1. **Transaction Control**

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;

Write out the results of these statements:

1. Example: rollback

| **Time** | **session** | **output** |
| --- | --- | --- |
| t0 | COMMIT; | Commit complete. |
| t1 | SET TRANSACTION NAME 'cost\_update'; | Transaction NAME succeeded. |
| t2 | SELECT XID, name, STATUS FROM V$TRANSACTION; | No rows selected. |
| t3 | UPDATE project  SET cost = 8000  WHERE id = 1; | 1 row updated |
| t4 | SELECT XID, name, STATUS FROM V$TRANSACTION; | 0A001000E7020000 cost\_update ACTIVE |
| t5 | SELECT \* FROM project; | 1 jupiter 8000  2 saturn 1000  3 mercury 15000 |
| t6 | ROLLBACK; | Rollback complete. |
| t7 | SELECT \* FROM project; | 1 jupiter 2000  2 saturn 1000  3 mercury 15000 |
| t8 | SELECT XID, name, STATUS FROM V$TRANSACTION; | No rows selected. |

1. Example: commit

| **Time** | **session** | **output** |
| --- | --- | --- |
| t1 | COMMIT; | Commit complete. |
| t2 | SELECT XID, name, STATUS FROM V$TRANSACTION; | No rows selected |
| t3 | UPDATE project  SET cost = 6000  WHERE id = 2; | 1 row updated. |
| t4 | SELECT XID, name, STATUS FROM V$TRANSACTION; | 030000008B020000 ACTIVE |
| t5 | Insert into project values (4, 'neptune', 19000); | 1 row inserted. |
| t6 | SELECT XID, name, STATUS FROM V$TRANSACTION; | 030000008B020000 ACTIVE |
| t7 | COMMIT; | Commit complete. |
| t8 | SELECT \* FROM project; | 1 jupiter 2000  2 saturn 6000  3 mercury 15000  4 neptune 19000 |
| t9 | SELECT XID, name, STATUS FROM V$TRANSACTION; | No rows selected |

1. 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 row 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. Example: DDL

| **Time** | **session** | **output** |
| --- | --- | --- |
| t0 | COMMIT; | Commit complete. |
| 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  No rows selected. |

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. Compare data at time t3 and t5

| **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 row updated. |  |  |
| t3 | Select \* from project; | 1 jupiter 467  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; | Rollbacks 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 |

| **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 12300  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. 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  3 mercury 3456  4 neptune 19000 | Select \* from project; | 1 jupiter 1900  2 saturn 6000  3 mercury 15000  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. F

| **Time** | **Session1** | **Output1** | **Session2** | **Output2** |
| --- | --- | --- | --- | --- |
| t0 | SET TRANSACTION NAME 'cost\_update8'; | Transaction NAME succeeded. | SET TRANSACTION NAME 'cost\_update9'; | Transaction NAME succeeded. |
| t1 | Update project set cost=3490  where pname='mercury'; |  |  |  |
| t2 | Select \* from project; |  | Select \* from project; | 1 jupiter 1900  2 saturn 6000  3 mercury 15000  4 neptune 19000  5 mars 14500 |
| t3 |  |  | Update project set cost=298  Where pname='saturn'; | 1 row updated. |
| t4 | Select \* from project; | 1 jupiter 1900  2 saturn 6000  3 mercury 3490  4 neptune 19000  5 mars 14500 | Select \* from project; | 1 jupiter 1900  2 saturn 298  3 mercury 15000  4 neptune 19000  5 mars 14500 |
| t5 | Create table test1 (id number); | Table TEST1 created. |  |  |
| t6 | Rollback; |  |  |  |
| t7 | Select \* from project; | 1 jupiter 1900  2 saturn 6000  3 mercury 3490  4 neptune 19000  5 mars 14500 | Select \* from project; | 1 jupiter 1900  2 saturn 298  3 mercury 15000  4 neptune 19000  5 mars 14500 |
| t8 |  |  | Commit; | Commit complete. |
| t9 | Select \* from project; | 1 jupiter 1900  2 saturn 298  3 mercury 15000  4 neptune 19000  5 mars 14500 | Select \* from project; | 1 jupiter 1900  2 saturn 298  3 mercury 15000  4 neptune 19000  5 mars 14500 |

1. **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;

Following is the difference circumstance of transferring money

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 |

1. 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 (PDB5USER.SYS\_C007561) 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 |

1. 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;  UPDATE accounts SET balance = balance - transfer WHERE account\_id = 7715;  COMMIT;  END; | Error report -  ORA-02290: check constraint (PDB5USER.SYS\_C007561) violated  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 5350.5 |

1. 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 (PDB5USER.SYS\_C007561) 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 |

1. Example: PL/SQL WITH EXCEPTION

|  |  |  |
| --- | --- | --- |
| **Time** | **Session** | **output** |
| t0 | SELECT \* FROM accounts; | 7715 6100  7720 14350.5 |
| t1 | 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; | error!!!!!!!!!  PL/SQL procedure successfully completed. |
| t2 | SELECT \* FROM accounts; | 7715 6100  7720 23350.5 |

1. 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;  UPDATE accounts SET balance = balance - transfer WHERE account\_id = 7715;  COMMIT;  EXCEPTION WHEN OTHERS THEN  **RAISE;**  END; | Error report -  ORA-02290: check constraint (PDB5USER.SYS\_C007561) violated  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 |

1. 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 (PDB5USER.SYS\_C007561) 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 |