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**IST 302**  
**Spring 2017 Computer Exercise 3 (CE3)**  
**Due Date: 03/06/2017**

Create copies of the IST302.PROMOTIONS, IST302.CUSTOMERS, IST302.CHANNELS, IST302.TIMES tables in your schema as MY\_PROMOTIONS, MY\_CUSTOMERS, MY\_CHANNELS, MY\_TIMES. You do not need to calculate storage for these tables.

**Question 3.1: Query Catalog Tables**

- a) Run a query that accesses the USER\_TABLES catalog table and reports the AVG\_ROW\_LEN, NUM\_ROWS values for the **MY\_PROMOTIONS** table.
- b) Execute the statement “ANALYZE TABLE **MY\_PROMOTIONS** COMPUTE STATISTICS” and then rerun the query of part (a). Is there any difference in the results of both queries? Please provide an explanation.

**Question 3.2: Execution Plans**

Use the EXPLAIN PLAN facility to generate the execution plans for each query described in the table below. Interpret each execution plan.

- o You should first analyze table then generate the execution plans.
- o You should try to generate at least 4 execution plans (see below) for each query then select the ‘best’ plan based on the cost.
- o Plan Type 1: Indexes should be available on the Join columns only
- o Plan Type 2: Individual indexes on all select ( $\sigma$ ) columns should also be available plus those above
- o Plan Type 3: Use index hint on one of the indexes that you think the query optimizer should use. Check Oracle index hint syntax [here](#).
- o Plan Type 4: A composite index on CUST\_GENDER & CUST\_MARITAL\_STATUS should also be available plus those above

Label	Description
Q3.2a	<p><b>SELECT</b></p> <p>CUST_LAST_NAME  ', '  CUST_FIRST_NAME AS CUST_NAME,      FISCAL_MONTH_NAME, S.TIME_ID AS SALES_DATE, CHANNEL_DESC,      PROMO_NAME, PROD_SUBCATEGORY, PROD_NAME, AMOUNT SOLD</p> <p><b>FROM</b></p> <p>MY_SALES S, MY_CUSTOMERS C, MY_PRODUCTS_CE2 P, MY_PROMOTIONS      R, MY_CHANNELS H, MY_TIMES T</p> <p><b>WHERE</b></p> <p>S.CUST_ID = C.CUST_ID      AND S.PROD_ID = P.PROD_ID      AND S.PROMO_ID = R.PROMO_ID      AND S.CHANNEL_ID = H.CHANNEL_ID      AND S.TIME_ID = T.TIME_ID      AND CUST_GENDER = 'M' AND CUST_MARITAL_STATUS = 'Married'      AND FISCAL_MONTH_NAME IN ('February', 'March', 'April', 'May', 'June')      AND PROD_SUBCATEGORY IN ('Monitors', 'Recordable CDs')      AND CHANNEL_DESC = 'Tele Sales'      AND S.TIME_ID BETWEEN '02-25-1998' AND '01-30-2000';</p>

Q3.2b

```

SELECT
  CUST_LAST_NAME||', '||CUST_FIRST_NAME AS CUST_NAME
FROM
  MY_SALES S, MY_CUSTOMERS C, MY_PRODUCTS_CE2 P
WHERE
  S.CUST_ID = C.CUST_ID
  AND S.PROD_ID = P.PROD_ID
  AND CUST_GENDER = 'M' AND CUST_MARITAL_STATUS = 'Married'
  AND PROD_SUBCATEGORY IN ('Monitors', 'Recordable CDs')
MINUS
SELECT
  CUST_LAST_NAME||', '||CUST_FIRST_NAME AS CUST_NAME
FROM
  MY_SALES S, MY_CUSTOMERS C, MY_PROMOTIONS R, MY_CHANNELS H,
  MY_TIMES T
WHERE
  S.CUST_ID = C.CUST_ID
  AND S.PROMO_ID = R.PROMO_ID
  AND S.CHANNEL_ID = H.CHANNEL_ID
  AND S.TIME_ID = T.TIME_ID
  AND FISCAL_MONTH_NAME IN ('February', 'March', 'April', 'May', 'June')
  AND CHANNEL_DESC = 'Direct Sales'
  AND S.TIME_ID BETWEEN '02-25-1998' AND '01-30-2000';

