

T-SQL Lab 01: Create Database Objects and Manipulate Data

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Contents

Introduction	1
Lab Activities	1
Create an instance level login	1
Create and set options for a database	2
Create a database user	3
Create a database schema	3
Create and transfer tables between schemas	4
Create other tables for the database	5
Insert data into created tables	6
Create and enforce foreign key constraints	8
Drop tables	9

Introduction

This lab aims to help students get used to DDL statements to create database objects and manipulate data in SQL Server environment.

Lab Activities

Create an instance level login

```
5 use master;
6 go
7
8 --drop hr instance level login
9
```

```

10  if exists (
11      select name
12      from master.sys.server_principals
13      where name = 'hr')
14  begin
15      drop login hr;
16  end
17  go
18
19
20  --Create instance level login hr
21  if not exists (
22      select name
23      from master.sys.server_principals
24      where name = 'hr')
25  begin
26      create login hr
27          with password = 'dbsys2018';
28  end
29  go
30
31  --verify that the hr user has been created
32  select *
33      from master.sys.server_principals
34      where name = 'hr';
35  go

```

Create and set options for a database

```

39  --drop database if already exists
40  drop database if exists company;
41  go
42
43  --for earlier versions of SQL Server
44  /*
45  if DB_ID('COMPANY') is not null
46      drop database company;
47  */
48
49  --create the database
50  create database company;
51  go
52  /*
53
54  alter database company

```

```

55         set read_only;
56     go
57
58     --the folowing statements will cause error
59     use company;
60     go
61
62     create table test(id int primary key,
63         name varchar(30));
64     go
65
66     --set the database option back to read_write
67     use master;
68     go
69
70     alter database company
71     set read_write;
72     go
73 */

```

Create a database user

```

77 --creating database user mapped to login
78 use company;
79 go
80
81 if USER_ID('hr') is null
82     begin
83         CREATE USER hr FOR LOGIN hr;
84         alter role [db_owner] add member [hr];
85     end
86 go

```

Create a database schema

```

90 --drop hr schema if already exists
91 drop schema if exists hr;
92 go
93 --for earlier versions
94 /*
95 if schema_ID('hr') is not null
96     drop schema hr;
97 go
98 */

```

```

99
100 --create hr schema with hr user as owner
101 create schema hr authorization hr;
102 go
103
104 --verify that hr shema created
105 select * from sys.schemas
106 where name = 'hr';
107 go
108
109 --assign hr as default schema for user hr
110 alter user hr
111     with default_schema = hr;
112 go
113
114 select name, default_schema_name
115 from sys.database_principals
116 where name = 'hr';
117 go

```

Create and transfer tables between schemas

```

121 --creating tables
122 create table department (
123     dname varchar(20) not null,
124     dnumber int not null,
125     mgrssn char(9) not null,
126     mgrstartdate date not null,
127     constraint pk_department primary key (dnumber),
128     constraint ck_department unique (dname)
129 );
130
131 --verify that department table created in the default schema dbo
132 select s.name, t.name
133 from sys.tables t join sys.schemas s
134     on t.schema_id = s.schema_id
135 order by s.name, t.name;
136
137 --switch to hr user's security context
138 execute as user = 'hr';
139
140 --creating employee table in the default dbo schema
141 create table employee (
142     fname varchar(15) not null,
143     lname varchar(20) not null,

```

```

144     ssn char(9) not null,
145     bdate date not null,
146     address varchar(30) not null,
147     sex char(1) not null,
148     salary decimal(10,2) not null,
149     superssn char(9),
150     dno int not null,
151     constraint pk_employee primary key (ssn)
152 );
153
154 --verify that employee table created in hr schema, which is the default schema for hr user
155 select s.name, t.name
156 from sys.tables t join sys.schemas s
157     on t.schema_id = s.schema_id
158 order by s.name, t.name;
159
160 --go back to previous security context
161 revert;
162 go
163
164 --move employee table from dbo schema to hr schema
165 alter schema dbo transfer hr.employee;
166 go
167
168 --verify
169 select s.name, t.name
170 from sys.tables t join sys.schemas s
171     on t.schema_id = s.schema_id
172 order by s.name, t.name;

```

Create other tables for the database

```

176 --creating other tables in the default dbo schema
177 create table project (
178     pname varchar(20) not null,
179     pnumber int not null,
180     plocation varchar(20) not null,
181     dnum int not null,
182     constraint pk_project primary key (pnumber),
183     constraint ck_project unique (pname)
184 );
185
186 create table works_on (
187     essn char(9) not null,
188     pno int not null,

```

```

189     hours decimal(5,1),
190     constraint pk_works_on primary key (essn, pno)
191 );
192
193 create table dependent (
194     essn char(9) not null,
195     dependent_name varchar(10) not null,
196     sex char(1) not null,
197     bdate date not null,
198     relationship varchar(30) not null,
199     constraint pk_dependent primary key (essn, dependent_name)
200 );
201
202 create table dept_locations (
203     dnumber int not null,
204     dlocation varchar(15) not null,
205     constraint pk_dept_locations primary key (dnumber, dlocation)
206 );

