

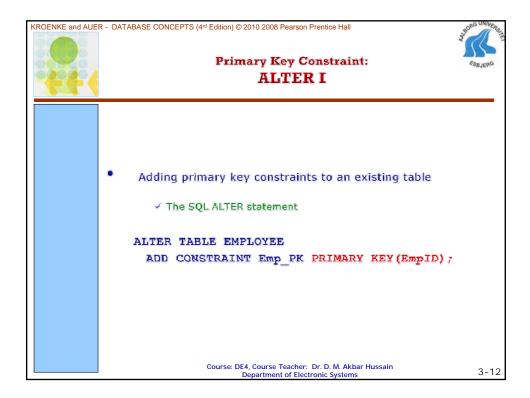
KROENKE and AUE	R - DATABASE CONCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Definition: CREATE with CONSTRAINT I
	 Creating database tables with PRIMARY KEY constraints: The SQL CREATE TABLE statement The SQL CONSTRAINT keyword
	CREATE TABLE EMPLOYEE (
	EmpID Integer NOT NULL,
	EmpName Char(25) NOT NULL,
	CONSTRAINT Emp_PK PRIMARY KEY(EmpID));
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems 3-7

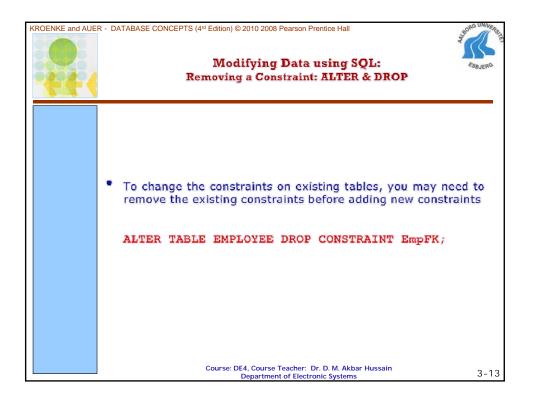
KROENKE and AUE	R - DATABASE CONCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Definition: CREATE with CONSTRAINT II	G UNIVERS
	<pre>Creating database tables with composite primary keys using PRIMARY KEY constraints > The SQL CREATE TABLE statement > The SQL CONSTRAINT keyword CREATE TABLE EMP_SKILL(EmpID Integer NOT NULL, SkillID Integer NOT NULL, SkillLevel Integer NULL, CONSTRAINT EmpSkill_PK PRIMARY KEY</pre>	7
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-8

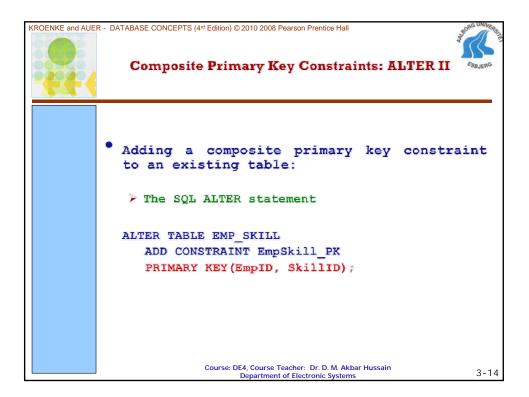
KROENKE and AUER - DATABASE CO	ONCEPTS (4 ^d Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Definition: CREATE with CONSTRAINT III	JERO
FOREI	ting database tables using PRIMARY KEY and GN KEY constraints e SQL CREATE TABLE statement e SQL CONSTRAINT keyword	
CREA E S	TE TABLE EMP_SKILL(mpID Integer NOT NULL, killID Integer NOT NULL, killLevel Integer NULL, ONSTRAINT EmpSkill PK PRIMARY KEY	
	(EmpID, SkillID), ONSTRAINT Emp_FK FOREIGN KEY(EmpID) REFERENCES EMPLOYEE(EmpID), ONSTRAINT Skill_FK FOREIGN KEY(SkillID) REFERENCES SKILL(SkillID);	
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-9

ENKE and AUER -		Pearson Prentice Hall
CF);	EATE TABLE DEPARTMENT(DepartmentName Char (35) BudgetCode Char (15) OfficeNumber Char (25) Phone Char (12) CONSTRAINT DEPAR	NOT NULL, NOT NULL,
CF);	EATE TABLE EMPLOYEE(EmployeeNumber Int FirstName Char (25) LastName Char (25) Department Char (35) Phone Char (12) Email Char(100 CONSTRAINT CONSTRAINT) NOT NULL, NULL,
		Teacher: Dr. D. M. Akbar Hussain 3

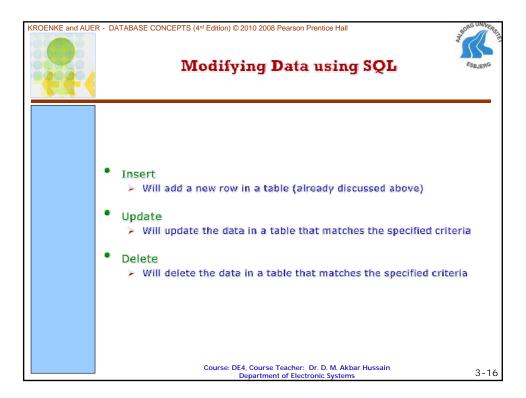
KROENKE and AUER - DATABASE CONCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Definition: CREATE with CONSTRAINT IV	ESBJERG
 Creating database tables using PRIMARY KEY and FOREIGN KEY constraints 	đ
 The SQL CREATE TABLE statement The SQL CONSTRAINT keyword ON UPDATE CASCADE and ON DELETE CASCADE 	
CREATE TABLE EMP_SKILL (EmpID Integer NOT NULL,	
SkillID Integer NOT NULL, SkillLevel Integer NULL, CONSTRAINT EmpSkill_PK PRIMARY KEY(EmpID, SkillID),	
CONSTRAINT Emp_FK FOREIGN KEY(EmpID) REFERENCES EEMPLOYEE(EmpID) ON DELETE CASCADE, CONSTRAINT Skill FK FOREIGN KEY(SkillD)	
REFERENCES SKILL(Skillid) ON UPDATE CASCADE	
) ; Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-11

