



**JSC “Kazakh British Technical University”  
School of Mathematic and Cybernetics**

Analysis of Data Bases

**Laboratory Work #3**

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## 1.1 Add constraint Primary key – for new column EMP\_ID

```
281 alter table employees
282 add column emp_id serial ;
283 alter table employees add constraint pk_employees primary key (emp_id);
284 /* Primary key - for new column EMP_ID */
```

first_name	last_name	email	phone_number	hire_date	job_id	salary	commission_pct	department_id	emp_id
Y	Higgins	SHIGGINS	515.123.8080	1994-06-07	AC_MGR	12000	36000	110	1
M	Gietz	WGIEZT	515.123.8181	1994-06-07	AC_ACCOUNT	8300	24900	110	2
Li	Moldash	SKING	515.123.4567	2001-08-18	AD_PRES	24000	72000	10	3
	Kochhar	NKOCHAR	515.123.4568	1989-09-21	AD_VP	17000	51000	10	4
	De Haan	LDEHAAN	515.123.4569	1993-03-13	AD_VP	17000	51000	10	5
er	Whalen	JWHALEN	515.123.4444	1987-09-17	AD_ASST	4400	13200	10	6
l	Hartstein	MHARTSTE	515.123.5555	1996-02-17	MK_MAN	13000	39000	20	7
	Fay	PFAY	603.123.6666	1997-08-17	MK_REP	6000	18000	20	8
	Mourgos	KNOURGOS	650.123.5234	1999-11-16	SH_MAN	5800	17400	50	9
	Rajs	TRAJS	650.121.8009	1995-10-17	SH_CLERK	3500	10500	50	10
	Davies	CDAVIES	650.121.2994	1997-01-29	SH_CLERK	3100	9300	50	11
l	Matos	RMATOS	650.121.2874	1998-03-15	SH_CLERK	2600	7800	50	12
	Vargas	PVARGAS	650.121.2004	1998-07-09	SH_CLERK	2500	7500	50	13
der	Hunold	AHUNOLD	515.123.4567	1990-01-03	IT_PROG	9000	27000	60	14
	Ernst	BERNST	515.123.4568	1991-05-21	IT_PROG	6000	18000	60	15
	Lorentz	DLorentz	515.123.4567	1999-02-07	IT_PROG	4200	12600	60	16
	Zlotkey	EZLOTKEY	011.44.1344.429018	2000-01-29	SA_MAN	10500	31500	80	17
	Abel	EABEL	011.44.1644.429267	1996-05-11	SA_REP	11000	33000	80	18
on	Taylor	JTAYLOR	011.44.1644.429265	1998-03-24	SA_REP	8600	25800	80	19
ely	Grant	KGRANT	011.44.1644.429263	1999-05-24	SA_REP	7000	21000	80	20
olat	Maratuly	t_maratuly@kbtu.kz	515.123.2132	2001-01-31	IT_PROG	35000	105000	60	21

## 1.2 Add constraint unique – for Email

```
285 alter table employees add unique (email);
286 /* Unique - for Email */
```

## 1.3 Add constraint not null – for First\_Name

```
287 alter table employees alter column first_name set not null;
288 /*Not Null - for First_Name*/
```

## 1.4 Add constraint Check >1000 – for Salary

```
289 alter table employees add check ( salary > 1000 );
290 /*Check >1000 - for Salary */
```

## 1.5 Add constraint Check where the last name's length < 15

```
291 alter table employees add check( length(last_name) < 15);
292 /*The length of the last name < 15 */
```

## 1.6 Add new Employee taking into account all constraints

```
293 insert into employees values (105,'Temirbolat','Maratuly','t_maratuly@kbtu.kz','515.123.2132','2001-01-31','IT_PROG',35000,105_000,60);
294 /*Add a new Employee Temirbolat to the existed table and satisfy the constraints*/
```

105	Temirbolat	Maratuly	t_maratuly@kbtu.kz	515.123.2132	2001-01-31	IT_PROG	35000	105000	60	21
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## 1.7 Create queries that would give errors for each constraint

```
295 insert into employees values (208,NULL,'Wolf','w_olf@kbtu.kz','123.412.2133','2012.11.10','SA_MAN',1500,80,default);
296 /*Here we obtain error because the name is NULL*/
```

