LAB 4

Transaction

Subject: Database Management System

Class: IS210.M21.HTCL

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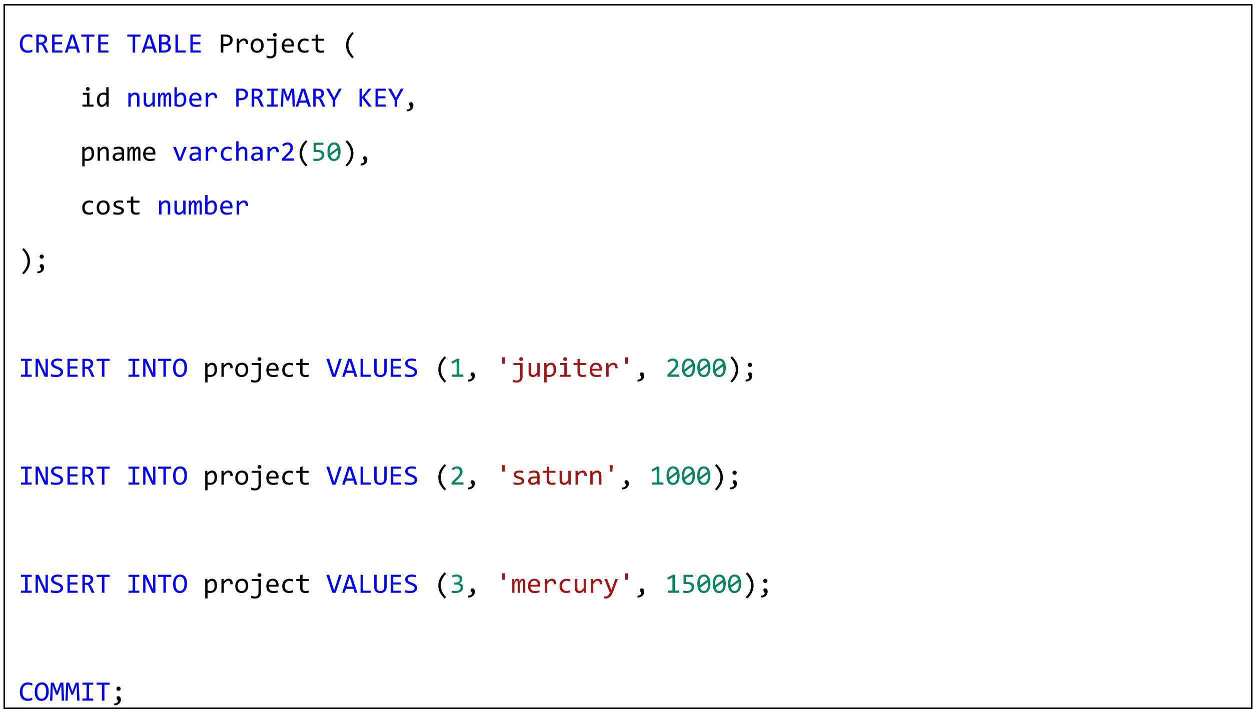
1. Transaction Control



```sql
CREATE TABLE Project (
    id number PRIMARY KEY,
    pname varchar2(50),
    cost number
);

INSERT INTO project VALUES (1, 'jupiter', 2000);

INSERT INTO project VALUES (2, 'saturn', 1000);

INSERT INTO project VALUES (3, 'mercury', 15000);

COMMIT;
```

1.1. Example: rollback

Time	session	output
t0	COMMIT;	Commit completed
t1	SET TRANSACTION NAME 'cost_update';	Transaction NAMED succeeded
t2	SELECT XID, name, STATUS FROM V$TRANSACTION;	No rows selected

t3	UPDATE project
	    SET cost = 8000
	    WHERE id = 1;
		1 rows updated

t4	SELECT XID, name, STATUS FROM V$TRANSACTION;	0100110034030000 null ACTIVE
t5	SELECT * FROM project;	1 JUPITER 2000 2 Saturn 6000 3 Mercury 15000
t6	ROLLBACK;	Rollback complete.

