metric is the number of page I/Os unless otherwise noted, and the cost of writing the result is ignored.

Relation R contains 10,000 tuples and has 10 tuples per page. Relation S contains 2,000 tuples and also has 10 tuples per page. Attribute b of relation S is the primary key for S.

Both relations are stored as simple heap files. Neither relation has any indexes built on it.

52 buffer pages are available.

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1. What is the cost of joining R and S using simple nested loops join?
2. What is the cost of joining R and S using a page-oriented nested loops join?
3. What is the cost of joining R and S using a block-nested loops join?
4. Assuming that there exists a B+ tree index (with height 3) on ‘a’ column of relation R, what is the cost of performing an index nested loops join? Explain your answer.