[23502] ОШИБКА: значение NULL в столбце "first\_name" отношения "employees" нарушает ограничение NOT NULL  
Подробности: Ошибочная строка содержит (208, null, Wolf, w\_olf@kbtu.kz, 123.412.2133, 2012-11-10, SA\_MAN, 1500, 80, null, 22).

```

295 insert into employees values (208,'Henry','Wolf','t_maratuly@kbtu.kz','123.412.2133','2012.11.10','SA_MAN',1500,80,default);
296 /*Here we obtain error because the email is not unique and it had already existed*/

```

[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "employees\_email\_key"  
 Подробности: Ключ "(email)=(t\_maratuly@kbtu.kz)" уже существует.

```

295 insert into employees values (208,'Henry','Wolf','h_wolf@kbtu.kz','123.412.2133','2012.11.10','SA_MAN',700,80,default);
296 /*Here we obtain error because the salary is less 1000*/

```

[23514] ОШИБКА: новая строка в отношении "employees" нарушает ограничение-проверку "employees\_salary\_check"  
 Подробности: Ошибочная строка содержит (208, Henry, Wolf, h\_wolf@kbtu.kz, 123.412.2133, 2012-11-10, SA\_MAN, 700, 80, null, 24).

```

295 insert into employees values (208,'Henry','Wolfeschlegelstein','h_wolf@kbtu.kz','123.412.2133','2012.11.10','SA_MAN',1700,80,default);
296 /*Here we obtain error because the lenght of the last name is higher than 15*/

```

[23514] ОШИБКА: новая строка в отношении "employees" нарушает ограничение-проверку "employees\_last\_name\_check"  
 Подробности: Ошибочная строка содержит (208, Henry, Wolfeschlegelstein, h\_wolf@kbtu.kz, 123.412.2133, 2012-11-10, SA\_MAN, 1700, 80, null, 25).

```

295 insert into employees values (105,'Henry','Wolf','h_wolf@kbtu.kz','123.412.2133','2012.11.10','SA_MAN',1700,80,default);
296 /*Here we obtain error because the row with the same primary key value is already there*/

```

[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "pk\_employee"  
 Подробности: Ключ "(employee\_id)=(105)" уже существует.

## 2.1 Add constraint primary key – for new column DEP\_ID

```

301 alter table departments add column DEP_ID serial;
302 alter table departments add constraint pk_departments primary key (DEP_ID);
303 /*Primary key - for new column DEP_ID*/

```

## 2.2 Add constraint unique – for the Department\_Name

```

304 alter table departments add unique (department_name);
305 /*Unique - for Department_Name*/

```

## 2.3 Add constraint NOT NULL – for Location\_Id

```

306 alter table departments alter column location_id set not null ;
307 /*Not Null - for Location_Id*/

```

## 2.4 Add foreign key – for Manager\_ID with reference to Employee\_ID from Employees

```

309 alter table employees drop constraint pk_employees;
310 /*Delete the previous primary key constraint to add another*/
311 alter table employees add constraint pk_employee primary key (employee_id);
312 /*Add another primary key into employees table*/
313 alter table departments add constraint dep_manager_fk foreign key (manager_id) REFERENCES employees(EMPLOYEE_ID);
314 /* Foreign key - for Manager_ID with reference to Employee_ID from Employees*/

```

## 2.5 Add Foreign key – for Department\_ID (Employees table) with reference to Department\_ID from Departments table

```

317 alter table departments drop constraint pk_departments;
318 alter table departments add constraint pk_departments primary key (department_id);
319 alter table employees add constraint dep_id_fk foreign key (department_id) REFERENCES departments(department_id);
320 /*Foreign key - for Department_ID (Employees table) with reference to Department_ID from Departments table */

```

## 2.6 Create queries that would give errors for each constraint

```

322 insert into departments values (190,'Temir_Adam','105',1700,1);
323 /*Error that is correspondent with the existed value for primary key*/
[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "departments_department_name_key"
Подробности: Ключ "(department_name)=(Temir_Adam)" уже существует.

