

Module 3

Implementing a Database

SQL Developer

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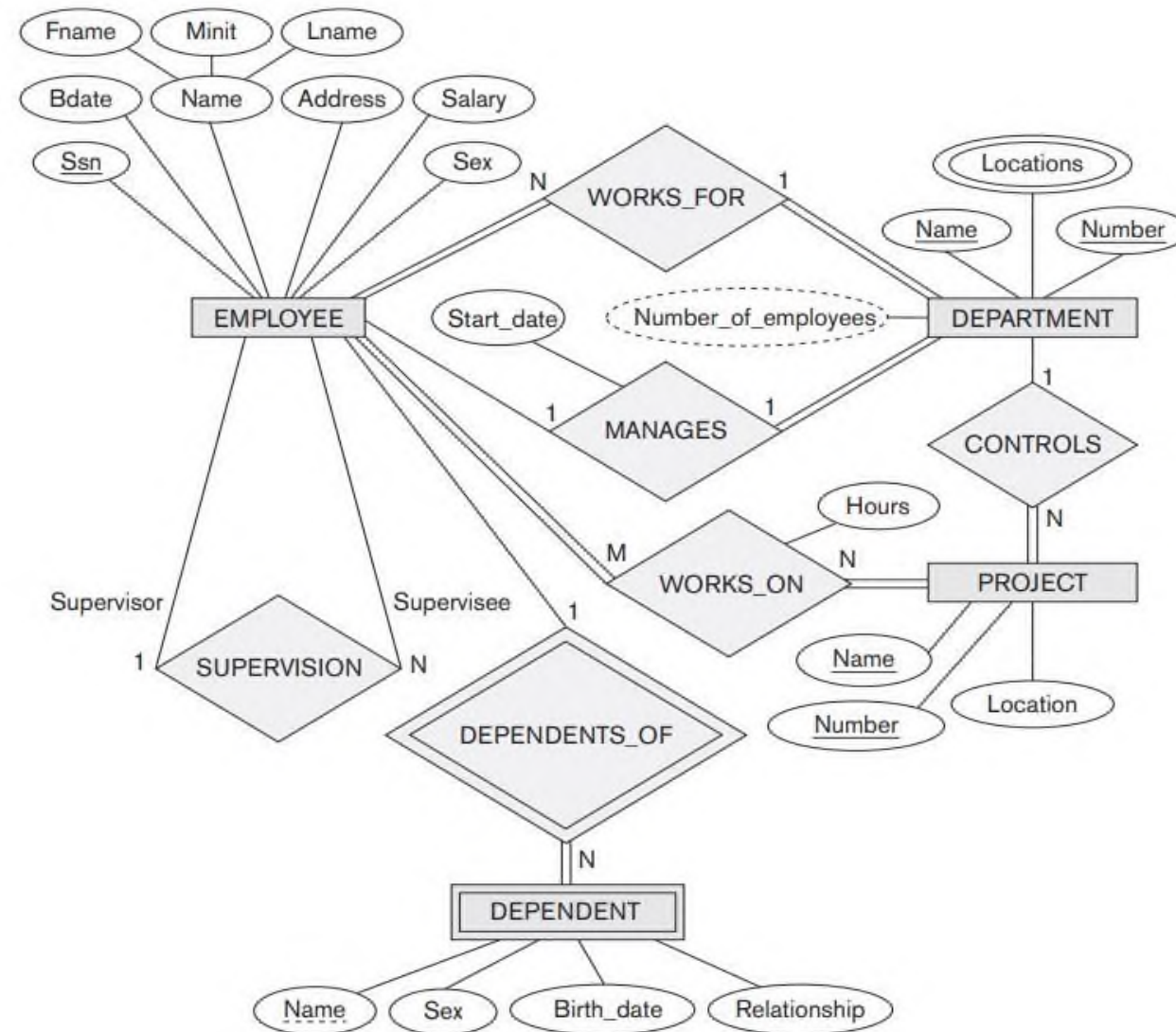
Content

- Create the Company database using SQL Developer
 - Create tables
 - Insert data
 - Create constraints (Unique, Foreign Keys, Check)