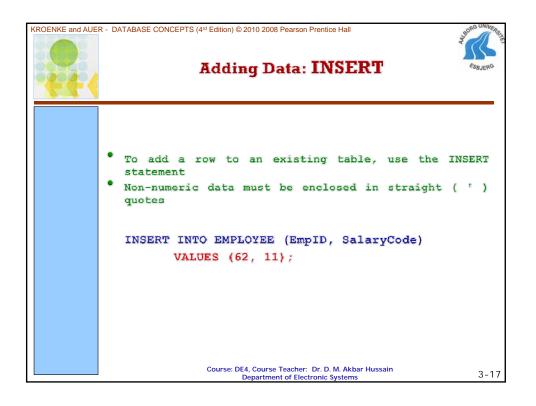


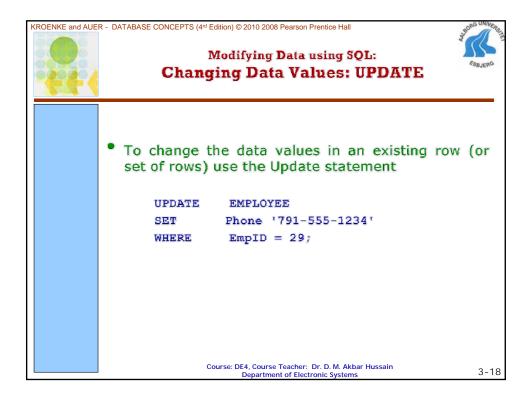


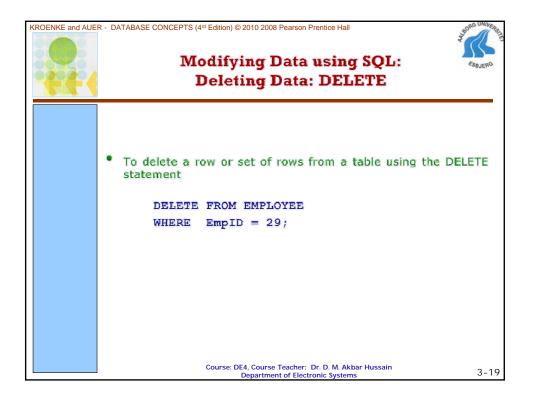


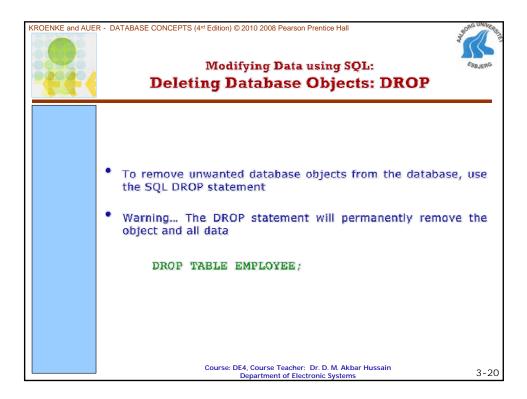


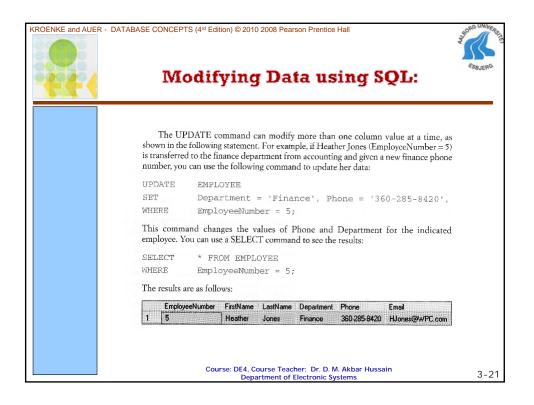


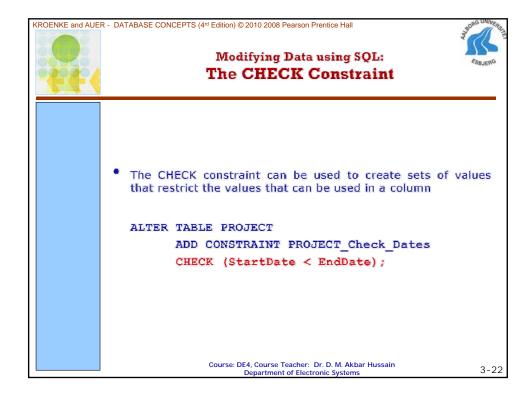


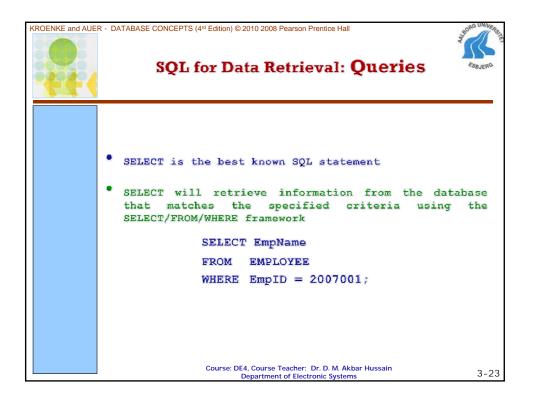








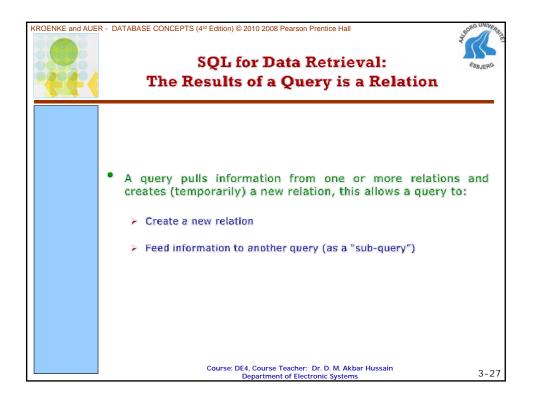




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	ProjectID 🔻	Name 🗸	Department -	MaxHours 👻	StartDate 👻	EndDate 🔻	Add New Field
		2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	
		2008 Q3 Portfolio Analysis		135,00	05-07-2008	25-07-2008	
		2008 Q3 Tax Preparation	Accounting	120,00	10-08-2008	15-10-2008	
		2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
		2008 Q4 Portfolio Analysis		140.00	05-10-2008	13-03-2008	
		SELECT Name, Dep FROM PROJECT;	partment, N	laxHours			

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24	;	SQL for Da	ita Ret	rieval	: Que	ries
Proj	ectID 👻	Name 🔻	Department +	MaxHours 👻	StartDate 🔻	EndDate - Add New Fie
		2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008
	1100	2008 Q3 Portfolio Analysis	Finance	120,00	05-07-2008	25-07-2008
	1200	2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008
	1300	2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008
	1400	2008 Q4 Portfolio Analysis	Finance	140,00	05-10-2008	

