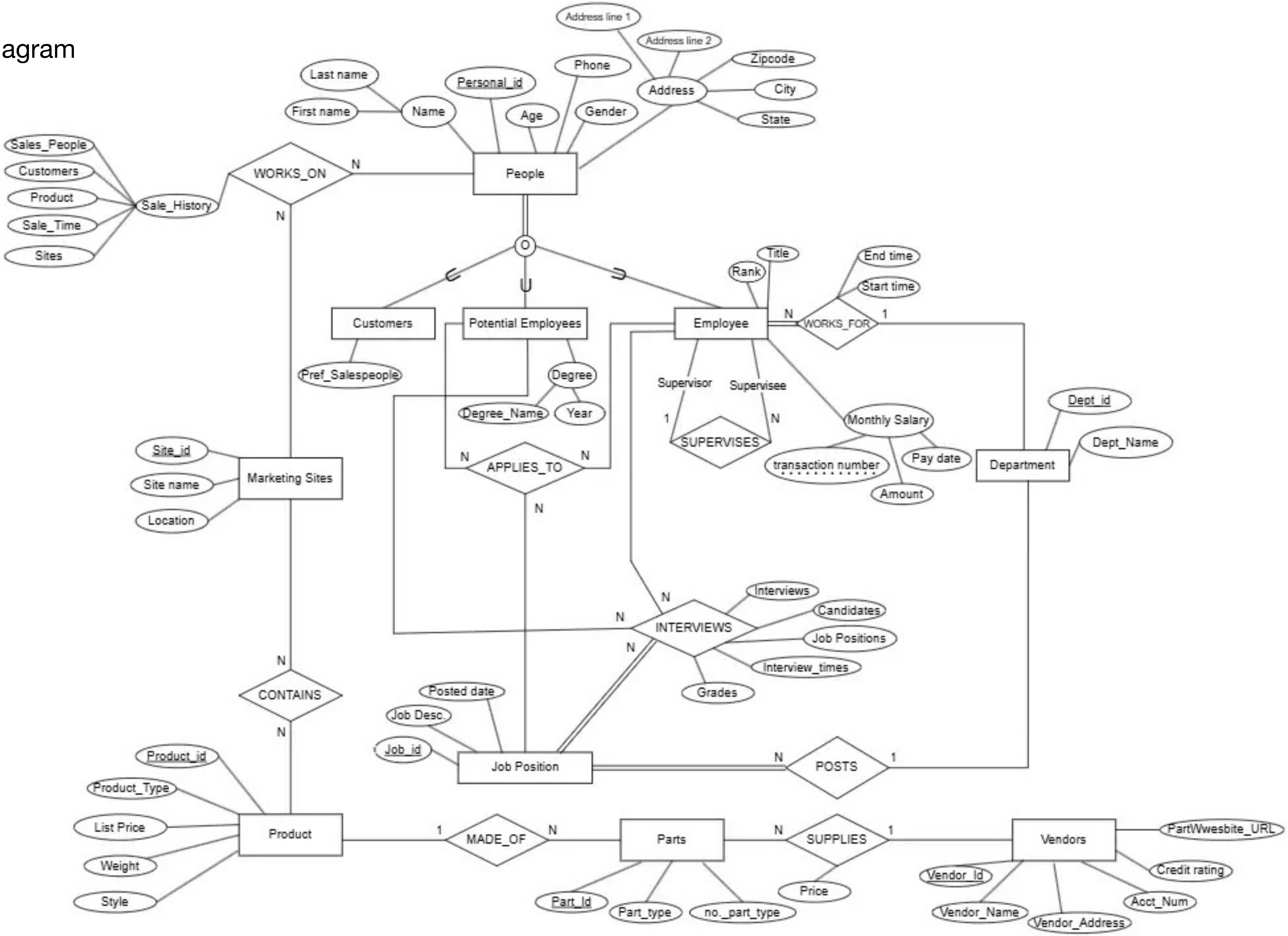
EER Diagram


Address line 1
Address line 2
Zipcode
Phone
Address
City
State
Last name
Personal_id
First name
Name
Age
Gender
People
Sales_People
Customers
Product
Sale_History
Sale_Time
Sites
WORKS_ON
N
N
O
U
U
U
Title
Rank
End time
Start time
Customers
Potential Employees
Employee
N
WORKS_FOR
1
Pref_Salespeople
Degree
Degree_Name
Year
Supervisor
Supervisee
1
N
SUPERVISES
Monthly Salary
transaction number
Pay date
Amount
Dept_id
Dept_Name
Department
Site_id
Site name
Location
Marketing Sites
N
APPLIES_TO
N
N
Interviews
Candidates
Job Positions
Interview_times
Grades
N
N
INTERVIEWS
N
N
CONTAINS
N
Posted date
Job Desc.
Job_id
Job Position
N
POSTS
1
Product_id
Product_Type
List Price
Weight
Style
Product
1
MADE_OF
N
Parts
N
SUPPLIES
1
Vendors
PartWwesbite_URL
Credit rating
Acct_Num
Vendor_Id
Vendor_Name
Vendor_Address
Part_Id
Part_type
no._part_type
Price

Schema

MARKETING_SITES

site_id	site_name	Location

PRODUCT

Product_id	Product_Type	List_Price	weight	Style

PARTS

Part_id	part_type	no_part_type	vendor_id	Price	Product_id

VENDORS

vendor_id	vendor_name	vendor_address	Acct_num	credit_rating	PW_URL

DEPARTMENT

Dept_id	Department_Name

JOB_POSITIONS

Job_id	Job_Description	posted_Date	Dept_id

WORKS_ON

Personat_id	site_id	sales_people	customers	Product	sales_Time	sites

CONTAINS

Product_id	site_id

APPLIES_TO

Personal_id	Job_id

INTERVIEWS

Personal_id	Job_id	grades	interview_Times	Job_Positions	Canidates	interviews

PEOPLE

Personal_id	Fname	Lname	Age	Phone_Number	Gender	Address_Line 1	Address_Line2	zipcode	City	State

EMPLOYEE

Personal_id	Rank	Title	Dept_id	Start_Time	End_Time	Transaction_number	Amount	Pay_Date	Super_id