A Sample Database Application: COMPANY database

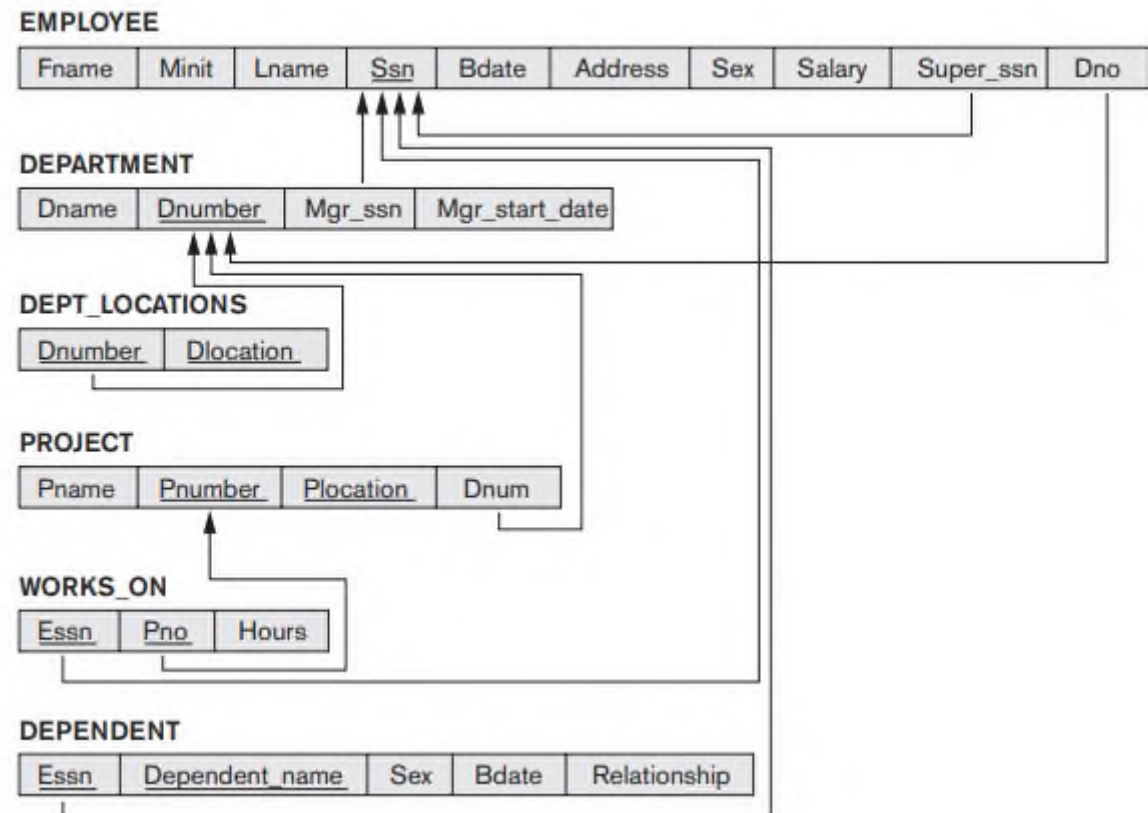
- The company is organized into departments. Each department has a **unique name**, a **unique number**, and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.
- A department controls a number of projects, each of which has a **unique name**, a **unique number**, and a single location.
- We store each employee's name, Social Security number, address, salary, sex(gender), and birth date. An employee is assigned to one department, but may work on several projects, which are not necessarily controlled by the same department. We keep track of the current number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee (who is another employee).
- We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent's first name, sex, birth date, and relationship to the employee.

COMPANY ER

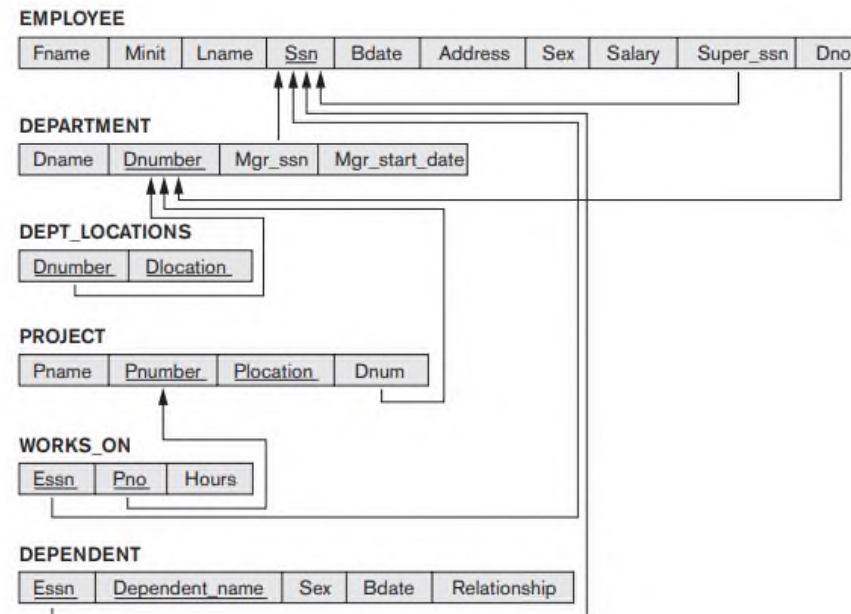
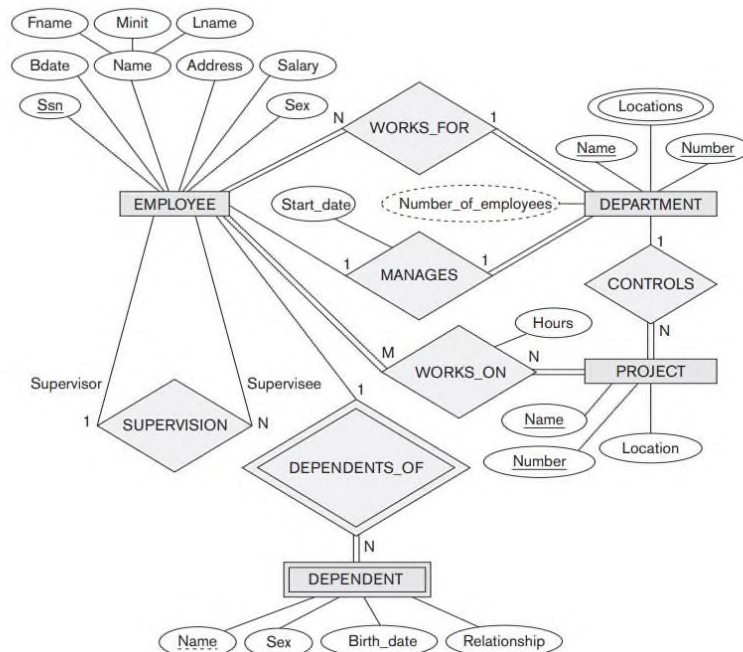