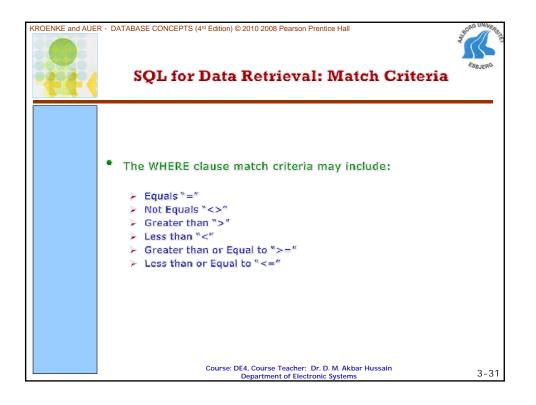
ProjectID Name Department MaxHours StartDate EndDate Add New File 1000 2008 Q3 Product Plan Marketing 135,00 10-05-2008 15-06-2008 15-06-2008 1100 2008 Q3 Portfolio Analysis Finance 120,00 005-07-2008 15-10-2008 1200 2008 Q3 Tax Preparation Accounting 145,00 10-08-2008 15-10-2008 1300 2008 Q4 Product Plan Marketing 150,00 10-08-2008 15-09-2008 1400 2008 Q4 Portfolio Analysis Finance 140,00 05-10-2008 15-09-2008 SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate StartDate, EndDate FROM PROJECT WHERE Department = 'Finance'; 'Finance'; Image: StartDate in the start in the star							
1100 2008 Q3 Portfolio Analysis Finance 120,00 05-07-2008 25-07-2008 1200 2008 Q3 Tax Preparation Accounting 145,00 10-08-2008 15-10-2008 1300 2008 Q4 Product Plan Marketing 150,00 10-08-2008 15-09-2008 1400 2008 Q4 Portfolio Analysis Finance 140,00 05-10-2008 15-09-2008 SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate FROM PROJECT	ProjectID 👻			MaxHours 👻	StartDate 👻		Add New Fie
1200 2008 Q3 Tax Preparation Accounting 145,00 10-08-2008 15-10-2008 1300 2008 Q4 Product Plan Marketing 150,00 10-08-2008 15-09-2008 1400 2008 Q4 Portfolio Analysis Finance 140,00 05-10-2008 SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate FROM PROJECT							
1300 2008 Q4 Product Plan Marketing 150,00 10-08-2008 15-09-2008 1400 2008 Q4 Portfolio Analysis Finance 140,00 05-10-2008 SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate StartDate Finance							
1400 2008 Q4 Portfolio Analysis Finance 140,00 05-10-2008 SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate FROM PROJECT							
SELECT ProjectID, Name, Department, MaxHours, StartDate, EndDate FROM PROJECT						15-09-2008	
WHERE Department = 'Finance';	FROM		EndDate				
	WHERE	Department	= 'Finand	ce';			



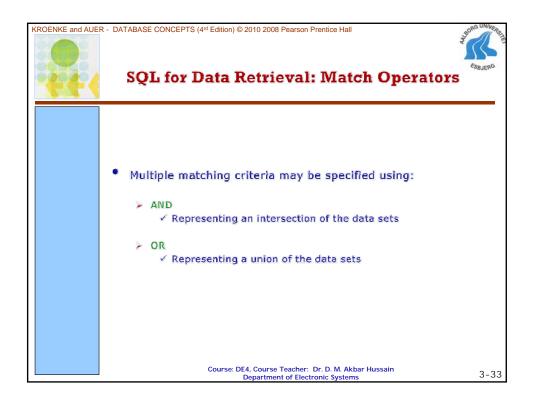
KROENKE and AUER	R - DATABASE CONCEPTS (4rd Edition) © 20				olumns	ESBJERG
	 To show all of the co specified criteria, use SELECT FROM 		isk (*)	the rows	that m	atch the
	ProjectID V Name V	Department +	MaxHours 👻	StartDate 🔹	EndDate 👻	Add New Field
	1000 2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	
	1100 2008 Q3 Portfolio Analysis	Finance	120,00	05-07-2008	25-07-2008	
	1200 2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008	
	1300 2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
	1400 2008 Q4 Portfolio Analysis	Finance	140,00	05-10-2008		
		Course Teach				3-28

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ProjectID 👻	Name 🗸	Department +	MaxHours 👻	StartDate 👻	EndDate 👻	Add New Field
	2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	
	2008 Q3 Portfolio Analysis		120,00	05-07-2008	25-07-2008	
	2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008	
	2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
	2008 Q4 Portfolio Analysis		140,00	05-10-2008		
				-		
	SELECT	DIST PROJE	INCT De	partme	nt	
	FROM Depai Marki Finan	PROJE		partme	Departmen Marketing Finance Accounting Marketing Finance	

	r Data Retries				rch Cı	riteria	SBJERO
ProjectID 🔻	Name 🗸	Department +	MaxHours 👻	StartDate 🔹	EndDate 👻	Add New Field	T
	2008 Q3 Product Plan	Marketing	135.00	10-05-2008	15-06-2008		
	2008 Q3 Portfolio Analysis	· · · ·	120,00	05-07-2008	25-07-2008		
1200	2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008		
1300	2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008		
1400	2008 Q4 Portfolio Analysis	Finance	140,00	05-10-2008			
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reco					-		
reco	SELECT	Name PROJ		120.00	;		
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	2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	
	2008 Q3 Portfolio Analysis		135,00	05-07-2008	25-07-2008	
	2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008	
	2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
	2008 Q4 Portfolio Analysis		140,00	05-10-2008	10 00 1000	



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	SELECT FROM WHERE	EmpName EMPLOYEE DeptID < 7 OR DeptID > 12;	
	SELECT FROM WHERE	EmpName EMPLOYEE DeptID = 9 AND SalaryCode <= 23;	
		Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-34

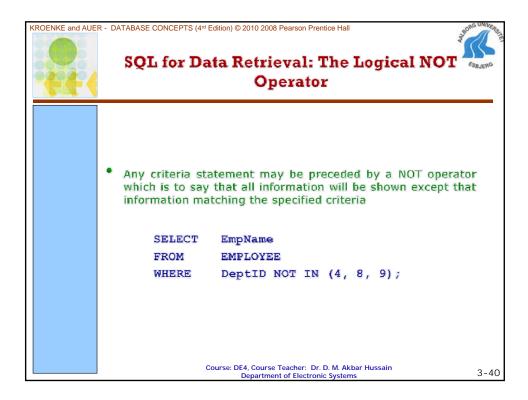
ENKE and AUER - D	ATABASE CON	ICEPTS (4 rd Edition) © 2	2010 2008 Pear	son Prentice H	all		A BORG UN
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F							
	ProjectID 👻	Name 👻	Department -	MaxHours 👻	StartDate 👻	EndDate 👻	Add New Field
	1000 2	008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	
	1100 2	008 Q3 Portfolio Analysis	Finance	120,00	05-07-2008	25-07-2008	
	1200 2	008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008	
	1300 2	008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
	1400 2	008 Q4 Portfolio Analysis	Finance	140,00	05-10-2008		
	FROM	PROJECT	- IFinar	and AND	Maxilours	> 135.	
	WHERE	Department	= 'Finar	ce' AND	MaxHours	> 135;	
		Course: DE4	4, Course Teac	her: Dr. D. M.	Akbar Hussair	1	3-

