

DAMG6210 - Data Management and Database Design

Homework 10

1.

```
CREATE FUNCTION CalculateDiscountedBudget (  
    @project_no CHAR(4),  
    @discount_percentage DECIMAL(5, 2)  
)  
RETURNS FLOAT  
AS  
BEGIN  
    DECLARE @budget FLOAT;  
    SELECT @budget = budget FROM project WHERE project_no = @project_no;  
  
    RETURN @budget - (@budget * @discount_percentage / 100);  
END;  
GO
```

Execute stored procedure:

```
SELECT dbo.CalculateDiscountedBudget('p2', 10) AS DiscountedBudget;  
  
SELECT dbo.CalculateDiscountedBudget('p2', 40) AS DiscountedBudget;
```

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Run Cancel Disconnect Change Database: sample2 Estimated Plan Enabl

```
526 SET dept_no = 10;
527 WHERE emp_no = 15000;
528 SELECT * FROM EmpDeptChangeHistory;
529 Go
530
531
532
533 --CalculateDiscountedBudget
534 CREATE FUNCTION CalculateDiscountedBudget (
535     @project_no CHAR(4),
536     @discount_percentage DECIMAL(5, 2)
537 )
538 RETURNS FLOAT
539 AS
540 BEGIN
541     DECLARE @budget FLOAT;
542     SELECT @budget = budget FROM project WHERE project_no = @project_no;
543
544     RETURN @budget - (@budget * @discount_percentage / 100);
545 END;
546 GO
547
548 SELECT dbo.CalculateDiscountedBudget('p2', .10) AS DiscountedBudget;
549
550 SELECT dbo.CalculateDiscountedBudget('p2', .40) AS DiscountedBudget;
551
552
553
```

Results Messages

	DiscountedBudget
1	81000

	DiscountedBudget
1	54000

2.

```
CREATE TABLE project_log (  
    log_id INT IDENTITY(1,1) PRIMARY KEY,  
    emp_no INT,  
    project_no CHAR(4),  
    job VARCHAR(50),  
    enter_date DATE,  
    log_date DATETIME DEFAULT GETDATE()  
);  
GO
```

```
CREATE TRIGGER trg_LogNewProjectAssignment  
ON works_on  
AFTER INSERT  
AS  
BEGIN  
    INSERT INTO project_log (emp_no, project_no, job, enter_date, log_date)  
    SELECT emp_no, project_no, job, enter_date, GETDATE()  
    FROM inserted;  
END;  
GO
```

Execute stored procedure:

```
INSERT INTO employee (emp_no, emp_fname, emp_lname, dept_no)  
VALUES (15009, 'Jenny', 'Kim', 'D3');  
  
INSERT INTO works_on (emp_no, project_no, job, enter_date)  
VALUES (15009, 'p3', 'Quality Analyst', '2024-11-12');  
  
SELECT * FROM project_log WHERE emp_no = 15009 AND project_no = 'p3';
```

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Run Cancel Disconnect Change Database: sample2 Estimated Plan Enable Actual Plan Parse

```
555 --project_log
556 CREATE TABLE project_log (
557     log_id INT IDENTITY(1,1) PRIMARY KEY,
558     emp_no INT,
559     project_no CHAR(4),
560     job VARCHAR(50),
561     enter_date DATE,
562     log_date DATETIME DEFAULT GETDATE()
563 );
564 GO
565 --AFTER INSERT
566 CREATE TRIGGER trg_LogNewProjectAssignment
567 ON works_on
568 AFTER INSERT
569 AS
570 BEGIN
571     INSERT INTO project_log (emp_no, project_no, job, enter_date, log_date)
572     SELECT emp_no, project_no, job, enter_date, GETDATE()
573     FROM inserted;
574 END;
575 GO
576
577 INSERT INTO employee (emp_no, emp_fname, emp_lname, dept_no)
578 VALUES (15009, 'Jenny', 'Kim', 'D3');
579
580 INSERT INTO works_on (emp_no, project_no, job, enter_date)
581 VALUES (15009, 'p3', 'Quality Analyst', '2024-11-12');
582
583 SELECT * FROM project_log WHERE emp_no = 15009 AND project_no = 'p3';
584
585
```