```

```

324 insert into departments values (200,'Administration', 105,1700,default);
325 /*Error that appeared because of the existed Administration department_name*/
[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "departments_department_name_key"
Подробности: Ключ "(department_name)=(Administration)" уже существует.

```

```

326 insert into departments values (200,'Engineering',105,NULL,default);
327 /*Error appeared since the location_id can not be NULL*/
[23502] ОШИБКА: значение NULL в столбце "location_id" отношения "departments" нарушает ограничение NOT NULL
Подробности: Ошибочная строка содержит (200, Engineering, 105, null, 12).

```

### 3.1 Add constraint primary key – for GRA

```

331 alter table job_grades add constraint pk_job_grades primary key (gra);
332 /*Primary key - for GRA*/

```

### 3.2 Add constraint Not Null – for Lowest\_Sal and Highest\_Sal

```

334 alter table job_grades alter column lowest_sal set not null;
335 alter table job_grades alter column highest_sal set not null;
336 /*Not Null - for Lowest_Sal and Highest_Sal*/

```

### 3.3 Add constraint Check to avoid letter with sign

```

338 alter table job_grades add check ( length(gra) <2 );
339 /*The constraint that there can not be double marks as A+, B- and so on*/

```

### 3.4 Add a new Grade taking into account all constraints

```

341 insert into job_grades values ('G',41000,49999);
342 select * from job_grades;

```

	gra	lowest_sal	highest_sal
1	A	1000	2999
2	B	3000	5999
3	C	6000	9999
4	D	10000	14999
5	E	15000	24999
6	F	25000	40000
7	G	41000	49999

### 4.1 Add constraint Primary key – for Location\_ID

```

346 alter table locations add constraint pk_locations primary key (loc_id);
347 /*Primary key - for Location_ID*/

```

## 4.2 Add constraint Unique - for Location\_Name

```
349 alter table locations add unique (loc_name);
350 /*Unique - for Location_Name*/
```

## 4.3 Add Foreign key – for Location\_ID (Departments table) with reference to Location\_ID from Locations

```
352 alter table departments add constraint dep_location_id_FK foreign key (location_id) references locations(loc_id);
353 /* Foreign key - for Location_ID (Departments table) with reference to Location_ID from Locations*/
```

5. Create a table films, add all the constraints during the creation and write the queries to catch all the errors for each constraint.

```
357 CREATE TABLE films(
358     code varchar(5) constraint firstkey PRIMARY KEY,
359     title varchar(40) NOT NULL,
360     did integer unique,
361     date_prod date,
362     len real,
363     constraint con1 CHECK ( len>1.3 )
364 );
```

	code	title	did	date_prod	len
1	1	Star Wars	9	2001-01-31	2

```
366 insert into films values (1,'Your Name',10,'2016-02-15',2.3);
367 /*Error comes because the primary key 1 is already used*/
```

[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "firstkey"  
Подробности: Ключ "(code)=(1)" уже существует.

```
368 insert into films values (2,NULL,10,'2016-02-14',2.3);
369 /*Error appears because the title can not be NULL*/
```

[23502] ОШИБКА: значение NULL в столбце "title" отношения "films" нарушает ограничение NOT NULL  
Подробности: Ошибочная строка содержит (2, null, 10, 2016-02-14, 2.3).

```
370 insert into films values (2,'Your Name',9,'2016-02-15',2.3);
371 /*Error appears since the did column is the same as for Star Wars*/
```

[23505] ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "films\_did\_key"  
Подробности: Ключ "(did)=(9)" уже существует.

```
372 insert into films values (2,'Your Name', 10,'2016-02-15',1.0);
373 /*Error is here because the length of the film must be higher than 1.3 */
```

[23514] ОШИБКА: новая строка в отношении "films" нарушает ограничение-проверку "con1"  
Подробности: Ошибочная строка содержит (2, Your Name, 10, 2016-02-15, 1).