EmployeeNumb	FirstName	 LastName 	Department	• Phone •	Email
	Mary	Jacobs	Administration	360-285-8110	MJacobs@WPC.com
	2 Rosalie	Jackson	Administration	360-285-8120	RJackson@WPC.com
	Richard	Bandalone	Legal	360-285-8210	RBanalone@WPC.cor
	1 Tom	Caruthers	Accounting	360-285-8310	TCaruthers@WPC.cor
	5 Heather	Jones	Finance	360-285-8420	HJones@WPC.com
	5 Mary	Abernathy	Finance	360-285-8410	MAbernathy@WPC.c
	7 George	Smith	Human Resources	360-285-8510	GSmith@WPC.com
;	3 Tom	Jackson	Production	360-287-8610	TJackson@WPC.com
1	9 George	Jones	Production	360-287-8620	GJones@WPC.com
1) Ken	Numoto	Marketing	360-287-8710	KMumoto@WPC.com
1	L James	Nestor	Info Systems		JNestor@WPC.com
1:	2 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com
SELI FROM WHEN	A E	EMPLOYEE Departmer	e, LastName, nt = 'Accoun = '360-285-	ting'	

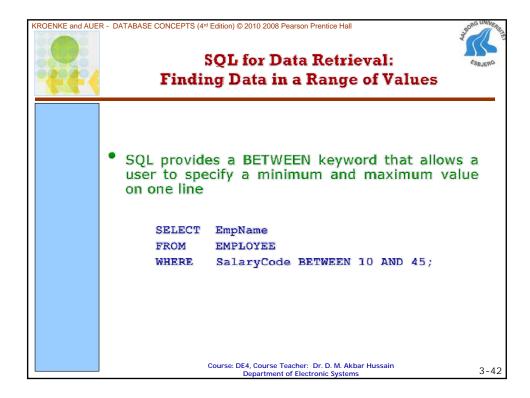
E and AUER - DATABA					
SOI	for Dat	a Ref	trieval:	Onera	tor Example
······································			and your	opera	tor Brampro
Emplo	FirstName Mary	LastName Jacobs	Department Administration	 Phone 360-285-8110 	Email • . MJacobs@WPC.com
				360-285-8110	
	2 Rosalie 3 Richard	Jackson Bandalone	Administration		RJackson@WPC.com RBanalone@WPC.com
	3 Richard 4 Tom	Caruthers	Legal		TCaruthers@WPC.com
	5 Heather	Jones	Finance		HJones@WPC.com
	6 Mary	Abernathy	Finance		MAbernathy@WPC.com
	7 George	Smith	Human Resources		GSmith@WPC.com
	8 Tom	Jackson	Production		TJackson@WPC.com
	9 George	Jones	Production	360-287-8620	
	10 Ken	Numoto	Marketing	360-287-8710	
	11 James	Nestor	Info Systems	300-207-0710	JNestor@WPC.com
	12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com
	SELECT	FirstN	lame, LastNar	ne, Phone	, Department
	FROM	EMPLOY	EE		
	WHERE	Depart	ment = 'Acco	unting'	
		OR Phot	ne = '360-285	-8410 .	
		OR FIIO	110 - 500-20.	, 0410 ,	
		Courses DE4	, Course Teacher:	D. D. M. Alaka	and the second se

KROENKE and AUE	R - DATABASE CONCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Retrieval: A List of Values	SBJERG
	 The WHERE clause may include the IN keyword specify that a particular column value must included in a list of values 	
	SELECT EmpName	
	FROM EMPLOYEE	
	WHERE DeptID IN (4, 8, 9);	
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-38

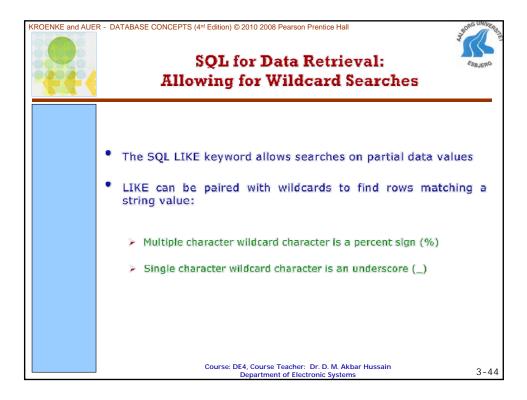
SQL for D	ata R	letriev			
SQL for D	ata F	etriev			
		CCLACY.	al: A L	ist of Val	ues
EmployeeNumb - FirstName			Phone	Email	
Mary	Jacobs	Administration		MJacobs@WPC.com	
2 Rosalie	Jackson	Administration		RJackson@WPC.com	
3 Richard	Bandalone	Legal		RBanalone@WPC.com	
4 Tom 5 Heather	Caruthers	Accounting		TCaruthers@WPC.com	
6 Mary	Jones Abernathy	Finance		HJones@WPC.com MAbernathy@WPC.com	
7 George	Smith	Human Resources		GSmith@WPC.com	
8 Tom	Jackson	Production		TJackson@WPC.com	
9 George	Jones	Production		Glones@WPC.com	
10 Ken	Numoto	Marketing		KMumoto@WPC.com	
11 James	Nestor	Info Systems		JNestor@WPC.com	
12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com	
SELECT	FirstName	, LastName,	Phone, Dep	artment	
	EMPLOYEE				
		t IN ('Acco	unting! IE	[manga]	
	-		unting, r.	inance',	
	'Marketin	g');			
Co	ourse: DE4. (Course Teacher	Dr. D. M. Akb	ar Hussain	



S.	QL for D	ata I	Retriev	al: A	List of V	alues	SBJER
	yeeNumb: FirstName Many 2 Rotalie 3 Richard 4 Tom 5 Heather 6 Mary 7 George 8 Tom 9 George 10 Ken 11 James 12 Rick SELECT FROM WHERE	Jacobs Jackson Bandalone Caruthers Jones Abernathy Smith Jackson Jackson Jackson Jackson Jackson Brown Firstl EMPLO Depar	Administration Administration Legal Accounting Finance Finance Production Production Production Marketing Info Systems Info Systems Info Systems	\$60-285-8120 160-285-8210 160-285-8210 160-285-8410 160-285-8410 160-285-8410 160-285-8610 160-287-8610 160-287-8610 160-287-8620 160-287-8820 16	MJacobs@WPC.com Riactson@WPC.com Riactson@WPC.com TCaruthers@WPC.com MbBernathy@WPC.com Giontle@WPC.com TJackson@WPC.com Comthe@WPC.com INestor@WPC.com Reform@WPC.com ppartment		
	Co	urse: DE4	, Course Teache	r: Dr. D. M. A	kbar Hussain		3-