```

Q3.2c

```

SELECT
  CUST_GENDER AS GENDER, PROD_SUBCATEGORY,
  FISCAL_MONTH_NAME, TO_CHAR(S.TIME_ID, 'MONTH') AS SALES_MONTH,
  CHANNEL_CLASS, SUM(AMOUNT SOLD) AS TOTAL_AMOUNT SOLD
FROM
  MY_SALES S, MY_CUSTOMERS C, MY_PRODUCTS_CE2 P, MY_PROMOTIONS
  R, MY_CHANNELS H, MY_TIMES T
WHERE
  S.CUST_ID = C.CUST_ID
  AND S.PROD_ID = P.PROD_ID
  AND S.PROMO_ID = R.PROMO_ID
  AND S.CHANNEL_ID = H.CHANNEL_ID
  AND S.TIME_ID = T.TIME_ID
  AND CUST_GENDER = 'M' AND CUST_MARITAL_STATUS = 'Married'
  AND FISCAL_MONTH_NAME IN ('February', 'March', 'April', 'May', 'June')
  AND PROD_SUBCATEGORY IN ('Monitors', 'Recordable CDs')
  AND S.TIME_ID BETWEEN '02-25-1998' AND '01-30-2000'
GROUP BY
  CUST_GENDER, PROD_SUBCATEGORY, FISCAL_MONTH_NAME,
  TO_CHAR(S.TIME_ID, 'MONTH'), CHANNEL_CLASS;

```

## Appendix 3.1: Query Execution Plan Report

**Table 1: Plan Cost Report**

Query	Plan 1 (index on ID fields)	Plan 2 (plus $(\sigma)$ columns)	Plan 3 (using hint)	Plan 4 (plus composite index)	Best Plan #
	Cost	Cost	Cost	Cost	
Query 3.2 a					
Query 3.2 b					
Query 3.2 c					

**Table 2: Query 3.2 a Query Execution Plan**

	Query Execution Plan Output
Plan 1	
Plan 2	
Plan 3	
Plan 4	
Best Plan Explanation	Describe the steps in the ‘best’ execution plan; indicated whether each table is read completely or randomly; for each randomly accessed table, indicate selected index

**Table 3: Query 3.2 b Query Execution Plan**

	Query Execution Plan Output
Plan 1	
Plan 2	
Plan 3	
Plan 4	
Best Plan Explanation	Describe the steps in the ‘best’ execution plan; indicated whether each table is read completely or randomly; for each randomly accessed table, indicate selected index

**Table 4: Query 3.2 c Query Execution Plan**

	Query Execution Plan Output
Plan 1	
Plan 2	
Plan 3	
Plan 4	
Best Plan Explanation	Describe the steps in the ‘best’ execution plan; indicated whether each table is read completely or randomly; for each randomly accessed table, indicate selected index

## Appendix 3.2: CE3 Grade Form

**Student:**

<b>Ques</b>	<b>Comments</b>	<b>Score</b>	
		<b>Actual</b>	<b>Perfect</b>
3.1a	[ ]Evidence of Successful Query Execution not displayed		2
3.1b	[ ]Evidence of Successful Analyze Execution not displayed [ ]Evidence of Successful Query Execution not displayed [ ]No or Inadequate Explanation provided		6
3.2	[ ]Did not Analyze each Table – No Evidence displayed [ ]Did not create indexes for each $\sigma$ column – No Evidence displayed [ ]Did not create indexes for each JOIN column – No Evidence displayed [ ]Did not create of one or more composite index – No Evidence displayed [ ]Did not Analyze each index - No Evidence displayed		10
3.2a	[ ]Not Done [ ]Evidence of Execution Plan(s) generation not displayed [ ]Did not generate multiple execution plans (e.g. with, without hints) [ ]Entire Cost for each query execution plan not displayed [ ]Did not Correctly identify the 'best' of the generated plans [ ]Did not describe the steps in the 'best' execution plan [ ]Did not indicated whether each table is read completely or randomly. [ ]For each randomly accessed table, did not indicate selected index		16
3.2b	[ ]Not Done [ ]Evidence of Execution Plan(s) generation not displayed [ ]Did not generate multiple execution plans (e.g. with, without hints) [ ]Entire Cost for each query execution plan not displayed [ ]Did not Correctly identify the 'best' of the generated plans [ ]Did not describe the steps in the 'best' execution plan [ ]Did not indicated whether each table is read completely or randomly. [ ]For each randomly accessed table, did not indicate selected index		16
3.2c	[ ]Not Done [ ]Evidence of Execution Plan(s) generation not displayed [ ]Did not generate multiple execution plans (e.g. with, without hints) [ ]Entire Cost for each query execution plan not displayed [ ]Did not Correctly identify the 'best' of the generated plans [ ]Did not describe the steps in the 'best' execution plan [ ]Did not indicated whether each table is read completely or randomly. [ ]For each randomly accessed table, did not indicate selected index		16
	<b>*** TOTAL ***</b>		<b>66</b>



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