CS27020 Assignment - Career Planner

Tom Leaman (thl5)

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1 Un-normalised Analysis

Company name	varchar(128)
Company information	varchar(1024)
Role	varchar(64)
Deadline	date
Required strength 1	varchar(64)
Required strength 2	varchar(64)
Required strength 3	varchar(64)
Required qualification 1	varchar(64)
Required qualification 2	varchar(64)
My strength 1	varchar(64)
My strength 2	varchar(64)
My strength 3	varchar(64)
Evidence 1	varchar(64)
Evidence 2	varchar(64)
Evidence 3	varchar(64)
Satisfaction 1	varchar(64)
Satisfaction 2	varchar(64)
Satisfaction 3	varchar(64)
Qualification 1	varchar(64)
Qualification 2	varchar(64)
Qualification 3	varchar(64)
Date 1	date
Date 2	date
Date 3	date
Grade 1	varchar(64)
Grade 2	varchar(64)
Grade 3	varchar(64)
Aim 1	varchar(64)
Aim 2	varchar(64)
Aim 3	varchar(64)
Relevance 1	varchar(64)
Relevance 2	varchar(64)
Relevance 3	varchar(64)
CV	varchar(128)
Covering letter	varchar(128)
Date sent	date
Response	boolean
Interview date	date
Outcome	varchar(1024)
Reflection	varchar(1024)

I have simply specified a field for each box on the form which I assume will contain data. This means that the table already conforms to 1NF (each field contains only one piece of data).

I have specified all Varchar type attributes with a limit which is a power of 2 (I believe this not only provides a more logically consistent scheme but also may improve efficiency and aid optimisation when using particular database engines). I would, however, hope to check these limits against representative example data before committing to these limits.

1.1 Primary key

The primary key will be a composite of the Company name, Role and Deadline. I have chosen to include the Deadline as it may be possible to apply for the same position with the same company on more than one occasion.

1.2 Functional dependencies

I have identified the following functional dependencies:

Company name → Company information

Each company will have its own blurb.

Qualification → Date, Grade

Each qualification will have been achieved on a single date with a single grade.

Company name, Role, Deadline → Company information, Deadline, Required Strengths, Required Qualifications, Strengths, Evidence, Satisfaction, Qualifications, Dates, Grades, Aims, Relevance, CV, Covering Letter, Date sent, Response, Interview date, Outcome, Reflection

The composite primary key uniquely identifies the remaining information in each application.

It is possible that fields such as Strengths and Qualifications be functionally dependent on the Required strengths and Required qualifications. I have decided not to specify this as a functional dependency in this design; if the user is applying for the same role at the same company at a different time, it is possible (or even likely) that they will want to specify different Strengths and Qualifications that they have gained in the intervening time.

Likewise, it would be possible to specify the Evidence and Satisfaction fields as functionally dependent on the Strength; again, I feel this is too great of an assumption to make without sample data/client consultation.

2 2nd Normal Form

The Company information is only dependent on the Company name (part of the primary key). So a new table will be created containing the Company name (which will be the primary key) and the Company information. The Company information field can then be removed from the main table.

3 3rd Normal Form

The Date and Grade of the Qualification are transitively dependent on the Company name, Role and Deadline so to bring the database to 3rd normal form, we will create a new table with Qualification (which will be the primary key), Date and Grade. We can then remove the Date and Grade fields from the main table.