ENKE and AUER - DATABAS					List of V	alues
	loyeeNumb: FirstName A Mary 2 Rosale 3 Roshard 4 Tom 5 Neather 6 Mary 7 George 8 Tom 9 George 10 Ken	 LastName Jacobs Jackson Bandalone Caruthers Jones Abernathy Smith Jackson Jackson Jones Numoto 	Department Administration Administration Legal Accounting Finance Finance Human Resources Production Production	360-285-8120 260-285-8310 360-285-8310 360-285-8420 360-285-8410 360-285-8510 360-285-8510 360-287-8610 360-287-8620	MJacobs@WPC.com RJackson@WPC.com RBanalone@WPC.com TCaruthers@WPC.com HJones@WPC.com MAbernathy@WPC.com GSmith@WPC.com TJackson@WPC.com	•
	11 James 12 Rick	Nestor Brown	Info Systems Info Systems		JNestor@WPC.com RBrown@WPC.com	
	SELECT FROM WHERE	EMPLOYE				
	WILLE	тиртоЛее	eNumber BETW	sen z and	51	
	c		, Course Teacher epartment of Ele			3-



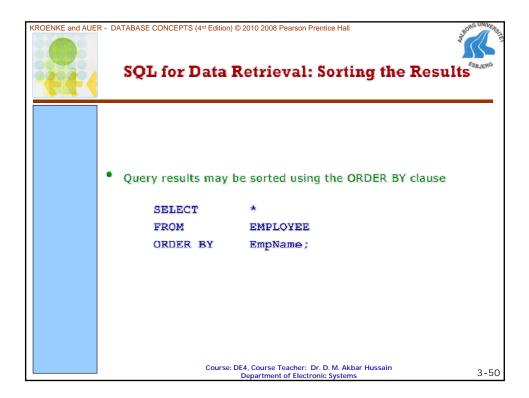
KROENKE and AUE		© 2010 2008 Pearson Prentice Hall QL for Data Retrieval: ard Search Examples	ESBJERG
	SELECT	EmpID	
	FROM	EMPLOYEE	
	WHERE	EmpName LIKE 'Kr%';	
	SELECT	EmpID	
	FROM	EMPLOYEE	
	WHERE	Phone LIKE '616';	
	Course: E	DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems	3-45

KROENKE and AUER - DA	ATABASE CO		for Dat	a Retrie	val:	es	ESBJERO
	ProjectID 👻	Name 🗸	Department •	MaxHours -	StartDate 🔹	EndDate 🗸	Add New Field
		2008 Q3 Product Plan	Marketing	135,00	10-05-2008	15-06-2008	Add New Field
		2008 Q3 Portfolio Analysis	•	120,00	05-07-2008	25-07-2008	
		2008 Q3 Tax Preparation	Accounting	145,00	10-08-2008	15-10-2008	
		2008 Q4 Product Plan	Marketing	150,00	10-08-2008	15-09-2008	
	1400	2008 Q4 Portfolio Analysis	Finance	140,00	05-10-2008		
	FF	ELECT * NOM PROJECT HERE Name LIKE	'2008 Q_ Pc	ortfolio Ana	lysis';		
				her: Dr. D. M. J Electronic System		n	3-4

28		SQL	for Data	Retrie	val:	_
8- 6	Wi	ldcaı	d Sear	ch Ex	amples	
Empl	oyeeNumb + FirstName	LastName	Department	· Phone ·	Email	
	Mary	Jacobs	Administration		MJacobs@WPC.com	
	2 Rosalie	Jackson	Administration	360-285-8120	RJackson@WPC.com	
	3 Richard	Bandalone	Legal	360-285-8210	RBanalone@WPC.com	
	4 Tom	Caruthers	Accounting		TCaruthers@WPC.com	
	5 Heather	Jones	Finance	360-285-8420	HJones@WPC.com	
	6 Mary	Abernathy	Finance		MAbernathy@WPC.com	
	7 George	Smith	Human Resources		GSmith@WPC.com	
	8 Tom	Jackson	Production		TJackson@WPC.com	
	9 George	Jones	Production		GJones@WPC.com	
	10 Ken	Numoto	Marketing		KMumoto@WPC.com	
	11 James	Nestor	Info Systems		INestor@WPC.com	
	12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com	
		* EMPLOYEE Phone LIKE	: '360-287			

			n aearc	h Ey	amples	
		aoui	u beare		impres	
EmployeeNun	nb · FirstName ·			 Phone + 		•
	Mary	Jacobs	Administration	360-285-8110	MJacobs@WPC.com	
	2 Rosalie	Jackson	Administration	360-285-8120	RJackson@WPC.com	
	3 Richard 4 Tom	Bandalone	Legal	360-285-8210	RBanalone@WPC.com	
2	5 Heather	Jones	Accounting Finance		TCaruthers@WPC.com HJones@WPC.com	
	6 Mary	Abernathy	Finance		MAbernathy@WPC.com	
	7 George	Smith	Human Resources		GSmith@WPC.com	
	8 Tom	Jackson	Production		TJackson@WPC.com	
	9 George	Jones	Production		GJones@WPC.com	
	10 Ken	Numoto	Marketing	360-287-8710		
	11 James	Nestor	Info Systems		JNestor@WPC.com	
	12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com	
SELECT	*					
FROM	EMPLO	YEE				
WHERE	Phone	LIKE	360-287-8			
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	Co	ourse: DE4.	Course Teacher:	Dr. D. M. A	kbar Hussain	

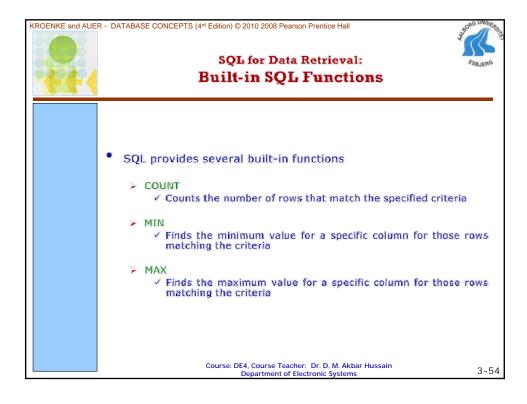
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6 Mary Abernathy Finance 369-285-840 Mabernathy@WPC.com 7 George Smith Human Resources 369-285-8610 GSmith@WPC.com 8 Tom Jackson Production 369-285-8610 GSmith@WPC.com 9 George Jones Production 369-287-8610 Tackson@WPC.com 10 Ken Numctor Jones@WPC.com Jones@WPC.com 11 James Nestor Info Systems JNestor@WPC.com 12 Rick Brown Info Systems 360-287-880 Rerown@WPC.com	6 Mary Abernathy Finance 360-285-8410 Mabernathy@WPC.com 7 George Smith Human Resources 360-285-8410 Mabernathy@WPC.com 8 Tom Jarkson Production 360-287-8501 Takson@WPC.com 9 George Jones Production 360-287-8502 Giones@WPC.com 10 Ken Numoto Marketing 360-287-8520 Giones@WPC.com 11 James Nestor Info Systems 360-287-8820 Rerown@WPC.com 12 Ruck Brown Info Systems 360-287-8820 Rerown@WPC.com	ny Abernathy orge Smith m Jackson Jones Jones n Numoto nes Nestor k Brown	Finance Human Resources Production Production Marketing Info Systems	360-285-8410 360-285-8510 360-287-8610 360-287-8620 360-287-8710	MAbernathy@WPC.com GSmith@WPC.com TJackson@WPC.com GJones@WPC.com KMumoto@WPC.com JNestor@WPC.com	
7 George Smith Human Resources 360-283-880 O Smith@WPC.com 8 Tom Jackson Production 366-287-801 O Smith@WPC.com 9 George Jones Production 366-287-801 GLones@WPC.com 10 Ken Numoto Marketing 360-287-820 GLones@WPC.com 11 James Nestor Info Systems 360-287-820 Risrown@WPC.com 12 Rick Brown Info Systems 360-287-820 Risrown@WPC.com	7 George Smith Human Resources 360-235-3510 Gimith@WPC.com 8 Tom Jackson Production 360-237-8510 Giones@WPC.com 9 George Jones Production 360-237-8510 Giones@WPC.com 10 Ken Numoto Marketing 360-237-8510 KMumoto@WPC.com 11 James Nestor Info Systems JMestor@WPC.com 12 Rick Brown Info Systems 360-287-8820 Rerown@WPC.com	orge Smith n Jackson orge Jones n Numoto nes Nestor k Brown PLOYEE	Human Resources Production Production Marketing Info Systems	360-285-8510 360-287-8510 360-287-8520 360-287-8710	GSmith@WPC.com TJackson@WPC.com GJones@WPC.com KMumoto@WPC.com JNestor@WPC.com	
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					Course: DE4. Course Teacher: Dr. D. M. A	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems

