বঙ্গবন্ধু শেখ মুজিবুর রহমান বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়, গোপালগঞ্জ

অতিরিক্ত উত্তরপত্র

নম্বর - 34478

স্টুডেন্ট নম্বর ঃ .....

কোর্স নম্বর ঃ .....

কোর্স শিরোনাম ঃ .....

সেকশন ঃ এ / বি

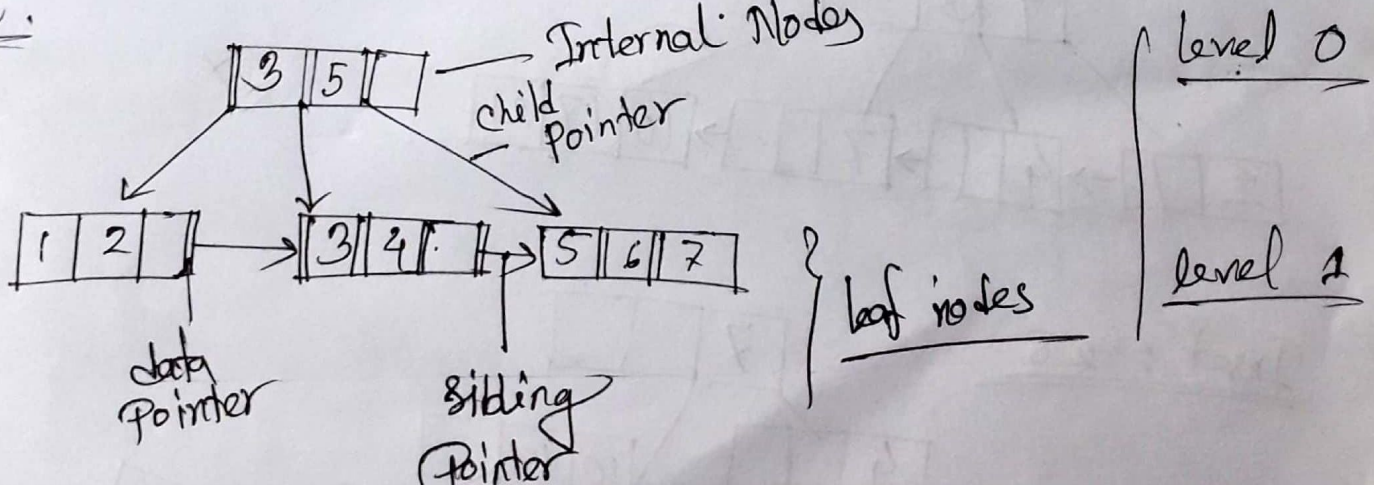
সীল

ইনভিজিলেটরের স্বাক্ষর

B+ tree

- Data record are only store in leaves.
- Internal nodes stores just keys.
- All leaves nodes are interconnected with each other Faster access.
- keys are used for directing a search to the Proper ~~key~~ leaf.
- B+ tree combine feaches of ISAM (Index Access Method / sequential) & B tree

Ex.



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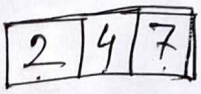
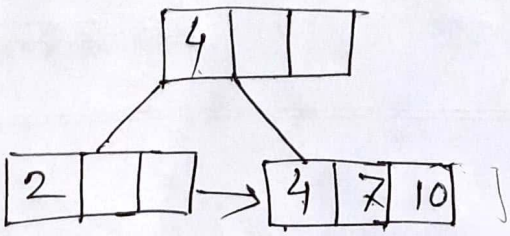
(2)