4 PostGreSQL implementation

4.1 Table schema

```
psql (9.2.3)
Type "help" for help.

career-planner=# \d
          List of relations
 Schema |     Name      | Type  | Owner
--------+---------------+-------+-------
 public | company       | table | tom
 public | main          | table | tom
 public | qualification | table | tom
(3 rows)

career-planner=# \d company
                  Table "public.company"
       Column        |          Type           | Modifiers
---------------------+-------------------------+-----------
 company_name        | character varying(128)  | not null
 company_information | character varying(1024) |
Indexes:
    "company_pkey" PRIMARY KEY, btree (company_name)
Referenced by:
    TABLE "main" CONSTRAINT "main_company_name_fkey" FOREIGN KEY\
(company_name) REFERENCES company(company_name)

career-planner=# \d qualification
           Table "public.qualification"
    Column     |         Type          | Modifiers
---------------+-----------------------+-----------
 qualification | character varying(64) | not null
 date          | date                  |
 grade         | character varying(64) |
Indexes:
    "qualification_pkey" PRIMARY KEY, btree (qualification)
Referenced by:
    TABLE "main" CONSTRAINT "main_qualification_1_fkey" FOREIGN KEY\
(qualification_1) REFERENCES qualification(qualification)
    TABLE "main" CONSTRAINT "main_qualification_2_fkey" FOREIGN KEY\
(qualification_2) REFERENCES qualification(qualification)
    TABLE "main" CONSTRAINT "main_qualification_3_fkey" FOREIGN KEY\
(qualification_3) REFERENCES qualification(qualification)

career-planner=# \d main
                     Table "public.main"
          Column          |          Type           | Modifiers
--------------------------+-------------------------+-----------
 company_name             | character varying(128)  | not null
 role                     | character varying(64)   | not null
 deadline                 | date                    | not null
 required_strength_1      | character varying(64)   |
 required_strength_2      | character varying(64)   |
 required_strength_3      | character varying(64)   |
 required_qualification_1 | character varying(64)   |
 required_qualification_2 | character varying(64)   |
 my_strength_1            | character varying(64)   |
 my_strength_2            | character varying(64)   |
```

```
 my_strength_3            | character varying(64)   |
 evidence_1               | character varying(64)   |
 evidence_2               | character varying(64)   |
 evidence_3               | character varying(64)   |
 satisfaction_1           | character varying(64)   |
 satisfaction_2           | character varying(64)   |
 satisfaction_3           | character varying(64)   |
 qualification_1          | character varying(64)   |
 qualification_2          | character varying(64)   |
 qualification_3          | character varying(64)   |
 aim_1                    | character varying(64)   |
 aim_2                    | character varying(64)   |
 aim_3                    | character varying(64)   |
 relevance_1              | character varying(64)   |
 relevance_2              | character varying(64)   |
 relevance_3              | character varying(64)   |
 cv                       | character varying(128)  |
 covering_letter          | character varying(128)  |
 date_sent                | date                    |
 response                 | boolean                 |
 interview_date           | date                    |
 outcome                  | character varying(1024) |
 reflection               | character varying(1024) |
Indexes:
    "main_pkey" PRIMARY KEY, btree (company_name, role, deadline)
Foreign-key constraints:
    "main_company_name_fkey" FOREIGN KEY (company_name) REFERENCES\
company(company_name)
    "main_qualification_1_fkey" FOREIGN KEY (qualification_1) REFERENCES\
qualification(qualification)
    "main_qualification_2_fkey" FOREIGN KEY (qualification_2) REFERENCES\
qualification(qualification)
    "main_qualification_3_fkey" FOREIGN KEY (qualification_3) REFERENCES\
qualification(qualification)

career-planner=# \q
```

4.2 Queries

```
psql (9.2.3)
Type "help" for help.

career-planner=# SELECT company_name, role, interview_date FROM main WHERE response='t';
 company_name | role  | interview_date
--------------+-------+----------------
 Y Popty      | Baker | 2012-12-02
(1 row)

career-planner=# SELECT * FROM qualification WHERE grade='A' OR grade='B';
 qualification |    date    | grade
---------------+------------+-------
 Pro Knitter   | 2012-11-01 | A
 GNVQ Tetris   | 2013-01-01 | B
(2 rows)

career-planner=# SELECT company_name, role FROM main WHERE response='f';
 company_name  |  role
---------------+---------
 Awooga Models | Jnr Dev
 Spar          | Lackey
(2 rows)

career-planner=# \q
```