Results Messages

	log_id	emp_no	project_no	job	enter_date	log_date
1	1	15009	p3	Quality Analyst	2024-11-12	2024-11-12 23:59:03.423

Execute stored procedure:

**INSERT INTO works_on (emp_no, project_no, job, enter_date)
VALUES (15008, 'p3', 'Quality Analyst', '2024-11-12');**

SELECT * FROM project_log WHERE emp_no = 15008 AND project_no = 'p3';

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Run Cancel Disconnect Change Database: sample2 Estimated Plan Enable Actual Plan Pars

```
555 --project_log
556 CREATE TABLE project_log (
557     log_id INT IDENTITY(1,1) PRIMARY KEY,
558     emp_no INT,
559     project_no CHAR(4),
560     job VARCHAR(50),
561     enter_date DATE,
562     log_date DATETIME DEFAULT GETDATE()
563 );
564 GO
565 --AFTER INSERT
566 CREATE TRIGGER trg_LogNewProjectAssignment
567 ON works_on
568 AFTER INSERT
569 AS
570 BEGIN
571     INSERT INTO project_log (emp_no, project_no, job, enter_date, log_date)
572     SELECT emp_no, project_no, job, enter_date, GETDATE()
573     FROM inserted;
574 END;
575 GO
576
577 INSERT INTO works_on (emp_no, project_no, job, enter_date)
578 VALUES (15008, 'p3', 'Quality Analyst', '2024-11-12');
579
580 SELECT * FROM project_log WHERE emp_no = 15008 AND project_no = 'p3';
```

Results Messages

	log_id	emp_no	project_no	job	enter_date	log_date
1	2	15008	p3	Quality Analyst	2024-11-12	2024-11-13 00:03:59.833

3.

CREATE MASTER KEY ENCRYPTION BY PASSWORD = '\$y\$tem@123';

CREATE CERTIFICATE EmployeeNamesCert

WITH SUBJECT = 'Certificate for Employee Names Encryption';

GO

CREATE SYMMETRIC KEY EmployeeNames_SK

WITH ALGORITHM = AES_256

ENCRYPTION BY CERTIFICATE EmployeeNamesCert;

GO

ALTER TABLE employee ADD

encrypted_fname varbinary(256),

encrypted_lname varbinary(256);

GO

OPEN SYMMETRIC KEY EmployeeNames_SK

DECRYPTION BY CERTIFICATE EmployeeNamesCert;

UPDATE employee

SET

encrypted_fname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_fname),

encrypted_lname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_lname);

select * from employee;

Go

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Run Cancel Disconnect Change Database: sample2 Estimated Plan Enable Actual Plan Parse

```

594
595 CREATE MASTER KEY ENCRYPTION BY PASSWORD = '$y$tem@123';
596
597 CREATE CERTIFICATE EmployeeNamesCert
598     WITH SUBJECT = 'Certificate for Employee Names Encryption';
599 GO
600
601 CREATE SYMMETRIC KEY EmployeeNames_SK
602     WITH ALGORITHM = AES_256
603     ENCRYPTION BY CERTIFICATE EmployeeNamesCert;
604 GO
605
606 ALTER TABLE employee ADD
607     encrypted_fname varbinary(256),
608     encrypted_lname varbinary(256);
609 GO
610
611 OPEN SYMMETRIC KEY EmployeeNames_SK
612     DECRYPTION BY CERTIFICATE EmployeeNamesCert;
613
614 UPDATE employee
615 SET
616     encrypted_fname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_fname),
617     encrypted_lname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_lname);
618
619 select * from employee;
620

