



نام و نام خانوادگی : پارسا مسلم

شماره دانشجویی : 970073819

نام استاد : دکتر پویا فوده

نام درس : پیاده‌سازی سیستم‌های پایگاه داده

شماره تمرین : تمرین یک - اختیاری

Tables & keys

All the keys defined with **Orange** color

Marketer

nat_code	fullname	age	phone	p_id	a_code
0321234567	Parsa Moslem	23	09121234567	2	1
0313555462	Kasra Moslem	29	09371234567	1	2
0313555462	Kasra Moslem	29	09371234567	1	3
0313555462	Kasra Moslem	29	09371234567	2	2
0313555462	Kasra Moslem	29	09371234567	2	3

Key: (p_id, a_code)

Area

a_code	name	nat_code
1	phase1	0321234567
2	Phase2	0321234567
1	phase1	0313555462
3	Phase3	0313555462

Key: (a_code, nat_code)

Product

p_id	name	price	a_code
1	Pen	3.0	1
1	Pen	3.0	2
2	Pencil	1.5	1
2	Pencil	1.5	2
3	Eraser	1.5	1
3	Eraser	1.5	2

Key: (p_id, a_code)

Marketer Dependencies

Marketer - Dependencies

A	B	C	D	E	F
nat_code	fullname	age	phone	p_id	a_code
0321234567	Parsa Moslem	23	09121234567	2	1
0313555462	Kasra Moslem	29	09371234567	1	2
0313555462	Kasra Moslem	29	09371234567	1	3
0313555462	Kasra Moslem	29	09371234567	2	2
0313555462	Kasra Moslem	29	09371234567	2	3

- (E, F) -> A
- (E, F) -> B
- (E, F) -> C
- (E, F) -> D
- A -> B
- A -> C
- A -> D
- D -> A
- D -> B
- D -> C

Marketer Minimized Dependencies

Marketer – Minimized Dependencies

A	B	C	D	E	F
nat_code	fullname	age	phone	p_id	a_code
0321234567	Parsa Moslem	23	09121234567	2	1
0313555462	Kasra Moslem	29	09371234567	1	2
0313555462	Kasra Moslem	29	09371234567	1	3
0313555462	Kasra Moslem	29	09371234567	2	2
0313555462	Kasra Moslem	29	09371234567	2	3

(E, F) -> A D -> A
 (E, F) -> B D -> B
 (E, F) -> C D -> C
 (E, F) -> D
 A -> B
 A -> C
 A -> D



(E, F) -> A D -> A
 (E, F) -> B D -> B
 (E, F) -> C D -> C
 (E, F) -> D
 A -> B
 A -> C
 A -> D

Marketer Normal Form

Marketer – Normal Forms

A	B	C	D	E	F
nat_code	fullname	age	phone	p_id	a_code
0321234567	Parsa Moslem	23	09121234567	2	1
0313555462	Kasra Moslem	29	09371234567	1	2
0313555462	Kasra Moslem	29	09371234567	1	3
0313555462	Kasra Moslem	29	09371234567	2	2
0313555462	Kasra Moslem	29	09371234567	2	3

(E, F) -> A D -> A
 (E, F) -> B D -> B
 (E, F) -> C D -> C
 (E, F) -> D
 A -> B
 A -> C
 A -> D



1NF -> OK
 2NF -> 1NF OK -> OK
 3NF -> 2NF OK -> NOT OK

Marketer Normalization

Marketer – Normalization

R1 (E, F) -> A
 R21 A -> D
 R22 D -> B
 D -> C

R1 1NF -> OK
 2NF -> OK
 3NF -> OK
 BCNF -> OK

R21 1NF -> OK
 2NF -> OK
 3NF -> OK

R22 1NF -> OK
 2NF -> OK
 3NF -> OK

A	B	C	D	E	F
nat_code	fullname	age	phone	p_id	a_code
0321234567	Parsa Moslem	23	09121234567	2	1
0313555462	Kasra Moslem	29	09371234567	1	2
0313555462	Kasra Moslem	29	09371234567	1	3
0313555462	Kasra Moslem	29	09371234567	2	2
0313555462	Kasra Moslem	29	09371234567	2	3