COMPANY Relational Model

- Constraints:
 - Employee.ssn unique, not null
 - Employee.Fname not null
 - Employee.Lname not null
 - Employee.Sex IN ('M', 'F')
 - Department.dname unique, not null
 - Department.dnumber unique, not null
 - Department.Mgr_ssn not null (1:N mandatory)
 - Project.pname unique, not null
 - Project.pnumber unique, not null
 - Project.dnum not null (1:1 mandatory)
 - Works_on.hours not null
- Other constraints (Triggers)
 - Works_on mandatory.
- Semantic integrity constraints (Triggers)
 - The salary of an employee should not exceed the salary of the employee supervisor



COMPANY ER-Relational Mapping



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COMPANY database: Create Table sentences

- **Step 1: Mapping of Regular Entity Types:** Employee, Department, Project
- **Step 2: Mapping of Weak Entity Types:** Dependent
- **Step 3: Mapping of Binary 1:1 Relationship Types:** Manages
- **Step 4: Mapping of Binary 1:N Relationship Types:** Works_for, Supervision, Controls
- **Step 5: Mapping of Binary M:N Relationship Types:** Works_on
- **What about inserting data???**
 - **Be careful with foreign key constraints!!!!**

SQL Developer: Create Connection

Nueva / Seleccionar Conexión a Base de Datos

Nombre de Cone...	Detalles de Cone...
Afrodita	mmar@//afrodita...
corrigebd	corrigebd@//afro...

Name:

Tipo de Base de Datos:

Información de usuario

Tipo de autenticación:

Usuario: Rol:

Contraseña: ☐ Guardar Contraseña

Tipo de Conexión:

Detalles

Nombre del Host:

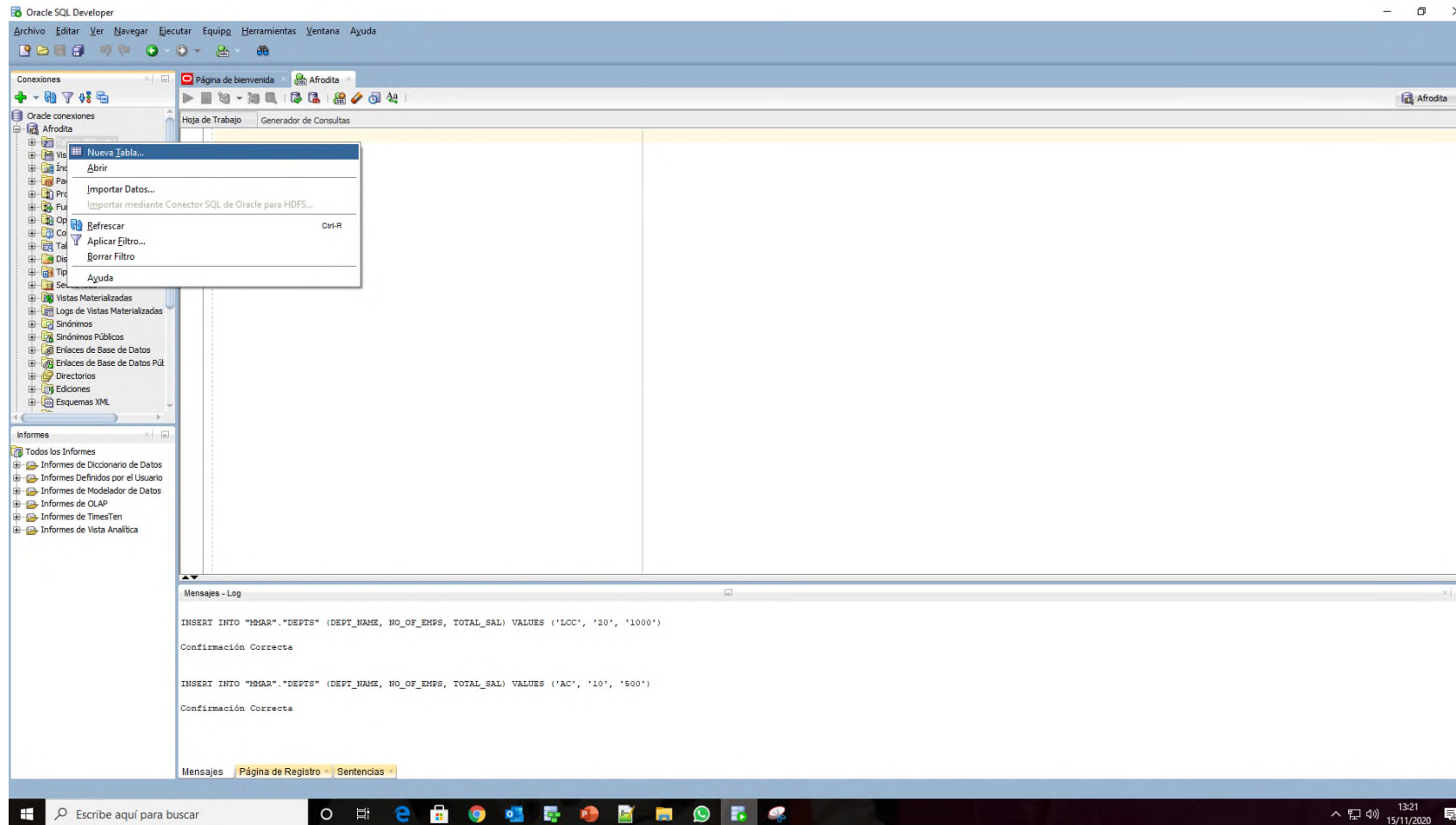
Puerto:

☒ SID:

☐ Nombre del Servicio:

Estado:

SQL Developer: Create Table



SQL Developer: Create Table

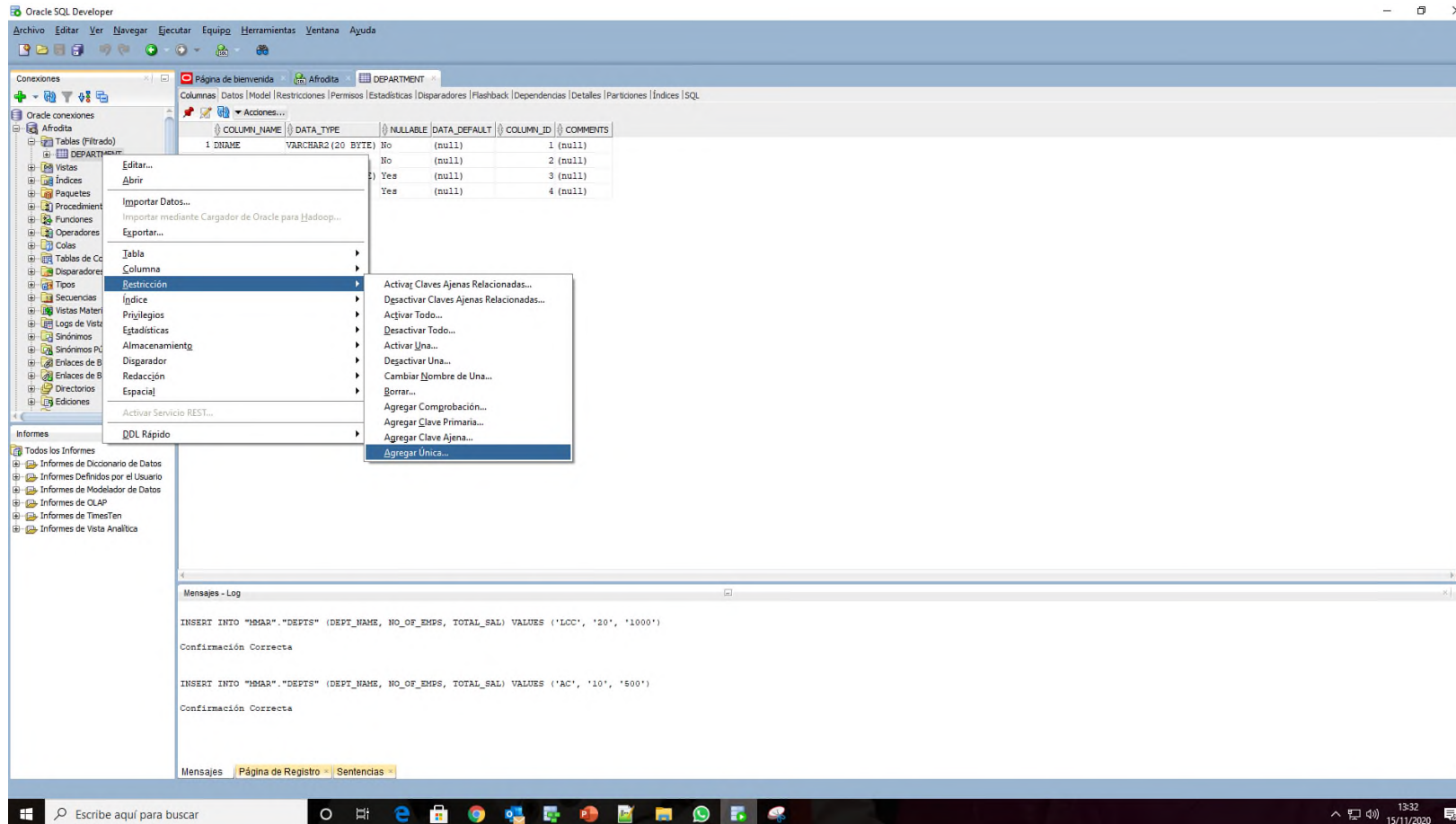
Primary Key

Add new column

Not null

PK	Nombre	Tipo de Datos	Tamaño	No Nulo	Valor por Defecto	Comentario
	DNAME	VARCHAR2	20	<input checked="" type="checkbox"/>		
	DNUMBER	INTEGER		<input checked="" type="checkbox"/>		
	MGRSSN	VARCHAR2	20	<input type="checkbox"/>		