```

Results Messages

	emp_no	dept_no	emp_fname	emp_lname	encrypted_fname	encrypted_lname
1	15000	D3	John	Smith	0x00ACB2765E13814E8780AFF0FF9552AB0200000343095E7B4...	0x00ACB2765E13814E8780AFF0FF9552AB020000006627BB...
2	15001	D2	Mark	Kelter	0x00ACB2765E13814E8780AFF0FF9552AB0200000069AC6C7E...	0x00ACB2765E13814E8780AFF0FF9552AB02000000FE0241...
3	15002	D3	Peter	McDonalds	0x00ACB2765E13814E8780AFF0FF9552AB02000000A13C35BCF8...	0x00ACB2765E13814E8780AFF0FF9552AB02000000F37B24...
4	15003	D2	Ba	Tran	0x00ACB2765E13814E8780AFF0FF9552AB020000009D7D4DE9BF...	0x00ACB2765E13814E8780AFF0FF9552AB0200000017C841...
5	15004	D3	Rohit	Joshi	0x00ACB2765E13814E8780AFF0FF9552AB020000007CC6E21757...	0x00ACB2765E13814E8780AFF0FF9552AB020000009858DE...
6	15005	D4	Lei	Zhou	0x00ACB2765E13814E8780AFF0FF9552AB02000000940B9A329D...	0x00ACB2765E13814E8780AFF0FF9552AB0200000045746F...
7	15006	D5	Juan	Garcia	0x00ACB2765E13814E8780AFF0FF9552AB02000000439DF25C15...	0x00ACB2765E13814E8780AFF0FF9552AB02000000137B9C...
8	15007	D2	Deshaun	Jackson	0x00ACB2765E13814E8780AFF0FF9552AB0200000069C8EE3868...	0x00ACB2765E13814E8780AFF0FF9552AB0200000034C7F9...
9	15008	D3	Lionell	Messi	0x00ACB2765E13814E8780AFF0FF9552AB020000006F31BD0DE7...	0x00ACB2765E13814E8780AFF0FF9552AB020000001BD6A8...
10	15009	D3	Jenny	Kim	0x00ACB2765E13814E8780AFF0FF9552AB020000009E20EEE704...	0x00ACB2765E13814E8780AFF0FF9552AB02000000372522...

```

SELECT
    emp_no,
    CONVERT(VARCHAR(20), DecryptByKey(encrypted_fname)) AS emp_fname_decrypted,
    CONVERT(VARCHAR(20), DecryptByKey(encrypted_lname)) AS emp_lname_decrypted
FROM employee;

```

```

CLOSE SYMMETRIC KEY EmployeeNames_SK;

```

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Run Cancel Disconnect Change Database: sample2 Estimated Plan Enable Actu

```

612 DECRYPTION BY CERTIFICATE EmployeeNamesCert;
613
614 UPDATE employee
615 SET
616     encrypted_fname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_fname),
617     encrypted_lname = EncryptByKey(Key_GUID('EmployeeNames_SK'), emp_lname);
618
619 select * from employee;
620 Go
621
622 SELECT
623     emp_no,
624     CONVERT(VARCHAR(20), DecryptByKey(encrypted_fname)) AS emp_fname_decrypted,
625     CONVERT(VARCHAR(20), DecryptByKey(encrypted_lname)) AS emp_lname_decrypted
626 FROM employee;
627
628 CLOSE SYMMETRIC KEY EmployeeNames_SK;
629
630
631
632

```

Results Messages

	emp_no	emp_fname_decrypted	emp_lname_decrypted
1	15000	John	Smith
2	15001	Mark	Kelter
3	15002	Peter	McDonalds
4	15003	Ba	Tran
5	15004	Rohit	Joshi
6	15005	Lei	Zhou
7	15006	Juan	Garcia
8	15007	Deshaun	Jackson
9	15008	Lionell	Messi
10	15009	Jenny	Kim
11	25348	Luke	Smith
12	28559	Matthew	Hoyer
13	29346	Jay	Moser