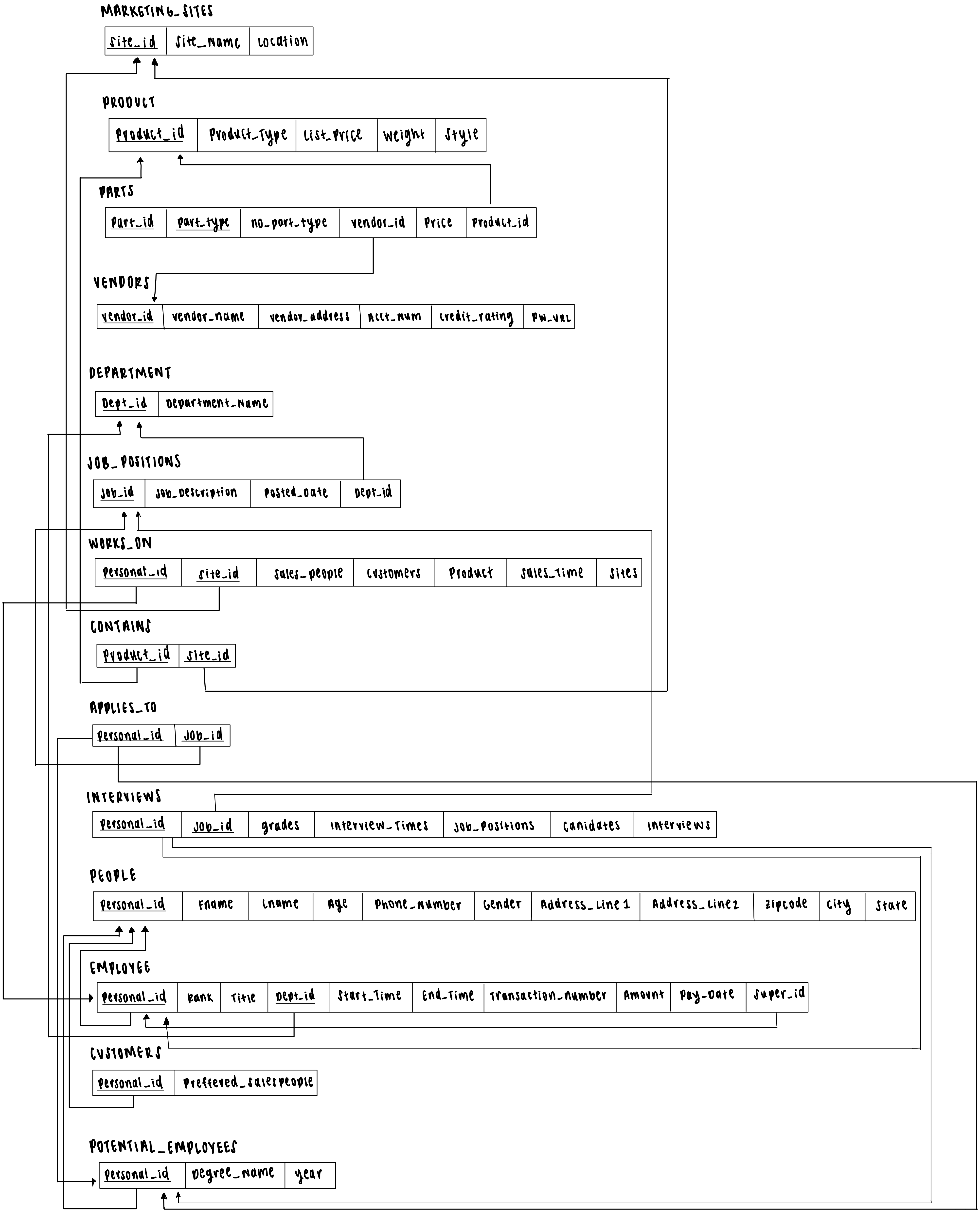
CUSTOMERS

Personal_id	Preffered_salespeople

POTENTIAL_EMPLOYEES

Personal_id	Degree_name	year

Relational Mapping



MARKETING_SITES

Site_id	Site_Name	Location

PRODUCT

Product_id	Product_Type	List_Price	Weight	Style

PARTS

Part_id	part_type	no_part_type	vendor_id	Price	Product_id

VENDORS

vendor_id	vendor_name	vendor_address	Acct_num	credit_rating	PW_URL

DEPARTMENT

Dept_id	Department_Name

JOB_POSITIONS

Job_id	Job_Description	Posted_Date	Dept_id

WORKS_ON

Personat_id	Site_id	Sales_people	Customers	Product	Sales_Time	Sites

CONTAINS

Product_id	Site_id

APPLIES_TO

Personal_id	Job_id

INTERVIEWS

Personal_id	Job_id	grades	Interview_Times	Job_Positions	Canidates	Interviews

PEOPLE

Personal_id	Fname	Lname	Age	Phone_Number	Gender	Address_Line 1	Address_Line2	Zipcode	City	State

EMPLOYEE

Personal_id	Rank	Title	Dept_id	Start_Time	End_Time	Transaction_number	Amount	Pay_Date	Super_id