Time	session	output
t7	SELECT * FROM project;	null
t8	SELECT XID, name, STATUS FROM V$TRANSACTION;	null

1.2. Example: commit

Time	session	output
t1	COMMIT;	Commit complete.
t2	SELECT XID, name, STATUS FROM V$TRANSACTION;	null

t3	UPDATE project
	SET cost = 6000
	WHERE id = 2;
		1 row updated.

t4	SELECT XID, name, STATUS FROM V$TRANSACTION;	090011002D030000 null ACTIVE
t5	Insert into project values (4, 'neptune', 19000);	1 row inserted.
t6	SELECT XID, name, STATUS FROM V$TRANSACTION;	090011002D030000 null ACTIVE
t7	COMMIT;	Commit complete.
t8	SELECT * FROM project;	1 JUPITER 2000 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t9	SELECT XID, name, STATUS FROM V$TRANSACTION;	null

1.3. Example: savepoint

Time	session	output
t0	COMMIT;	Commit complete.
t1	Select * from project;	1 JUPITER 2000 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t2	Update project set cost=400000 where pname='jupiter';	1 row updated.
t3	SAVEPOINT after_jupiter_cost;	Savepoint created.
t4	Update project set cost=130 where pname='jupiter';	1 rows updated.
t5	SAVEPOINT after_mercury_cost;	Savepoint created.
t6	ROLLBACK TO SAVEPOINT after_jupiter_cost;	Rollback complete.
t7	Select * from project;	1 JUPITER 400000 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t8	Update project set cost=170 where pname='mercury';	1 row updated.
t9	ROLLBACK;	Rollback complete.
t10	Select * from project;	1 JUPITER 2000 2 Saturn 6000 3 Mercury 15000 4 neptune 19000

1.4. Example: DDL

Time	session	output
t0	COMMIT;	Commit complete.

Time	session	output
t1	Select * from project;	1 JUPITER 2000 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t2	SET TRANSACTION NAME 'cost_update2';	Transaction NAME succeeded.
t3	Update project set cost=12300 where pname='jupiter';	1 row updated.
t4	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t5	--DDL statement Create table test (id number);	Table TEST created.
t6	Insert into test values (26);	1 row inserted.
t7	Rollback;	Rollback complete.

t8	Select * from project;
	Select * from test;
		1 JUPITER 12300
		2 Saturn 6000
		3 Mercury 15000
		4 neptune 19000
		
		null

From SQLDeveloper:

Right click on a connection and chose 'Open SQL Worksheet' it will create another window for the existing session. (Use Alt + F10and select the connection from the list).

If you need to create another independent session you can use Ctrl + Shift + N for an ongoing session.

Open two session (Ctrl + Shift + N) and do the following things.

1.5. Compare data at time t3 and t5

a.

Time	Session1	Output1	Session2	Output2
t0	SET TRANSACTION NAME 'cost_update3';	Transaction NAME succeeded.		
t1	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000		
t2	Update project set cost=467 where pname='jupiter';	1 rows updated		
t3	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t4	Rollback;	Rollback complete.		
t5	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000	Select * from project;	1 JUPITER 12300 2 Saturn 6000 3 Mercury 15000 4 neptune 19000

b.

Time	Session1	Output1	Session2	Output2
t1	SET TRANSACTION NAME 'cost_update5';	Transaction NAME succeeded.		
t2	Update project set cost=1900 where pname='jupiter';	1 row updated.		
t3	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t4	Commit;	Commit complete.		
t5	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000

1.6. Compare data at time t3, t5 and t8

Time	Session1	Output1	Session2	Output2
t0	SET TRANSACTION NAME 'cost_update6';	Transaction NAME succeeded.	SET TRANSACTION NAME 'cost_update7';	Transaction NAME succeeded.
t1	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000
t2	Update project set cost=3456 where pname='mercury';	1 row updated.		
t3	Select * from project;	1 JUPITER 1900 2 Saturn 6000	Select * from project;	1 JUPITER 1900 2 Saturn 6000

Time	Session1	Output1	Session2	Output2
		3 Mercury 3456 4 neptune 19000		3 Mercury 3456 4 neptune 19000
t4			Insert into project values (5, 'mars', 14500);	1 row inserted.
t5	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 3456 4 neptune 19000	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000 5 mars 14500
t6	Rollback;	Rollback complete.		
t7			Commit;	Commit complete.
t8	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000 5 mars 14500	Select * from project;	1 JUPITER 1900 2 Saturn 6000 3 Mercury 15000 4 neptune 19000 5 mars 14500

1.7. F

Time	Session1	Output1	Session2	Output2
t0	SET TRANSACTION NAME 'cost_update8';		SET TRANSACTION NAME 'cost_update9';	
t1	Update project set cost=3490 where pname='mercury';			
t2	Select * from project;		Select * from project;	
t3			Update project set cost=298 Where pname='saturn';	
t4	Select * from project;		Select * from project;	
t5	Create table test1 (id number);			

Time	Session1	Output1	Session2	Output2
t6	Rollback;			
t7	Select * from project;		Select * from project;	
t8			Commit;	
t9	Select * from project;		Select * from project;	