A	E	F
nat_code	p_id	a_code
0321234567	2	1
0313555462	1	2
0313555462	1	3
0313555462	2	2
0313555462	2	3

R1

A	D	B	C	D
nat_code	phone	fullname	age	phone
0321234567	09121234567	Parsa Moslem	23	09121234567
0313555462	09371234567	Kasra Moslem	29	09371234567

R21

R22

Area Dependencies

Area - Dependencies

A	B	C
a_code	name	nat_code
1	phase1	0321234567
2	Phase2	0321234567
1	phase1	0313555462
3	Phase3	0313555462

(A, C) -> B

A -> B

B -> A

Area Minimized Dependencies

Area – Minimized Dependencies

A	B	C
a_code	name	nat_code
1	phase1	0321234567
2	Phase2	0321234567
1	phase1	0313555462
3	Phase3	0313555462

(A, C) -> B
A -> B
B -> A



(A, C) -> B
A -> B
B -> A

Area Normal Forms

Area – Normal Forms

A	B	C
a_code	name	nat_code
1	Gohardasht	0321234567
2	Golshahr	0321234567
1	Gohardasht	0313555462
3	Jahanshahr	0313555462
4	Mehrshahr	0321234567

(A, C) -> B

A -> B

B -> A



1NF -> OK

2NF -> 1NF OK -> NOT OK

Area Normalization

Area – Normalization

R1
A -> B
B -> A

R2

R1
1NF -> OK
2NF -> OK
3NF -> OK

R2
1NF -> OK
2NF -> OK
3NF -> OK
BCNF -> OK

A		B		C	
a_code		name		nat_code	
1		Gohardasht		0321234567	
2		Golshahr		0321234567	
1		Gohardasht		0313555462	
3		Jahanshahr		0313555462	
4		Mehrshahr		0321234567	



A		B	
a_code		name	
1		Gohardasht	
2		Golshahr	
3		Jahanshahr	
4		Mehrshahr	

R1

A		C	
a_code		nat_code	
1		0321234567	
2		0321234567	
1		0313555462	
3		0313555462	
4		0321234567	

R2

Product Dependencies

Product - Dependencies

A	B	C	D
p_id	name	price	a_code
1	Pen	3.0	1
1	Pen	3.0	2
2	Pencil	1.5	1
2	Pencil	1.5	2
3	Eraser	1.5	1
3	Eraser	1.5	2

- (A, D) -> B
- (A, D) -> C
- A -> B
- A -> C
- B -> C
- B -> A

Product Minimized Dependencies

Product – Minimized Dependencies

	A	B	C	D
	p_id	name	price	a_code
	1	Pen	3.0	1
	1	Pen	3.0	2
	2	Pencil	1.5	1
	2	Pencil	1.5	2
	3	Eraser	1.5	1
	3	Eraser	1.5	2

(A, D) -> B
(A, D) -> C
A -> B
A -> C
B -> C
B -> A



(A, D) -> B
(A, D) -> C
A -> B
A -> C
B -> C
B -> A

Product Normal Forms

Product – Normal Forms

A	B	C	D
p_id	name	price	a_code
1	Pen	3.0	1
1	Pen	3.0	2
2	Pencil	1.5	1
2	Pencil	1.5	2
3	Eraser	1.5	1
3	Eraser	1.5	2

A -> B
A -> C
B -> C
B -> A



1NF -> OK
2NF -> 1NF OK -> NOT OK

Product Normalization

Product – Normalization

R1 R21 R22
 A -> B B -> C
 B -> A

R1
 1NF -> OK
 2NF -> OK
 3NF -> OK
 BCNF -> OK

R21
 1NF -> OK
 2NF -> OK
 3NF -> OK

R22
 1NF -> OK
 2NF -> OK
 3NF -> OK

A	B	C	D
p_id	name	price	a_code
1	Pen	3.0	1
1	Pen	3.0	2
2	Pencil	1.5	1
2	Pencil	1.5	2
3	Eraser	1.5	1
3	Eraser	1.5	2



A	D
p_id	a_code
1	1
1	2
2	1
2	2
3	1
3	2

R1

A	B
p_id	name
1	Pen
2	Pencil
3	Eraser

R21

B	C
name	price
Pen	3.0
Pencil	1.5
Eraser	1.5

R22