CUSTOMERS

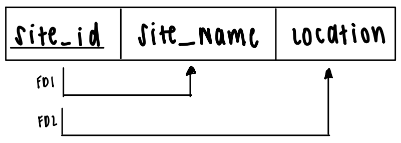
Personal_id	Preffered_salespeople

POTENTIAL_EMPLOYEES

Personal_id	Degree_Name	year

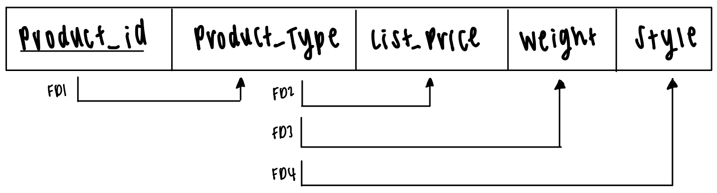
Functional Dependencies

MARKETING_SITES



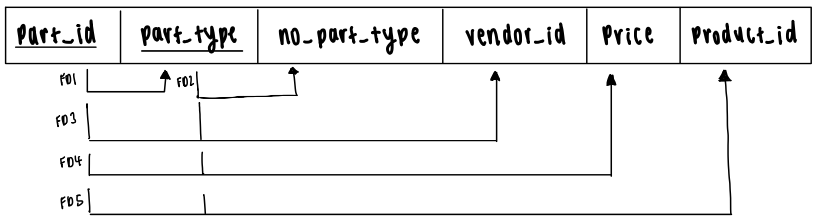
Site_id	Site_name	Location

PRODUCT



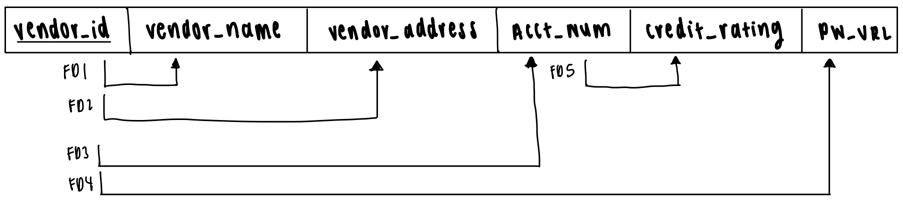
Product_id	Product_Type	List_Price	Weight	Style

PARTS



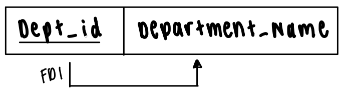
Part_id	part_type	no_part_type	vendor_id	Price	Product_id

VENDORS



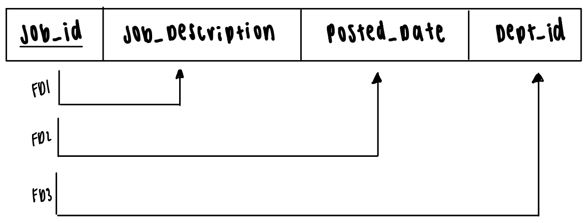
vendor_id	vendor_name	vendor_address	Acct_num	credit_rating	PW_URL

