

Database Optimization: Practicing

ADVANCED DATA BASE

Exercise 1

Determine the optimized execution tree with respect to the heuristic criteria presented in class

```
select  O_ORDERSTATUS, N_NAME, count(O_ORDERKEY)
from    ORDERS, CUSTOMER, NATION, REGION
where   O_CUSTKEY=C_CUSTKEY and C_NATIONKEY = N_NATIONKEY
        and N_REGIONKEY = R_REGIONKEY and R_NAME= 'Europe'
group by O_ORDERSTATUS, N_NAME
```

Exercise 2

Determine the optimized execution tree with respect to the heuristic criteria presented in class

```
select  sum(L_QUANTITY)
from    LINEITEM,ORDERS,PART,CUSTOMER,NATION
where   L_ORDERKEY=O_ORDERKEY and O_CUSTKEY=C_CUSTKEY
        and C_NATIONKEY=N_NATIONKEY
        and L_PARTKEY=P_PARTKEY and N_NAME= 'Canada'
```

Exercise 3

Draw the execution tree proposed by ORACLE for the following queries:

```
select  s_name, s_address
from    TPCD.supplier, TPCD.nation, TPCD.region
where   s_nationkey = n_nationkey and n_regionkey = r_regionkey and r_name='Europe';
```

Exercise 4 (see 1)

Draw the execution tree proposed by ORACLE for the following queries:

```
select  O_ORDERSTATUS, N_NAME, count(O_ORDERKEY)
from    TPCD.ORDERS, TPCD.CUSTOMER, TPCD.NATION, TPCD.REGION
where   O_CUSTKEY=C_CUSTKEY and C_NATIONKEY = N_NATIONKEY
        and N_REGIONKEY = R_REGIONKEY and R_NAME= 'Europe'
group by O_ORDERSTATUS, N_NAME
```

Exercise 5 (see 2)

Draw the execution tree proposed by ORACLE for the following queries:

```
select  sum(L_QUANTITY)
from    TPCD.LINEITEM,TPCD.ORDERS,TPCD.PART, TPCD.CUSTOMER, TPCD.NATION
where   L_ORDERKEY=O_ORDERKEY and O_CUSTKEY=C_CUSTKEY and
        C_NATIONKEY=N_NATIONKEY and L_PARTKEY=P_PARTKEY and N_NAME= 'Canada'
```

Exercise 6

Draw the execution tree proposed by ORACLE for the following queries:

```
select * from PART ORDER BY P_NAME;
```

```
select * from PART ORDER BY P_NAME;
```

Exercise 7

After drawing the execution tree of the optimizer for the query:

```
select  o_clerk, p_type, sum(l_quantity), avg(l_discount)
from    TPCD.lineitem, TPCD.orders, TPCD.part, TPCD.supplier, TPCD.nation
where   l_partkey = p_partkey and l_orderkey = o_orderkey
        and l_suppkey = s_suppkey
        and s_nationkey = n_nationkey
        and o_clerk = 'Clerk#000000955'
        and n_name = 'KENYA'
group  by o_clerk, p_type;
```

verify:

- How and why the execution tree changes when the o_clerk condition is removed
- How and why the execution tree changes when the condition on o_clerk is relaxed as follows:

o_clerk > 'Clerk#000000955'

Execution Cost Computation

ADVANCED DATA BASE

Exercise 8

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

$D = 4096$ byte $\text{len}(P)=\text{len}(K)=4$ byte $NB = 101$ $u = 0.69$ No projections on intermediate results

- `select sum(L_EXTENDEDPRICE)`
- `from TPCD.ORDERS, TPCD.LINEITEM`
- `WHERE O_ORDERKEY=L_ORDERKEY`
- `and O_CLERK='Clerk#000000559';`

Exercise 9

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

$D = 4096$ byte $\text{len}(P)=\text{len}(K)=4$ byte $NB = 101$ $u = 0.69$ No projections on intermediate results

- `select sum(L_EXTENDEDPRICE)`
- `from TPCD.ORDERS, TPCD.LINEITEM`
- `WHERE O_ORDERKEY=L_ORDERKEY`
- `and O_CLERK='Clerk#000000559';`

Exercise 10

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

D = 4096 byte len(P)=len(K)=4 byte NB = 101 u = 0.69 No projections on intermediate results

```
SELECT sum(PS_SUPPLYCOST)
FROM TPCD.PART,TPCD.PARTSUPP
WHERE P_PARTKEY=PS_PARTKEY and P_TYPE='SMALL BURNISHED STEEL';
```

Exercise 11

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

D = 4096 byte len(P)=len(K)=4 byte NB = 101 u = 0.69 No projections on intermediate results

```
select P_TYPE, SUM(L_QUANTITY)
from TPCD.LINEITEM, TPCD.PART
where L_PARTKEY=P_PARTKEY and P_BRAND= 'Brand#54'
group by P_TYPE
having COUNT(*) > 5;
```

Exercise 12

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

D = 4096 byte len(P)=len(K)=4 byte NB = 101 u = 0.69 No projections on intermediate results

```
select n_name, count(*)
from TPCD.CUSTOMER, TPCD.NATION, TPCD.SUPPLIER
where C_NATIONKEY=S_NATIONKEY and C_NATIONKEY=N_NATIONKEY
GROUP BY N_NAME;
```

Exercise 13

After drawing the execution tree of the optimizer for the query, compute the execution cost assuming that:

D = 4096 byte len(P)=len(K)=4 byte NB = 101 u = 0.69 No projections on intermediate results

```
select /*+ USE_MERGE(ORDERS,CUSTOMER)*/ O_CLERK, sum(O_TOTALPRICE)
from TPCD.ORDERS,TPCD.CUSTOMER
where O_CUSTKEY=C_CUSTKEY AND C_NAME LIKE 'A%' AND O_ORDERPRIORITY='2-HIGH'
group by O_CLERK;
```