

# Tutorial 9

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## Part 1

Ans 1 J1

(Company  $\bowtie$  Department  
Fname, address Company.Dno = Department.DNumber  $\wedge$  PNAME = "Research")

Ans 2

J1

Pno, Dno, Lastname,  
address, Birthdate

(Department  $\bowtie$  Project  
 $\bowtie$  Employee)

Project.DNum = Department.Dnumber  $\wedge$  PLocation = Staffon

Department.Dnumber = Employee.Dnumber  $\wedge$  MGRSSN = SSN

Ans 3

Project J1 (  $\sigma$  Project )  
Pnumber DNum = 5

R2  $\leftarrow$  J1 ( Works On )  
ESSN, PNO

R3  $\leftarrow$  R1  $\div$  R2

J1 ( Employee  $\bowtie$  R3 )  
Fname, Lname ESSN = SSN

Ans 4

R1  $\leftarrow$  J1 (  $\sigma$  Employee )  
SSN Lname = 'Smith'

R2  $\leftarrow$  J1 pno ( Works On  $\bowtie$  R1 )  
ESSN = SSN

R3  $\leftarrow$  J1 ~~number~~ ( Department  $\bowtie$  R1 )  
Dnumber MGRSSN = SSN

R4  $\leftarrow$  J1 pno ( Project  $\bowtie$  R3 )  
Dnumber = Dno

Add R3

J1 ( R2  $\cup$  R3 )  
Pno

Ans

Ans 5

Date \_\_\_\_\_

Page \_\_\_\_\_

Ans 6  $\pi$  (Employee)  $\sigma_{\text{Essn}}$   
From, last name

Ans 6  $\pi$  (Employee - Dependent)  
From, last name  $\sigma_{\text{Essn}}$

Ans 7  $\pi$  (Dependent  $\bowtie$  Employee)  $\bowtie$  Employee  
From, last name  $\text{ESSN} = \text{MRCSSN}$   $\text{MRCSSN} = \text{ESSN}$

## Part 2

Ans 1  $\pi$  (Player)  
Player Name, instrument

Ans 2  $\pi$  (Event)  
Orchestra Code, ~~Orchestra Name~~  $\sigma_{\text{venue} = \text{'Westerhall'}}$   
Event, Event Date, Venue

Ans 3  $\pi$  (Player)  
Player Name  $\sigma_{\text{Instrument} = \text{'Violin'} \wedge \text{Age} \leq 40}$

Ans 4  $\pi$  (Player  $\bowtie$  Orchestra)  
Playername  $\text{Player} \cdot \text{Orchestra Code} = \text{Orchestra} \cdot \text{Orchestra code}$

Ans 5  $\pi$  (Event  $\bowtie$  Orchestra)  
Venue, event date  $\text{Event} \cdot \text{Orchestra code} = \text{Orchestra} \cdot \text{Orchestra code}$   
 $\wedge \text{Orchestra} \cdot \text{Conductor} = \text{'P. Mancini'}$



Ans 6

JI

PlayerName, OrchestraName, Venue, EventDate

(Event  $\bowtie$  Orchestra)

E.orchestraCode = Orchestra.orchestraCode

OrchestraName = 'big Brass Ensemble'

$\bowtie$

Player)

Player.orchestraCode = E.orchestraCode

Player

Ans 7

JI

PlayerName

(Player  $\bowtie$

Orchestra)

PlayerName = Conductor

Ans 8

=

JI

PlayerName, Conductor

(Player  $\bowtie$

Orchestra)

Player.orchestraCode

= Orchestra.orchestraCode