Ex 2, 4, 7, 10, 17, 21, 28, order $m = 4$

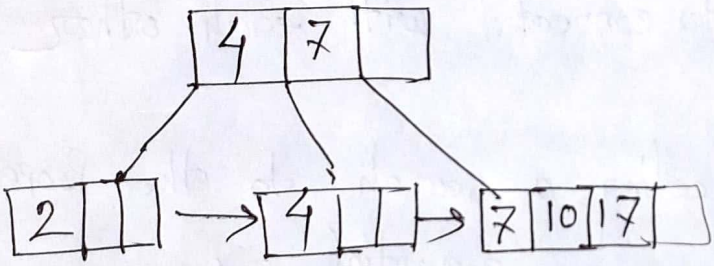
keys $= m - 1 = 3$



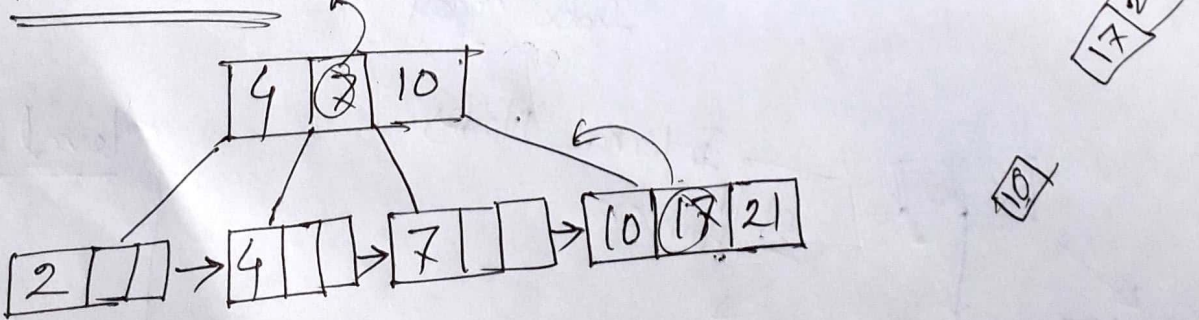
Insert: 10



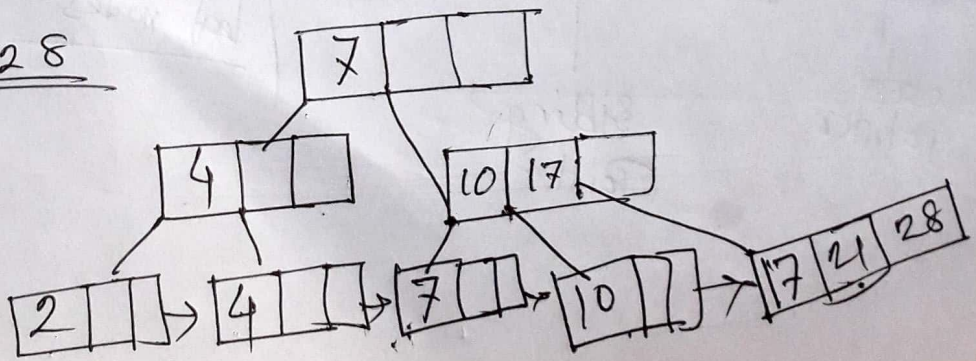
Insrt : 17



Insert : 21



Insert : 28



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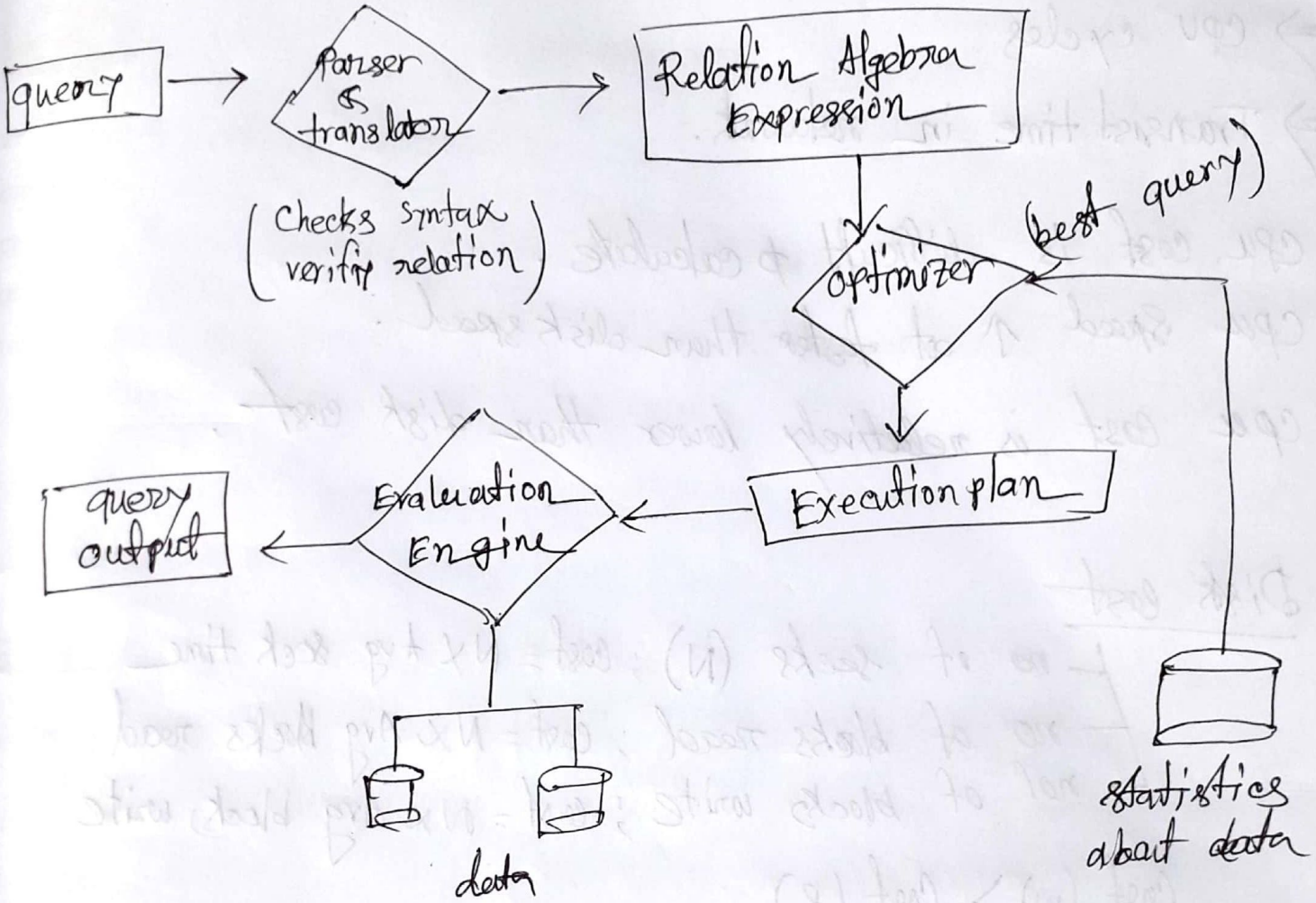
Query Processing Overview