2. Transaction Processing in PL/SQL

```
CREATE TABLE accounts (account_id NUMBER(6), balance NUMBER (10,2),
           check (balance>=0));
INSERT INTO accounts VALUES (7715, 6350.00);
INSERT INTO accounts VALUES (7720, 5100.50);
COMMIT;
```

2.1. Example: transfer money ($250) from account 7715 to 7720

Time	Session	output
t0	SELECT * FROM accounts;	7715 6350 7720 5100.5

t1	DECLARE
	  transfer NUMBER(8,2) := 250;
	BEGIN
	  UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	  UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	  COMMIT;
	END;
		PL/SQL procedure successfully completed.

t2	SELECT * FROM accounts;	7715 6100 7720 5350.5

2.2. Example: Transfer money ($9000) from account 7715 to 7720

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 5350.5

t1	DECLARE
	  transfer NUMBER(8,2) := 9000;
	BEGIN
	  UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	  UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	  COMMIT;
	END;
		Error report -
		ORA-02290: check constraint (HOANGLONG.SYS_C007616) violated
		ORA-06512: at line 4
		02290. 00000 - "check constraint (%s.%s) violated"
		*Cause: The values being inserted do not satisfy the named check
		*Action: do not insert values that violate the constraint

t2	SELECT * FROM accounts;	7715 6100 7720 5350.5

2.3. Example: Transfer money ($9000) from account 7715 to 7720

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 5350.5

t1	DECLARE
	  transfer NUMBER(8,2) := 9000;
	BEGIN
		Error report -
		ORA-02290: check constraint (HOANGLONG.SYS_C007616) violated

	UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	COMMIT;
	END;
		ORA-06512: at line 4
		02290. 00000 - "check constraint (%s.%s) violated"
		*Cause: The values being inserted do not satisfy the named check
		*Action: do not insert values that violate the constraint

t2	SELECT * FROM accounts;	7715 6100 7720 5350.5

2.4. Example: Transfer money ($9000) from account 7715 to 7720

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 5350.5

t1	DECLARE
	transfer NUMBER(8,2) := 9000;
	BEGIN
	UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	COMMIT;
	UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	COMMIT;
	END;
		Error report -
		ORA-02290: check constraint (HOANGLONG.SYS_C007616) violated
		ORA-06512: at line 6
		02290. 00000 - "check constraint (%s.%s) violated"
		*Cause: The values being inserted do not satisfy the named check
		*Action: do not insert values that violate the constraint.

t2	SELECT * FROM accounts;	7715 6100 7720 14350.5

2.5. Example: PL/SQL WITH EXCEPTION

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 14350.5

t1	SET SERVEROUTPUT ON
	DECLARE
	  transfer NUMBER(8,2) := 9000;
	BEGIN
	    UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	    UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	  COMMIT;
	    EXCEPTION WHEN **OTHERS** THEN
	        Dbms_output.put_line ('error!!!!!!!!! ');
	END;
		*Action: do not insert values that violate the constraint.
		error!!!!!!!!!
		PL/SQL procedure successfully completed.

t2	SELECT * FROM accounts;	7715 6100 7720 23350.5

2.6. Example: PL/SQL WITH EXCEPTION

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 23350.5

t1	DECLARE
	  transfer NUMBER(8,2) := 9000;
	BEGIN
		Error report -
		ORA-02290: check constraint (HOANGLONG.SYS_C007616) violated

	UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	COMMIT;
	EXCEPTION WHEN OTHERS THEN
	RAISE;
	END;
		ORA-06512: at line 8
		ORA-06512: at line 5
		02290. 00000 - "check constraint (%s.%s) violated"
		*Cause: The values being inserted do not satisfy the named check
		*Action: do not insert values that violate the constraint.

t2	SELECT * FROM accounts;	7715 6100 7720 23350.5

2.7. Example: PL/SQL WITH EXCEPTION

Time	Session	output
t0	SELECT * FROM accounts;	7715 6100 7720 23350.5

t1	DECLARE
	transfer NUMBER(8,2) := 9000;
	BEGIN
	UPDATE accounts SET balance = balance + transfer WHERE account_id = 7720;
	COMMIT;
	UPDATE accounts SET balance = balance - transfer WHERE account_id = 7715;
	EXCEPTION WHEN OTHERS THEN
	RAISE;
	END;
		Error report -
		ORA-02290: check constraint (HOANGLONG.SYS_C007616) violated
		ORA-06512: at line 8
		ORA-06512: at line 6
		02290. 00000 - "check constraint (%s.%s) violated"
		*Cause: The values being inserted do not satisfy the named check
		*Action: do not insert values that violate the constraint.

t2	`SELECT * FROM accounts;`	`7715    6100`
		`7720    32350.5`