IST769 Homework Submission Template

Basic Information

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Date Due: August 3, 2021   
Homework #: 4

Your Answers:

* Create a non-clustered index on the **timesheets** table in the **demo** database. The index you create should be designed to improve the following query:

select employee\_id, employee\_firstname, employee\_lastname, sum(timesheet\_hourlyrate\*timesheet\_hours)

from timesheets

group by employee\_id, employee\_firstname, employee\_lastname;

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| CODE |
| -- preparation  USE fudgemart\_V3  GO  DROP TABLE IF EXISTS demo.dbo.timesheets;  GO  SELECT \* INTO demo.dbo.timesheets  FROM fudgemart\_v3.dbo.fudgemart\_employees INNER JOIN fudgemart\_v3.dbo.fudgemart\_employee\_timesheets  ON employee\_id = timesheet\_employee\_id;  GO  --Exercise 1  SELECT employee\_id, employee\_firstname, employee\_lastname,  SUM(timesheet\_hourlyrate\*timesheet\_hours) AS total\_hours  FROM demo.dbo.timesheets  GROUP BY employee\_id,employee\_firstname,employee\_lastname;  GO  --Nonclustered Index  DROP INDEX IF EXISTS dbo.timesheets.timesheets\_IX1  CREATE INDEX timesheets\_IX1  ON demo.dbo.timesheets (employee\_id)  INCLUDE (employee\_firstname, employee\_lastname, timesheet\_hourlyrate,timesheet\_hours)  GO |
| SCREENSHOT/OUTPUT |
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* Write an SQL Select query which uses the index you created in the first question but does an index seek instead of an index scan.

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| CODE |
| --Exercise 2  --Index Scan - PK not provided in WHERE  SELECT employee\_id  , employee\_firstname  , employee\_lastname  , sum(timesheet\_hourlyrate\*timesheet\_hours)  FROM demo.dbo.timesheets  GROUP BY employee\_id, employee\_firstname, employee\_lastname;  GO  --Index Seek - PK provided  SELECT employee\_id  , employee\_firstname  , employee\_lastname  , sum(timesheet\_hourlyrate\*timesheet\_hours)  FROM demo.dbo.timesheets  WHERE employee\_id IN (1,2,3,4)  GROUP BY employee\_id, employee\_firstname, employee\_lastname;  GO  --Table Scan  SELECT employee\_department  , sum(timesheet\_hours) AS total\_hours  FROM demo.dbo.timesheets  GROUP BY employee\_department;  GO  SELECT employee\_department  , sum(timesheet\_hours) AS total\_hours  FROM demo.dbo.timesheets  GROUP BY employee\_department;  GO  DROP INDEX IF EXISTS dbo.timesheets.timesheets\_IX1 |
| SCREENSHOT/OUTPUT |
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* Create a single columnstore index on the **timesheets** table in the **demo** database which will improve the following queries:

select employee\_department, sum(timesheet\_hours)

from timesheets group by employee\_department

select employee\_jobtitle, avg(timesheet\_hourlyrate)

from timesheets group by employee\_jobtitle

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| CODE |
| --Exercise 3 Columnstore Index  USE demo  GO  DROP INDEX IF EXISTS timesheets\_IX2 ON dbo.timesheets  GO  CREATE NONCLUSTERED COLUMNSTORE INDEX timesheets\_IX2  ON demo.dbo.timesheets (  employee\_jobtitle  , employee\_department  , timesheet\_hourlyrate  , timesheet\_hours  );  GO  SELECT employee\_department  , SUM(timesheet\_hours) AS total\_hours  FROM demo.dbo.timesheets  GROUP BY employee\_department;  GO  SELECT employee\_jobtitle  , AVG(timesheet\_hourlyrate)  FROM demo.dbo.timesheets  GROUP BY employee\_jobtitle;  GO |
| SCREENSHOT/OUTPUT |
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* Create an indexed view named **v\_employees** on the **timesheets** table in the **demo** database which lists the employee id, first name, last name, job title, and department columns values and one row per employee (essentially re-building the employee table). Then set a unique clustered index on the view and finish by writing an SQL Select query which uses the indexed view.

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| CODE |
| -- Exercise 4  USE demo  GO  DROP VIEW IF EXISTS dbo.v\_employees;  CREATE VIEW dbo.v\_employees WITH SCHEMABINDING  AS  SELECT employee\_id  , employee\_firstname  , employee\_lastname  , employee\_jobtitle  , employee\_department  , COUNT\_BIG(\*) AS timesheet\_count  FROM dbo.timesheets  GROUP BY employee\_id, employee\_firstname, employee\_lastname, employee\_jobtitle, employee\_department;  GO  DROP INDEX IF EXISTS v\_employees.v\_employees\_IX1  GO  CREATE UNIQUE CLUSTERED INDEX v\_employees\_IX1 ON dbo.v\_employees (employee\_id)  GO  SELECT \* FROM dbo.v\_employees;  GO  SELECT employee\_id  , employee\_firstname  , employee\_lastname  , COUNT(\*) AS timesheet\_count  , SUM(timesheet\_hours) AS hours\_total  , AVG(timesheet\_hourlyrate) AS hourlyrate\_average  FROM dbo.timesheets  GROUP BY employee\_id, employee\_firstname, employee\_lastname;  GO |
| SCREENSHOT/OUTPUT |
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* Output the following query in JSON format: Display the employee id, first name, last name, count of timesheets, total hours worked, and average timesheet hourly rate.

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| CODE |
| SELECT  employee\_id,  employee\_firstname,  employee\_lastname,  COUNT(timesheet\_id) AS counts,  SUM(timesheet\_hours) AS total\_hours,  AVG(timesheet\_hourlyrate) AS avgrate  FROM timesheets  GROUP BY employee\_id, employee\_firstname, employee\_lastname  FOR JSON AUTO  GO |
| SCREENSHOT/OUTPUT |
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