**TOPIC 17: EMPLOYMENT AGENCY**

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*One of the most important things which graduates care about is to look for a suitable and well-paid job. Have you ever heard about or browsed the web site of employment agencies, such as www.vietnamworks.com? Your topic is to build a system where employers can post their vacancies, employees can browse or search suitable vacancies based on their attributes (age, degree, experience, required salary…)*

*Typical users and their activities in the required system:*

*• Employer: registry, post vacancies, browse or search available resumes*

*• Employee: registry, browse or search suitable vacancies*

*• Staff: manage vacancies (erase outdated vacancies, remind employees with the availability of suitable vacancies…)*

*• Manager: manage staffs*

**Question 1:** (40 pts) Analyzing requirements and designing ER model.

By discussing and analyzing the requirement, we have completed the ERD below

A close up of a map

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**Question 2:** (20 pts) Converting from ERD to relational model.

A close up of a map

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**EMPLOYEE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| E\_ID | E\_Name | E\_Address | E\_Phone | E\_email |

**RESUME**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| R\_ID | Expect\_salary | Background | Skills | Aca\_level | Exp |

**COMPANY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company\_Name | C\_Address | C\_Email | Rating | Field |

**STAFF**

|  |  |  |  |
| --- | --- | --- | --- |
| S\_ID | S\_Email | S\_Name | S\_Phone |

**VACANCY**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| V\_ID | Position | Field | Required\_Aca\_Level | Required\_Exp | Start\_Salary | Publish\_day |

**Step 2: Weak Entity Types**

**Step 3: Mapping Binary 1-to-1**

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**Step 4: Binary N-to-1**

**EMPLOYEE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| E\_ID | E\_Name | E\_Address | E\_Phone | E\_email |

**RESUME**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| R\_ID | Expect\_salary | Background | Skills | Aca\_level | Exp | E\_ID |

**COMPANY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company\_Name | C\_Address | C\_Email | Rating | Field |

**STAFF**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S\_ID | S\_Email | S\_Name | S\_Phone | Company\_Name | M\_ID |

**VACANCY**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V\_ID | Position | Field | Required\_Aca\_Level | Required\_Exp | Start\_Salary | Publish\_day | S\_ID | Company\_Name |

A close up of a map

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**EMPLOYEE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| E\_ID | E\_Name | E\_Address | E\_Phone | E\_email |

**RESUME**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| R\_ID | Expect\_salary | Background | Skills | Aca\_level | Exp | E\_ID |

**R\_Like**

|  |  |  |
| --- | --- | --- |
| R\_ID | S\_ID | Invite |

**COMPANY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company\_Name | C\_Address | C\_Email | Rating | Field |

**STAFF**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S\_ID | S\_Email | S\_Name | S\_Phone | Company\_Name | M\_ID |

**VACANCY**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V\_ID | Position | Field | Required\_Aca\_Level | Required\_Exp | Start\_Salary | Publish\_day | S\_ID | Company\_Name |

**V\_Like**

|  |  |  |
| --- | --- | --- |
| E\_ID | V\_ID | Apply |

A close up of a map

Description automatically generated**Step 6: Multivalued Attribute**

**EMPLOYEE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| E\_ID | E\_Name | E\_Address | E\_Phone | E\_email |

**RESUME**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| R\_ID | Expect\_salary | Background | Aca\_level | Exp | E\_ID |

**Skills**

|  |  |
| --- | --- |
| R\_ID | Skill |

**R\_Like**

|  |  |  |
| --- | --- | --- |
| R\_ID | S\_ID | Invite |

**COMPANY**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Company\_Name | C\_Address | C\_Email | Rating | Field |

**STAFF**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S\_ID | S\_Email | S\_Name | S\_Phone | Company\_Name | M\_ID |

**VACANCY**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| V\_ID | Position | Field | Required\_Aca\_Level | Required\_Exp | Start\_Salary | Publish\_day | S\_ID | Company\_Name |

V\_Like

|  |  |  |
| --- | --- | --- |
| E\_ID | V\_ID | Apply |

***Question 3:*** *(35 pts) Using SQL to create a database with integrity constraints. Next, input data into the database. Then, using SQL query to update, manipulate, query, retrieve data from the database.*

The .bak and .sql files in zip file

***Question 4:*** *(15 pts) Using relational algebra to perform data queries.*

***Select the employee and the company that have the same street address***

*Query*

--Select the employee and the company that have the same street address

SELECT em.E\_name,em.E\_address, co.Company\_Name

FROM dbo.EMPLOYEE AS em, dbo.COMPANY AS co

WHERE em.E\_address = co.C\_Address

*Relational* *Algebra*

π E\_name,E\_address,Company\_Name (σ E\_address = C\_Address (EMPLOYEE X COMPANY))

***Select the suitable job***

*Query*

--Select the suitable job

SELECT va.Company\_Name, va.Position, va.Field, va.Required\_Aca\_Level, va.Required\_Exp, va.Start\_Salary

FROM dbo.RESUME AS re, dbo.VACANCY AS va

WHERE re.Expect\_salary<=va.Start\_Salary AND re.Background = va.Field AND re.Aca\_level=va.Required\_Aca\_Level AND re.Exp>=va.Required\_Exp

*Relational Algebra*

π Company\_Name,Position,Field,Required\_Aca\_Level,Required\_Exp (σ Expect\_salary<=Start\_Salary ∧ Background = Field ∧ Aca\_level=Required\_Aca\_Level ∧ Exp>=Required\_Exp (RESUME X VACANCY))

***Select the jobs that have salary larger than 800***

*Query*

--Select the jobs that have salary larger than 800

SELECT va.Position,va.Start\_Salary, va.Company\_Name

FROM dbo.VACANCY AS va

WHERE va.Start\_Salary > 800

*Relational* *Algebra*

π Position,Start\_Salary,Company\_Name (σ Start\_Salary > 800 (VACANCY))

***Select the employees who have background in SQL***

*Query*

--Select the employees who have background in SQL

SELECT re.R\_ID, em.E\_Name

FROM dbo.RESUME AS re, dbo.EMPLOYEE AS em

WHERE re.Background = 'SQL' AND re.E\_ID = em.E\_ID

*Relational* *Algebra*

π R\_ID,E\_Name (σ Background = 'SQL' (RESUME ⨝ EMPLOYEE))

***Select the employees who have bachelor degree and work experience > 2.5 years***

*Query*

--Select the employees who have bachelor degree and work experience > 2.5 years

SELECT re.R\_ID, em.E\_Name

FROM dbo.RESUME AS re, dbo.EMPLOYEE AS em

WHERE re.E\_ID = em.E\_ID AND re.Aca\_level = 'bachelor' AND re.Exp > 2.5

*Relational* *Algebra*

π R\_ID,E\_Name (σ Aca\_level = 'bachelor' ∧ Exp > 2.5 (RESUME ⨝ EMPLOYEE))