DEPARTMENT



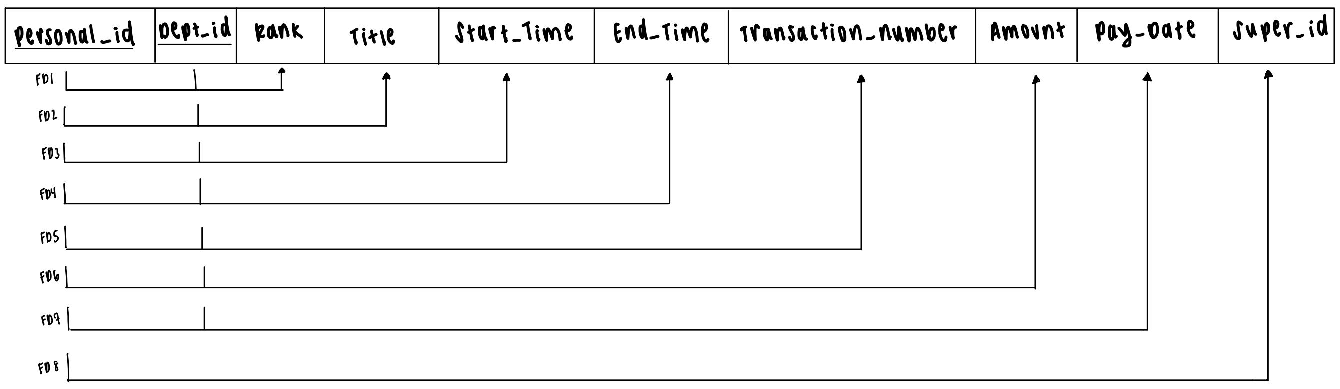
Dept_id	Department_Name

JOB_POSITIONS



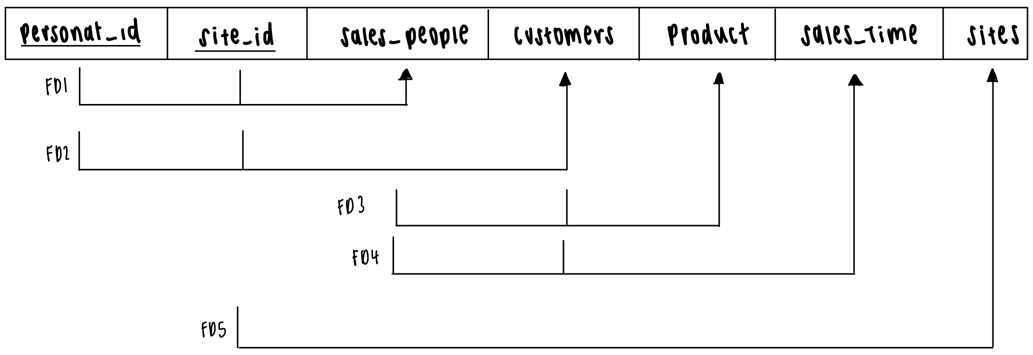
Job_id	Job_Description	Posted_Date	Dept_id

EMPLOYEE



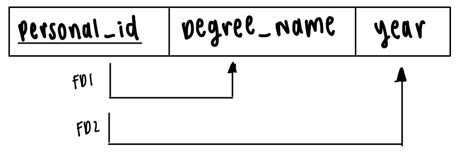
Personal_id	Dept_id	Rank	Title	Start_Time	End_Time	Transaction_number	Amount	Pay_Date	Super_id