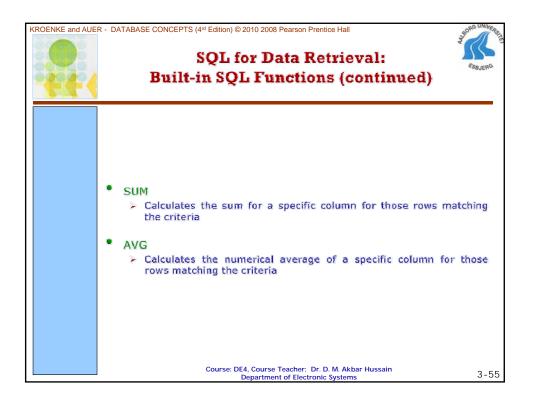


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Mary	Jacobs	Administration		Miacobs@WPC.com	
2 Rosalie	Jackson	Administration		RJackson@WPC.com	
3 Richard	Bandalone	Legal		RBanalone@WPC.com	
4 Tom	Caruthers	Accounting		TCaruthers@WPC.com	
5 Heather	Jones	Finance		Hones@WPC.com	
6 Mary	Abernathy	Finance		MAbernathy@WPC.com	
7 George	Smith	Human Resources		65mith@WPC.com	
8 Tom	Jackson	Production		TJackson@WPC.com	
9 George	Jones	Production		Glones@WPC.com	
10 Ken 11 James	Numoto	Marketing Info Systems	360-287-8710	KMumoto@WPC.com INestor@WPC.com	
12 Rick	Brown	info Systems	100 107 0010	R8rown@WPC.com	

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	EutonAnnanio	Mary	Jacobs	Administration		Miacobs@WPC.com	• .	
		2 Rotalie	Jackson	Administration		RJackson@WPC.com		
		3 Richard	Bandalone	Legal		RBanalone@WPC.com		
	0	4 Tom	Caruthers	Accounting		TCaruthers@WPC.com		
		5 Heather	Jones.	Finance	360-285-8420	Hiones@WPC.com		
		6 Mary		Finance		MAbernathy@WPC.com		
		7 George	Smith	Human Resources		05mith@WPC.com		
		8 Tom	Jackson	Production Production		TJackson@WPC.com Glones@WPC.com		
		9 George 10 Ken	Jones Numoto	Production Marketing		KMumoto@WPC.com		
		10 Ken 11 James	Nextor	Info Systems	300-227-6/10	INestor@WPC.com		
		12 Rick	Erown	Info Systems	360-287-8820	R8rown@WPC.com		
				and a property				
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	Co	urse: DF	4. Cours	e Teacher [.]	Dr. D. M 4	kbar Hussain		
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EmployeeNumb + FirstName	 LastName 		 Phone - 	Email •	
Mary 1	Jacobs	Administration	360-285-8110	MJacobs@WPC.com	
2 Rosalie	Jackson	Administration	360-285-8120	RUackson@WPC.com	
3 Richard	Bandalone	Legal	360-285-8210	RBanalone@WPC.com	
4 Tom	Caruthers	Accounting	360-285-8310	TCaruthers@WPC.com	
5 Heather	Jones	Finance		NJones@WPC.com	
6 Mary	Abernathy	Finance		MAbernathy@WPC.com	
7 George	Smith	Human Resources		GSmith@WPC.com	
8 Tom	Jackson	Production		TJackson@WPC.com	
9 George	jones	Production		GJones@WPC.com	
10 Ken	Numeto	Marketing		KMumoto@WPC.com	
11 James	Nestor	Info Systems	201 201-07 20	JNestor@WPC.com	
12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com	
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KROENKE and AUER - DATABA		for Da	ita Re	triev			AG UNIT
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	Course: DE4			. M. Akbar Systems	Hussain	

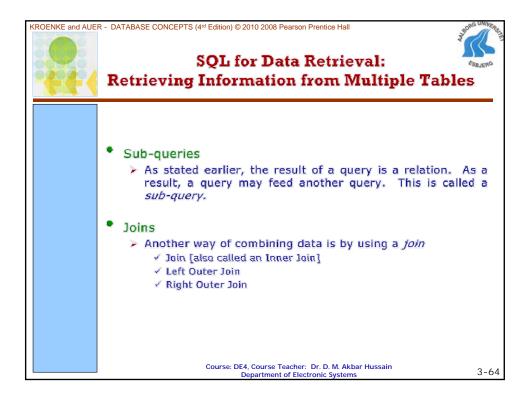
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KROENKE and AUE	R - DATABASE CONCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall SQL for Data Retrieval: Providing Subtotals: GROUP BY
	 In SQL GROUP BY clause group rows of common values. This increases the utility of built in functions because one can apply them to group of rows, following statement counts the number of employees in each department.
	 Subtotals may be calculated by using the GROUP BY clause
	 The HAVING clause may be used to restrict which data is displayed
	SELECT DeptID,
	COUNT(*) AS NumOfEmployees
	FROM EMPLOYEE
	GROUP BY DeptID
	HAVING COUNT $(*) > 3;$
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems 3-60