```

Insert data into created tables

```

210 --insert data into tables
211 insert into department values
212     ('Research',5,'333445555','1988-05-22'),
213     ('Administration',4,'987654321','1995-01-01'),
214     ('Headquarters',1,'888665555','1981-06-19');
215
216 insert into employee values
217     ('John','Smith','123456789','1965-01-09',
218         '731 Fondren, Houston TX','M',30000,'333445555',5),
219     ('Franklin','Wong','333445555','1965-12-08',
220         '638 Voss, Houston TX','M',40000,'888665555',5),
221     ('Alicia','Zelaya','999887777','1968-01-19',
222         '3321 Castle, Spring TX','F',25000,'987654321',4),
223     ('Jennifer','Wallace','987654321','1941-06-20',
224         '291 Berry, Bellaire TX','F',43000,'888665555',4),
225     ('Ramesh','Narayan','666884444','1962-09-15',
226         '975 Fire Oak, Humble TX','M',38000,'333445555',5),
227     ('Joyce','English','453453453','1972-07-31',
228         '5631 Rice, Houston TX','F',25000,'333445555',5),
229     ('Ahmad','Jabbar','987987987','1969-03-29',
230         '980 Dallas, Houston TX','M',25000,'987654321',4),
231     ('James','Borg','888665555','1937-11-10',
232         '450 Stone, Houston TX','M',55000,null,1);
233

```

```

234 insert into project values
235 ('ProductX',1,'Bellaire',5),
236 ('ProductY',2,'Sugarland',5),
237 ('ProductZ',3,'Houston',5),
238 ('Computerization',10,'Stafford',4),
239 ('Reorganization',20,'Houston',1),
240 ('Newbenefits',30,'Stafford',4);
241
242 insert into works_on values
243 ('123456789',1,32.5),
244 ('123456789',2,7.5),
245 ('666884444',3,40.0),
246 ('453453453',1,20.0),
247 ('453453453',2,20.0),
248 ('333445555',2,10.0),
249 ('333445555',3,10.0),
250 ('333445555',10,10.0),
251 ('333445555',20,10.0),
252 ('999887777',30,30.0),
253 ('999887777',10,10.0),
254 ('987987987',10,35.0),
255 ('987987987',30,5.0),
256 ('987654321',30,20.0),
257 ('987654321',20,15.0),
258 ('888665555',20,null);
259
260 insert into dependent values
261 ('333445555','Alice','F','1986-04-04','Daughter'),
262 ('333445555','Theodore','M','1983-10-25','Son'),
263 ('333445555','Joy','F','1958-05-03','Spouse'),
264 ('987654321','Abner','M','1942-02-28','Spouse'),
265 ('123456789','Michael','M','1988-01-04','Son'),
266 ('123456789','Alice','F','1988-12-30','Daughter'),
267 ('123456789','Elizabeth','F','1967-05-05','Spouse');
268
269 insert into dept_locations values
270 (1,'Houston'),
271 (4,'Stafford'),
272 (5,'Bellaire'),
273 (5,'Sugarland'),
274 (5,'Houston');

```

Create and enforce foreign key constraints

```
278  --create and enforce foreign key constraints
279  alter table department
280  with nocheck add constraint fk_department_employee
281      foreign key (mgrssn) references employee(ssn);
282  go
283
284  alter table department
285      check constraint fk_department_employee;
286  go
287
288  alter table employee
289  with nocheck add constraint fk_employee_department
290      foreign key (dno) references department(dnumber);
291  go
292
293  alter table employee
294  with nocheck add constraint fk_employee_employee
295      foreign key (superssn) references employee(ssn);
296
297
298  alter table employee
299      check constraint fk_employee_department;
300  go
301
302  alter table employee
303      check constraint fk_employee_employee;
304  go
305
306  alter table project
307  with nocheck add constraint fk_project_department
308      foreign key (dnum) references department(dnumber);
309  go
310
311  alter table project
312      check constraint fk_project_department;
313  go
314
315  alter table works_on
316  with nocheck add constraint fk_works_on_employee
317      foreign key (essn) references employee(ssn);
318  go
319
320  alter table works_on
```



```

321 with nocheck add constraint fk_works_on_project
322     foreign key (pno) references project(pnumber);
323 go
324
325 alter table works_on
326     check constraint fk_works_on_employee;
327 go
328
329 alter table works_on
330     check constraint fk_works_on_project;
331 go
332
333 alter table dependent
334 with nocheck add constraint fk_dependent_employee
335     foreign key (essn) references employee(ssn);
336 go
337
338 alter table dependent
339 check constraint fk_dependent_employee;
340 go
341
342 alter table dept_locations
343 with nocheck add constraint fk_dept_locations_department
344     foreign key (dnumber) references department(dnumber);
345 go
346
347 alter table dept_locations
348 check constraint fk_dept_locations_department;
349 go

```

Drop tables

```

353 --drop foreign key constraints then drop tables
354 /*
355 alter table department
356     drop constraint fk_department_employee;
357 alter table employee
358     drop constraint fk_employee_department;
359 alter table employee
360     drop constraint fk_employee_employee;
361 alter table project
362     drop constraint fk_project_department;
363 alter table works_on
364     drop constraint fk_works_on_employee;
365 alter table works_on

```

```
366         drop constraint fk_works_on_project;
367 alter table dependent
368         drop constraint fk_dependent_employee;
369 alter table dept_locations
370         drop constraint fk_dept_locations_department;
371 go
372
373 drop table department;
374 drop table employee;
375 drop table project;
376 drop table works_on;
377 drop table dependent;
378 drop table dept_locations;
379 go
380 */
```