WORKS_ON



Personat_id	Site_id	Sales_people	Customers	Product	Sales_Time	Sites

POTENTIAL_EMPLOYEES



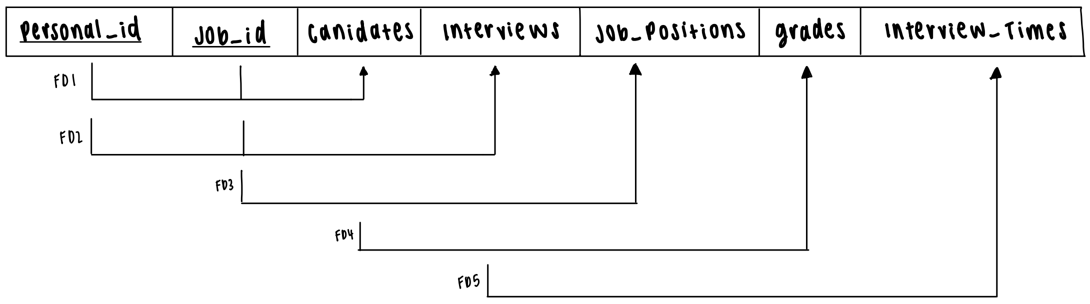
CONTAINS

Personal_id	Site_id

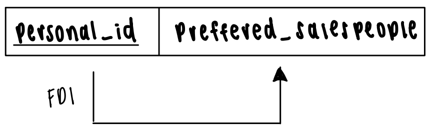
APPLIES_TO

Personal_id	Job_id

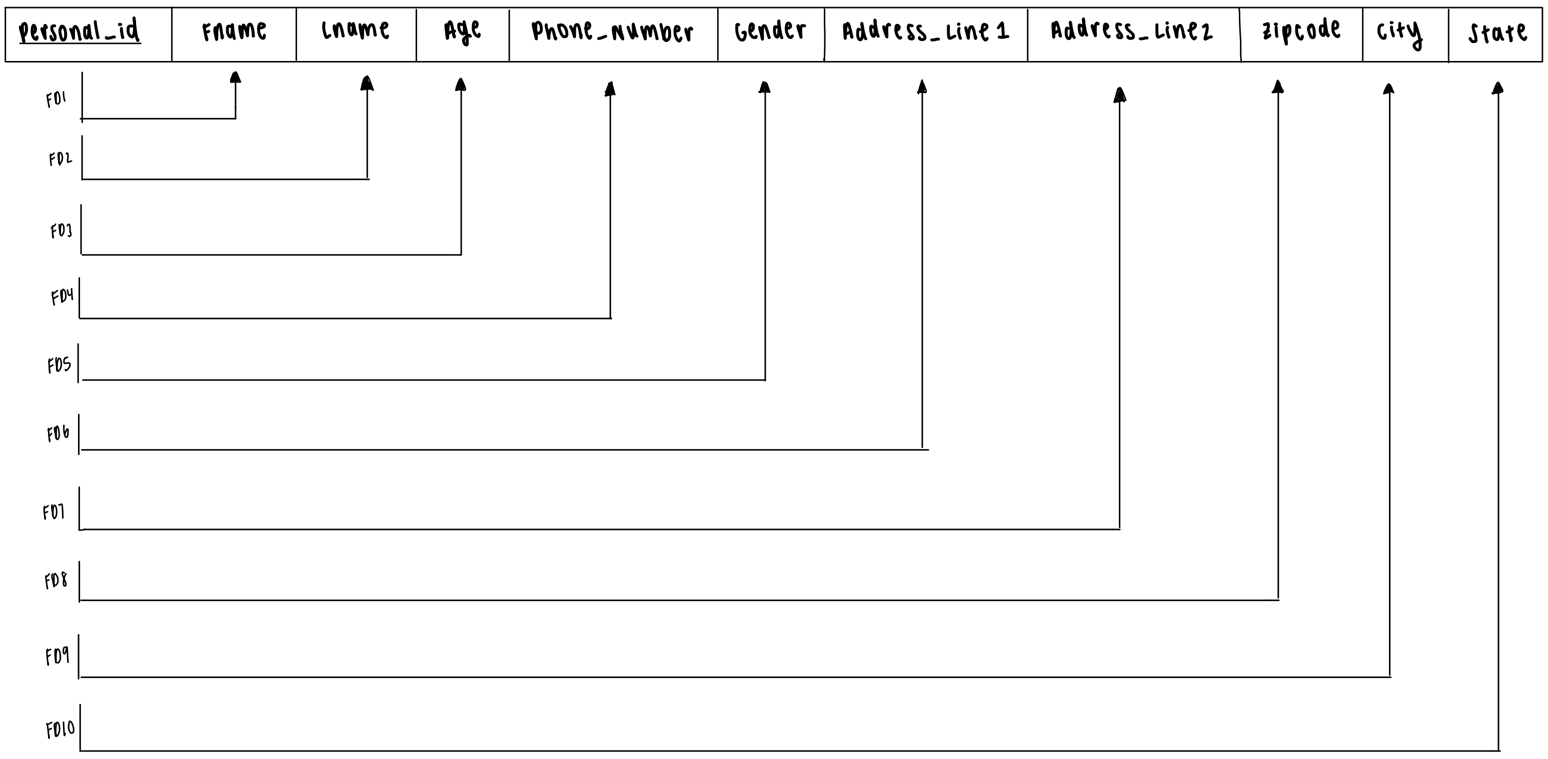
INTERVIEWS



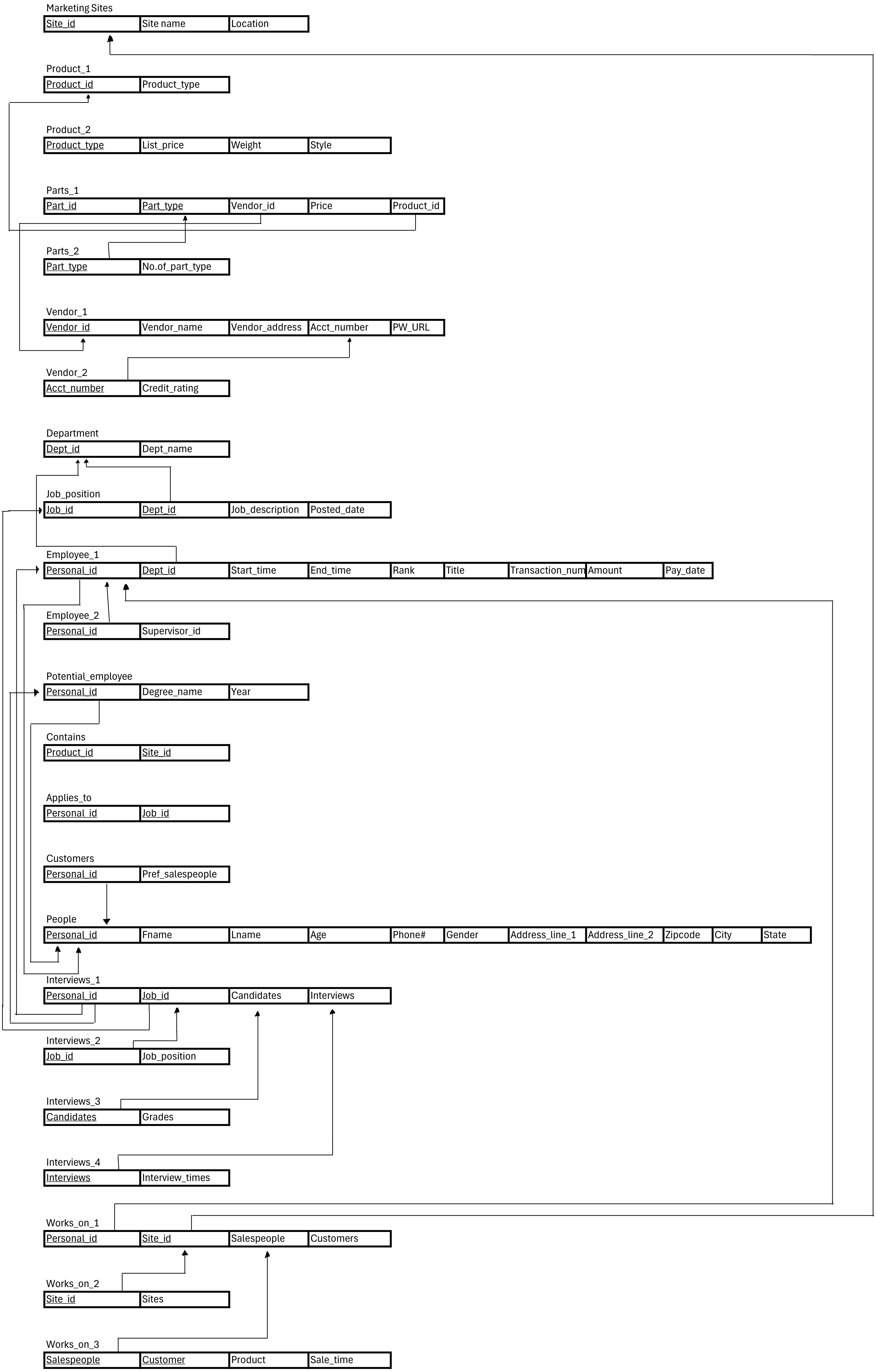
CUSTOMERS



PEOPLE



Normalized Version



Marketing Sites

Site_id	Site name	Location

Product_1

Product_id	Product_type

Product_2

Product_type	List_price	Weight	Style

Parts_1

Part_id	Part_type	Vendor_id	Price	Product_id

Parts_2