	for Data		eval: ROUP BY	ESBJERG
Creployeefunds - FristName Mary 2 Roadie 3 Richard 4 Tom 9 Heatry 7 George 8 Tom 9 George 10 Ken 11 James 12 Rick SELECT FROM GROUP BY		ent Phone 1 1 360-235-4210 360-235-4210 360-235-4210 360-235-4210 360-235-4210 360-235-4510 360-237-4610 360-237-4610 360-237-4610 360-237-4610 360-237-4610 360-237-8620	Email • Matobie@WWC.com Riskaton@WWC.com Tarathes@WWC.com Tarathes@WWC.com Matemath/@WWC.com Glanes@WWC.com Lataston@WWC.com Advanceto@WWC.com Ristourg@WPC.com Ristourg@WPC.com	
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	EmployeeNumb · FirstName	LastName	Department	· Phone ·	Email	
	Mary	Jacobs	Administration		MJacobs@WPC.com	
	2 Rosalie	Jackson	Administration		RJackson@WPC.com	
	3 Bichard	Bandalone	Legal	360-285-8210	RBanalone@WPC.com	
	4 Tom	Caruthers	Accounting		TCaruthers@WPC.com	
	5 Heather	Jones	Finance		HJones@WPC.com	
	6 Mary	Abernathy	Finance	360-285-8410	MAbernathy@WPC.com	
	7 George	Smith	Human Resources		GSmith@WPC.com	
	8 Tom	Jackson	Production	360-287-8610	TJackson@WPC.com	
	9 George	Jones	Production	360-287-8620	GJones@WPC.com	
	10 Ken	Numoto	Marketing	360-287-8710	KMumoto@WPC.com	
	11 James	Nestor	Info Systems		JNestor@WPC.com	
	12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com	
	SELECT FROM GROUP B	EMPLO	YEE	*) AS Numl	berOfEmployees	
	HAVING	-	(*) > 1;			

			r Data F		
		una y	ubtotal	s: GR	OUP BY
Employe	eeNumb · FirstName	- LastName	Department	Phone	Email
	Mary	Jacobs	Administration	360-285-8110	MJacobs@WPC.com
	2 Rosalie	Jackson	Administration	360-285-8120	Rlackson@WPC.com
	3 Richard	Bandalone	Legal		RBanalone@WPC.com
1	4 Tom 5 Heather	Caruthers	Accounting		TCaruthers@WPC.com
	6 Mary	Jones Abernathy	Finance	360-285-8420 360-285-8410	HJones@WPC.com MAbernathy@WPC.com
	7 George	Smith	Human Resources	360-285-8510	GSmith@WPC.com
	8 Tom	Jackson	Production		TJackson@WPC.com
E.	9 George	Jones	Production	360-287-8620	GJones@WPC.com
	10 Ken	Numoto	Marketing	360-287-8710	KMumoto@WPC.com
E	11 James	Nestor	Info Systems		JNestor@WPC.com
	12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.com
	FROM I WHERE I	EMPLOYEE	t, Count(*) A umber <= 6 t	S NumberOf	Employees
		COUNT(*) >			



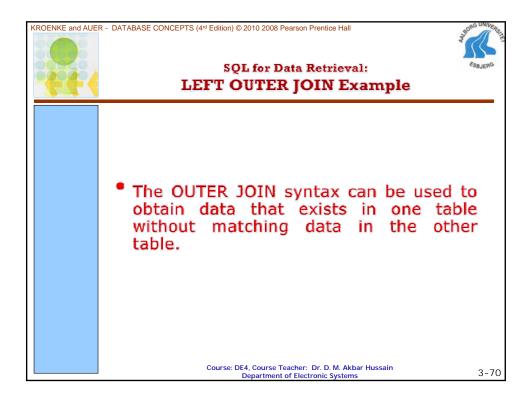
5		NT 6	Dete	Date			
	a)	у п 101	Data 🛛	Retr	ieval:		
- Rotric	eving Ir	form	ation f	vom	Max 14	inlo 7	Fable
i Kettie	sving H	101111	anon	1010	TATATC	hie i	Lanie
							i
ProjectID · Emp	oloyeeNumber + Hour	sWorke •					
1000	1	30,00					
1000		75.00					
1000	10	55.00 Emple	yeeNumb - FirstName		Department	 Phone 	Emai
			Mary	Jacobs	Administration		MJacobs@WPC.cc
1100	4	40,00	2 Rosalie	Jackson	Administration	360-285-8120	
1100	6	45,00	3 Richard	Bandalone	Legal	360-285-8210	
1200	1	25,00	4 Tom	Caruthers	Accounting	360-285-8310	
1200	2	20,00	5 Heather	Jones	Finance	360-285-8420	
1200	4	45.00	6 Mary	Abernathy		360-285-8410	
1200	5	40.00	7 George 8 Tom	Smith Jackson	Human Resources Production	360-285-8510 360-287-8610	
	3		9 George	Jones	Production	360-287-8620	
1300	1	35,00	10 Ken	Numeto	Marketing	360-287-8710	
1300	8	80,00	11 James	Nestor	Info Systems	200-201-0180	JNestor@WPC.co
1300	10	50,00	12 Rick	Brown	Info Systems	360.287.8820	RBrown@WPC.co
1400	4	15,00			and spreads		
1400	5	10.00					
1400	6	27,50					
1400		#1+10-0					
771	1	1		c			
The	queries considere	d so far hav	re involved dat	a from a	single table. I	lowever, a	it times,
more	than one table r	nust be pro	ressed to obtai	n the des	ired informat	ion For e	vample
suppo	ose we want to k	now the na	mes of all emp	ployees w	ho have worl	ked more	than 40
hours	s on any single as	signment T	he names of e	mplovees	are stored in	the FM DI	OVEE
							OILL
table.	but the hours th	ney have wo	rked are stored	d in the A	SSIGNMEN	T table.	

						ProjectID +	EmployeeNumber	 HoursWorke
EmployeeNumb · FirstName ·	LastName •		- Phone -		77	1000		1 30,
Mary	Jacobs	Administration		MJacobs@WPC.co		1000		8 75,
2 Rosalie	Jackson	Administration		RJackson@WPC.c		1000	1	10 55,
3 Richard 4 Tom	Eandalone Caruthers	Legal Accounting		RBanalone@WPC TCaruthers@WPC		1100		4 40,
5 Heather	Jones	Finance	360-285-8420	HJones@WPC.com		1100		6 45.
6 Mary	Abernathy	Finance	360-285-8410	MAbernathy@Wi		1200		
7 George	Smith	Human Resources	160-285-8510	G5mith@WPC.co				1 25,
# Tom	Jackson	Production	360-237-8610	TJackson@WPC.c		1200		2 20,
9 George	Jones	Production	360-287-8620	GJones@WPC.com		1200		4 45,
10 Ken	Numoto	Marketing	360-287-8710	KMumoto@WPC.	com	1200		5 40,
11 James	Nestor	Info Systems		INestor@WPC.co	m	1300		1 35,
12 Rick	Brown	Info Systems	360-287-8820	RBrown@WPC.co	m	1300		8 80,
						1300		10 50,
						1400		4 15.
						1400		5 10,
If we knew that employe	ees with Emp	loyeeNumber 8 and 1	10 have worke	d more than		1400		6 27,
ing expression: SELECT FirstNam FROM EMPLOYEE WHERE Employee® The result is:		amo (8, 10);	c S	an, however, ob ELECT D	tain the appropri		not given the employee nbers with the followin	

