**Sample Questions on Query Processing**

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| Q1: The size of the given NSU student relation is 1000 blocks. The seek time is 10ms and block transfer time is 0.1 ms. The query is  SELECT \* FROM student WHERE id >1801111042  The student relation is physically sorted on id. The number of blocks with id >= 1801111042 is 500.  The height of the primary index on id is 3. Find the estimated cost for the query using the primary index. |
| Q2: The NSU student schema is  Student (id, name, CGPA, street, city, year-admit)  The SQL is SELECT \* FROM student WHERE CGPA=3 AND City=‘Dhaka’ AND year-admit=2020  There are B+ tree indices on CGPA, city and year-admit.The heights of the indices are 3, 3 and 2 respectively. The number of tuples (pointers) for CGPA=3, City=‘Dhaka’ and year-admit=2020 are 100, 200 and 1000 respectively. Considering each tuple in separate block, find the least cost of the SQL using single index. The seek time is 10ms and block transfer time is 0.1 ms.  The result of the intersection of the set of pointers is 20. Find the estimated query cost using the intersection of pointers.  The height of the composite index on (CGPA, City, year-admit) is 5. The number of pointers satisfying the query is 20. Find the estimated query cost using the composite index. |

Q3: The student and takes schema are: 4

Student (id, name, CGPA, street, city, year-admit)

Takes (id, course-id, semester, year)

The number of records and sizes of student and takes relation are as follows:

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| **Relation** | **No. of records** | **No. of blocks** |
| student | 1000 | 50 |
| takes | 5000 | 10 |

Find the worst case and best-case cost of natural join operation student ⨝ takes using nested loop join and block nested loop join.

Q4: Write relational algebra and construct the execution tree for the following:

The relational schema for student course registration are as follows

Student (Sid, name, street, city. Mobile, email, CGPA, age)

Takes (course-id, Sid, semester, year, GP)

Course (course-id, title, credit-hour)

(a)

SELECT sid, name

FROM student inner join takes ON student.sid = takes.sid

WHERE city = ‘Dhaka’ AND year = 2023

(b)

SELECT sid, name

FROM (student inner join takes ON student.sid = takes.sid) inner join course ON takes.course\_id = course.course\_id

WHERE city = ‘Dhaka’ AND year = 2023 AND credit-hour = 3

**Sample Questions on Query Processing (Solution)**

Q1: The size of the given NSU student relation is 1000 blocks. The seek time is 10ms and block transfer time is 0.1 ms. The query is

SELECT \* FROM student WHERE id >1801111042

The student relation is physically sorted on id. The number of blocks with id >= 1801111042 is 500.

The height of the primary index on id is 3. Find the estimated cost for the query using the primary index.

br = 1000 blocks

ts = 10 ms

tT = 0.1 ms

b = 500

hi = 3

A5(Primary Index, Comparison)

Cost = hi \* (tT +ts) + ts + b \* tT = 3 \* (0.1 + 10) + 10 + (500 \* 0.1) = 90.3