Part_type	No.of_part_type

Vendor_1

Vendor_id	Vendor_name	Vendor_address	Acct_number	PW_URL

Vendor_2

Acct_number	Credit_rating

Department

Dept_id	Dept_name

Job_position

Job_id	Dept_id	Job_description	Posted_date

Employee_1

Personal_id	Dept_id	Start_time	End_time	Rank	Title	Transaction_num	Amount	Pay_date

Employee_2

Personal_id	Supervisor_id

Potential_employee

Personal_id	Degree_name	Year

Contains

Product_id	Site_id

Applies_to

Personal_id	Job_id

Customers

Personal_id	Pref_salespeople

People

Personal_id	Fname	Lname	Age	Phone#	Gender	Address_line_1	Address_line_2	Zipcode	City	State

Interviews_1

Personal_id	Job_id	Candidates	Interviews

Interviews_2

Job_id	Job_position

Interviews_3

Candidates	Grades

Interviews_4

Interviews	Interview_times

Works_on_1

Personal_id	Site_id	Salespeople	Customers

Works_on_2

Site_id	Sites

Works_on_3

Salespeople	Customer	Product	Sale_time

Normalization Explanations

The PRODUCT table violates the 2NF, because ‘List_Price’ ‘Weight’ and ‘Style’ are partial dependencies and hence do not depend on the whole key. This is due to the real-world dependency that these attributes have on the type of product at hand.