Ex: Select Book, title, Price from BOOK where Price > 30;

$\sigma_{Price>30}(\Pi_{book,title,Price}(Book))$ | $\Pi_{Book,title,Price}(\sigma_{Price>30}(Book))$

σ Price > 30
|
Π book, title, Price
|
Book

Π Book, title, Price
|
σ Price > 30
|
Book

⇒ Different Evaluation plans for a given query can have different cost. It is responsibility of query optimizer to generate least costly plan.

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(41)

Measure of Query Cost

⇒ Disk access

⇒ CPU cycles.

⇒ Transist time in network.

* CPU cost is difficult to calculate.
* CPU speed ↑ at faster than disk speed.
* CPU cost is relatively lower than disk cost.

Disk cost

- no of seeks (N); cost = N x Avg seek time
- no of blocks read; cost = N x Avg blocks read
- no of blocks write; cost = N x Avg blocks write

Cost (W) > Cost (R)

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ইনভিজিলেটরের স্বাক্ষর

Sorting

We use order by clause in SQL
Removes duplicates

Faster Execution of operation
- Internal Sorting → Quick sort, bubble sort (done in M.M relation)
- External Sorting (data base) (If relation is very large then the buffer In that case we use External sorting.)

External Merge Sort

~~M blocks can fit into memory~~
M block are read at a time
then sorted in memory
then M blocks are written block

Merge (m-1) runs at a time (M-1) way

- Read 1st block of M-1 runs
- then it o/p 1st record to buffer.
- Continue till buffer block is full
- o/p buffer block to disk
- When a block of a run is Exhausted next block of that run is read.
- end

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Ex

18, 11, 16, 13, 12, 17, 21, 15, 19, 20, 14

M=3

11, 16, 18 , 12, 13, 17 , 15, 19, 21 14, 20

buffer	buffer
11	16
12	17
13	18

buffer	buffer
14	20
15	21
19	

11, 12, 13, 16, 17, 18, 14, 15, 19, 20, 21

Cost of External Merge Sort Algo:

No: of passes $= 1 + \lceil \log_{B-1} \lceil N/B \rceil \rceil$

Cost = 2N * (# No. of passes)

Ex with 5 buffer pages, to sort 108 page file.

Pass 0 $= \lceil \frac{108}{5} \rceil = 22$

Pass 1 $= \lceil \frac{22}{4} \rceil = 6$

Pass 2 $= \lceil \frac{6}{3} \rceil = 2$

Pass 3 $= \lceil \frac{2}{2} \rceil = 1$

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