	DNCEPTS (4 rd Edition) © 2010 2008 Pearson Prentice Hall
N	Now, we can combine these two SQL statements by using a subquery , as follows:
s	SELECT FirstName, LastName
F	ROM EMPLOYEE
W	WHERE EmployeeNumber IN
	(SELECT DISTINCT EmployeeNumber
	PROM ASSIGNMENT
	WHERE HoursWorked > 50);
Т	The result of this expression is:
	FiniName LatiName
	1 Tom Jackson
	2 Ken Numoto
	a rear rearrant
	Course: DE4, Course Teacher: Dr. D. M. Akbar Hussain Department of Electronic Systems 3-67

S	QL fo	or Dat	ta Re	etrie	val: Jo	in Ex	ampl	e	No. ES	BJERG
							ProjectID • Er	nployeeNumber	- Hour	rsWork€
							1000		1	30,0
							1000		8	75,0
EmployeeNumb · FirstName				Phone -			1000		10	55.
Mary Mary	Jacobs	Administrati			MJacobs@WPC.o				4	
2 Rosalie 3 Richard	Jackson	Administrati		160-285-8120	RUackson@WPC.c		1100			40,
4 Tom	Bandalone Caruthers	Legal		360-285-8210 360-285-8310	RBanalone@WPC TCaruthers@WPC		1100		6	45,
5 Heather	Jones	Finance		160-285-8420	Hiones@WPC.co		1200		1	25,
6 Mary	Abernathy	Finance		160-285-8410	MAbernathy@Wi		1200		2	20,
7 George	Smith	Human Resp		360-285-8510	G5mith@WPC.co		1200		4	45,
8 Tom	Jackson	Production		360-287-8610			1200		5	40,
9 George	Jones	Production		360-287-8620	GJones@WPC.co		1300		1	35,
10 Ken	Numeto	Marketing		360-287-8710	KMumoto@WPC.				-	
11 James	Nestor	Info Systems			INestor@WPC.co	275	1300		8	80,
12 Rick	Brown	Info Systems		360-287-8820	RBrown@WPC.co	m	1300		10	50,
							1400		4	15,
							1400		5	10,
							1400		б	27,
ProjectID -	Name	*	Departm	nent • N	laxHours 👻	StartDate 🔹	EndDate 👻	Add New Field	Π.	
	O2 Broduct									
				''B						
1200 2008	Q3 Tax Prep	paration	Account	ing	145,00	10-08-2008	15-10-2008	3		
1300 2008	04 Product	Plan	Marketi	ng	150.00	10-08-2008	15-09-2008	3		
				.0						
1400 2008	Q4 Portion	o Analysis	Finance		140,00	05-10-2008				
1100 2008 1200 2008 1300 2008	Q3 Product Q3 Portfolio Q3 Tax Prep Q4 Product Q4 Portfolio	Plan o Analysis oaration Plan	Marketin Finance	ng ing ng	150,00 140,00	10-08-2008 05-10-2008	EndDate - 15-06-2008 25-07-2008 15-10-2008 15-09-2008	8		

						ESRIFF
202-1	SQI	for Data Retriev	al: JOIN	ON	Exar	nple
And A	1					
				FirstName	LastName	HoursWorked
			1	Mary	Jacobs	30.00
	SELECT	FirstName, LastName, Hours	Worked 2	Mary	Jacobs	25.00
	FROM	EMPLOYEE, ASSIGNMENT	3	Mary	Jacobs	35.00
	WHERE	EMPLOYEE.EmployeeNumber =	4	Rosalie	Jackson	20.00
	a defense a	ASSIGNMENT.EmployeeNumber	5	Tom	Caruthers	40.00
	ORDER BY	EMPLOYEE.EmployeeNumber, Pr	ojectID; 6	Tom	Caruthers	45.00
	Sectore and		7	Tom	Caruthers	15.00
	Using the JOI	N ON syntax, this query would be w	ritten as: 8	Heather	Jones	40.00
	SELECT	FirstName, LastName, Hours	Worked 9	Heather	Jones	10.00
	FROM	EMPLOYEE JOIN ASSIGNMENT	10	Mary	Abernathy	45.00
		ON EMPLOYEE.EmployeeNumb	er = 11	Mary	Abernathy	27.50
	1. And the second	ASSIGNMENT.EmployeeNu		Tom	Jackson	75.00
	ORDER BY	EMPLOYEE.EmployeeNumber, Pr	ojectID; 13	Tom	Jackson	80.00
			14	Ken	Numoto	55.00
			15	Ken	Numoto	50.00
			eacher: Dr. D. M. Akb			



	S LEFT (trieval: N Exa:	mple	
ProjectID	Name	- Dena	artment +	MaxHours •	StartDate •	EndDate 🔹	Add New Fi
	0 2008 Q3 Product Plan		keting	135,0		15-06-2008	
			nce	120,0		25-07-2008	
	0 2008 Q3 Tax Preparation		ounting	145,0		15-10-2008	
	0 2008 Q4 Product Plan		keting	150,0		15-09-2008	
140	0 2008 Q4 Portfolio Analysis		-	140,0	0 05-10-2008		
		ttID + 1000 1000 1000 1100 1200 1200 1200 120		1 8 10 4 6 1 2 4 5 1 8 10 4	rsWorke - 30,00 75,00 55,00 40,00 45,00 25,00 25,00 40,00 35,00 80,00 55,00 15,00		
		1400		5	10,00		

444	1	SQL for LEFT OUT	Data Ret ER JOIN			ESBJERO
	SELECT	Name, Employe	eeNumber, H	oursWorked		
	FROM	PROJECT LEFT				
	110011	ON PROJECT.Pr			ProjectID;	
		OIA LIGODCI.LI	0,00010 - 11			
			EmployeeNumber	HoursWorked		
	1	Name 2008 Q3 Product Plan	1	30.00		
	2	2008 Q3 Product Plan	8	75.00		
	3	2008 Q3 Product Plan	10	55.00		
	4	2008 Q3 Portfolio Analysis	4	40.00		
	5	2008 Q3 Portfolio Analysis	6	45.00		
	6	2008 Q3 Tax Preparation	1	25.00		
	7	2008 Q3 Tax Preparation	2	20.00		
	8	2008 Q3 Tax Preparation	4	45.00		
	9	2008 Q3 Tax Preparation	5	40.00		
	10	2008 Q4 Product Plan	1	35.00		
	11	2008 Q4 Product Plan	8	80.00		
	12	2008 Q4 Product Plan	10	50.00		
	13	2008 Q4 Portfolio Analysis	4	15.00		
	14	2008 Q4 Portfolio Analysis	5	10.00		
	15	2008 Q4 Portfolio Analysis	6	27.50		