- Hence, we separate it out into a PRODUCT_2 table where the non-key attributes (‘List_Price’ ‘Weight’ and ‘Style’) are reliant on the only key attribute (Product_type). We keep our two key attributes together in the other table
- This ensures it is in 3NF

The PARTS table also violates 2NF due to ‘no_part_type’ is a partial dependency relying on part of the composite key attribute (only part_type). This is also due to the real-world functional dependency of the quantity of the part type being tied to which part is in question

- Hence, we separate these two attributes out into a PARTS_2 table where ‘no_part_type’ is the only non-key attribute, and ‘part_type’ is the key attribute.
- This ensures it is in 3NF

The VENDORS table violates the 3NF due to the ‘Acct_number’ which is a non-key attribute relying on ‘credit_rating’ which is another non_key attribute. This makes it a transitive dependency, which elicits the need to separate them out. This dependency is created due to credit ratings in the real world being attached to the account number of a vendor.

- In the new table, the attribute which was functionally dependent on the key attribute becomes the key attribute and the other non-key attribute is still a non-key attribute. We also removed this non-key attribute from the initial table which is renamed to VENDOR_1.
- This ensures that it is in 3NF

The EMPLOYEE table violates 2NF as it has ‘Super_id’ which has a partial dependency due to it depending on only the ‘personal_id.’ This is because the supervisor’s id being taken out of the ready pool of employees with their own personal id’s in the company.

- Hence, we separate out ‘Super_id’ into a table with the part of the composite key which it is depended on. We remove the non-key attribute from the initial table which is now named EMPLOYEE_1.
- This ensures that it is in 3NF

The WORKS_ON table violates the 2NF due to the ‘Product’ attribute being partially dependent on the key. There are also transitive dependencies, however, it cannot be in 3NF regardless due to it not being in 2NF.

- Hence first we get it into 2NF by separating the non-key attribute ‘Sites’ into another table with ‘site_id’ as the key attribute and naming it WORKS_ON2. This places our table in 2NF as we have separated the attributes which violate the 2NF and treat them accordingly.
- Now, to get it in 3NF we separate out the 4 non-key attributes which are causing transitive dependencies in the table. Namely, ‘Sales_people’ ‘Customers’ ‘Product’ and ‘Sales_Time.’ So, we make a WORKS_ON3 and place these attributes in it, using the ‘Sale_people’ and ‘Customers’ as the key in this new table. We remove ‘Customers’ ‘Product’ ‘Sales_people’ and ‘Sales_Time’ from our initial table, which is now renamed to WORKS_ON1. Through real world

understanding of how a ‘Sale_Time’ and a ***‘Product’ would require a unique ‘Sales_Person’ and ‘Customer’ we make these the key attributes in our new table.

The INTERVIEWS table has the non-key attribute ‘Job_Positions’ which is partially dependent on the composite key attribute ‘Job_id’ and ‘Personal_id.’ Hence, violating 2NF. Since it violates 2NF, it cannot be in 3NF. ‘Job_Position’ is only dependent on ‘Job_id’ due to the real-world knowledge of the ‘Job_id’ only being connected to a certain ‘Job_Position’ and not a person (e.g. A job position can exist and have an id without a person with a personal id having the job).

- Hence, we separate out ‘Job_Positions’ and ‘Job_id’ into a new table with ‘Job_id’ being the new key in this table named INTERVIEWS2. We removed the ‘Job_Positions’ attribute from the initial INTERVIEWS table which is renamed to INTERVIEWS1.
- However, the ‘grades’ and ‘candidates’ attributes in the table, there is also a transitive dependency, making it violate 3NF. The ‘interviews’ and ‘interview_times’ also have a transitive dependency, having the same effect. This is due to how grades are given to candidates for the job irrespective of what their personal_id or job_id may be.
- Hence, we put ‘candidates’ and ‘grades’ into a new table, naming it INTERVIEWS3 and making ‘candidates’ the key attribute in the table. We take out ‘grades’ from the initial table, INTERVIEW1. Similarly, we take out ‘interviews’ and ‘interview_times’ and put it in a new table INTERVIEWS_4 making the ‘interviews’ the key attribute in this table. We remove ‘interview_times’ from the initial table, INTERVIEW1.

All other tables are already in 3NF as they have atomic elements, complete key dependencies and no transitive dependencies.