	MGRSTARTDATE	DATE		<input type="checkbox"/>		

SQL Developer: Add Unique constraint



SQL Developer: Add Unique constraint

Agregar Única

Peticiones de Datos SQL

Propietario: MMAR

Nombre: DEPARTMENT

Nombre de la Restricción: DEPARTMENT_DNAME_UK

Columna 1: DNAME

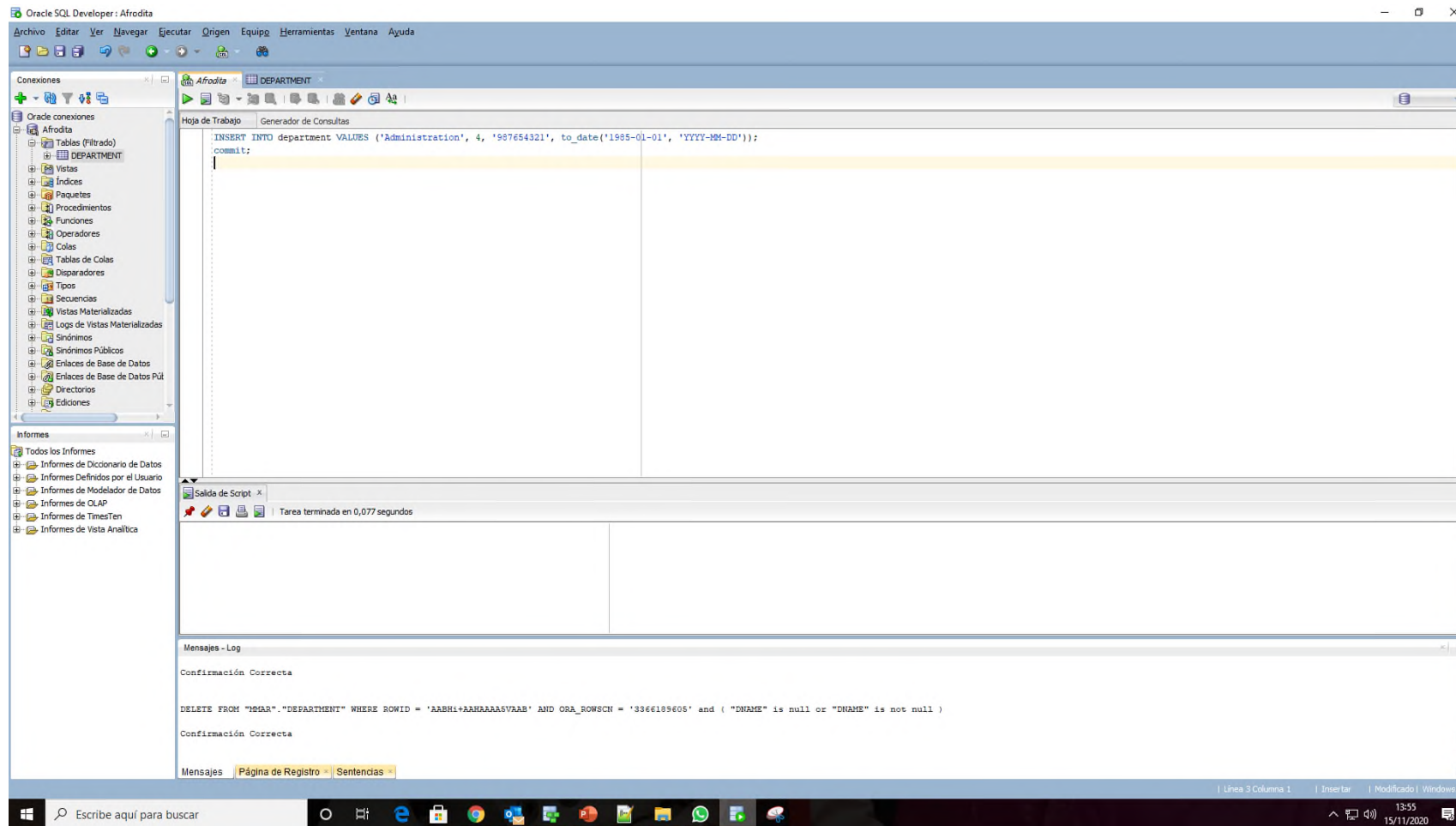
Columna 2:

Columna 3:

Columna 4:

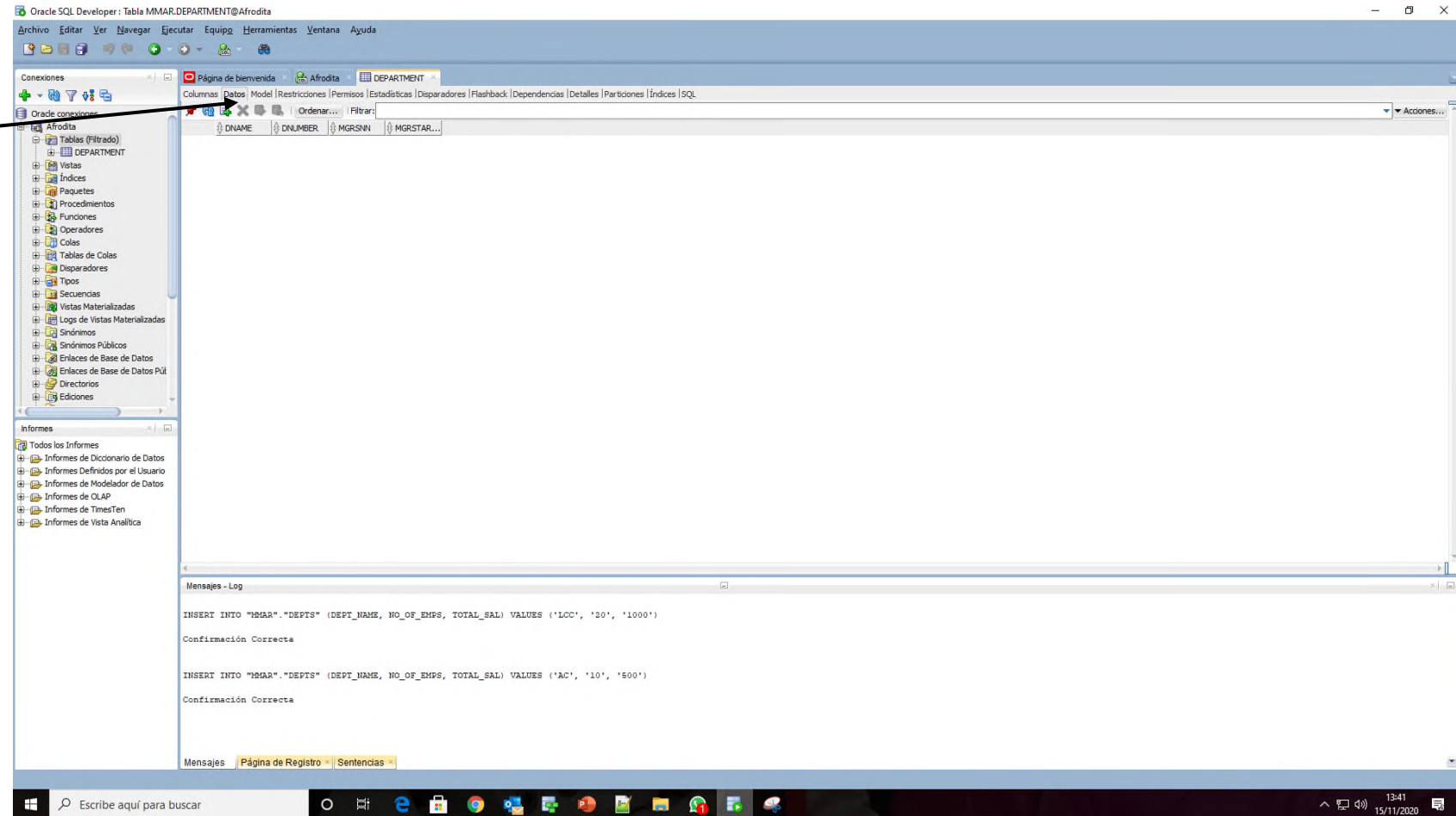
Ayuda Aplicar Cancelar

SQL Developer: Insert Data



SQL Developer: Insert Data

Insert Data



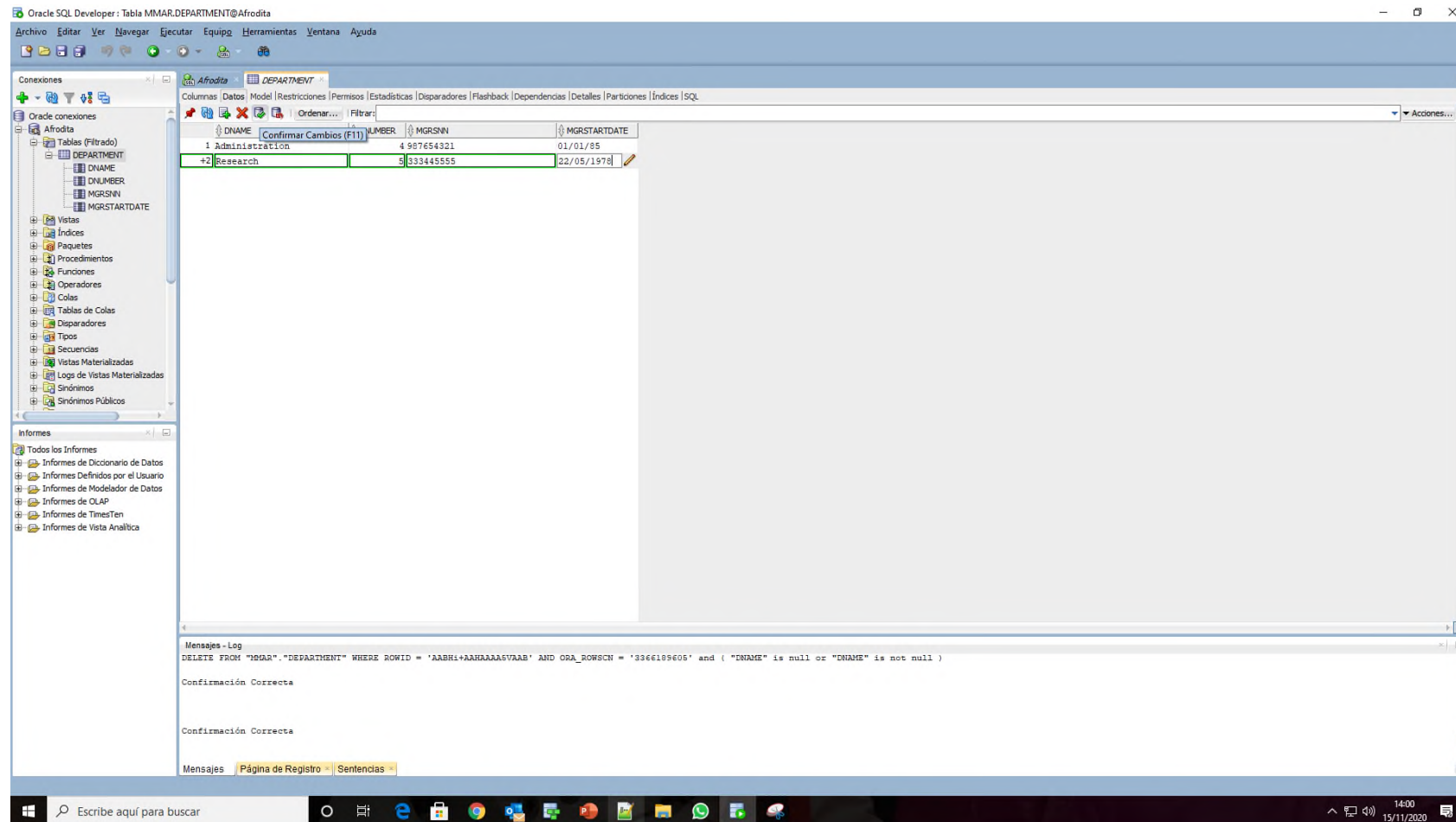
SQL Developer: Insert Data

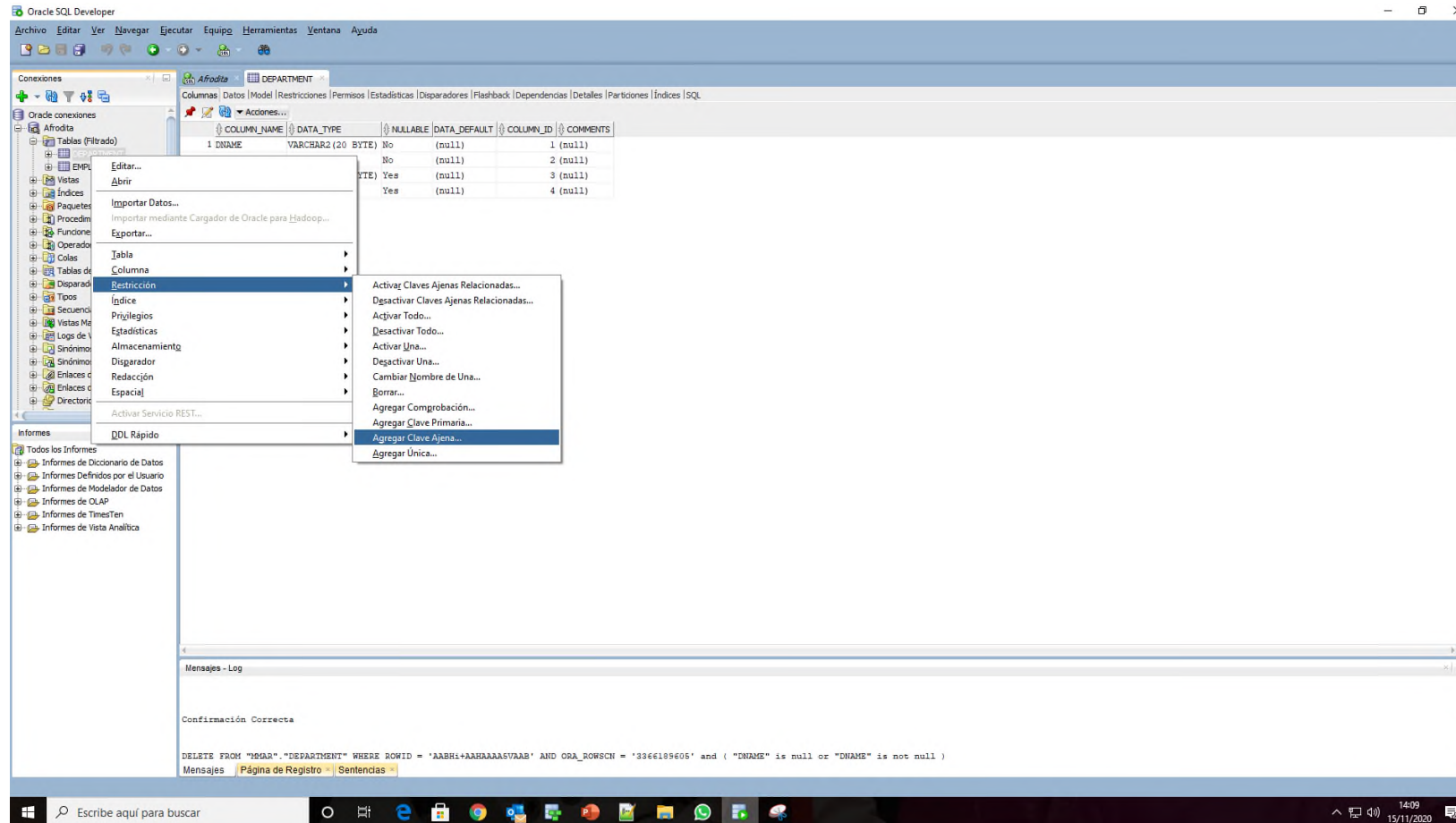
New tuple

The screenshot shows the Oracle SQL Developer interface. The left pane displays the database schema tree with the 'DEPARTMENT' table selected. The main pane shows the table's data in a grid view. The table has columns: DNAME, DNUMBER, MGRSNN, and MGRSTARTDATE. The first row contains 'Administration', '4987654321', and '01/01/85'. A second row, highlighted in green, is being inserted with values: '(null)', '(null)', '(null)', and '(null)'. An arrow points from the text 'New tuple' to this row. The bottom pane shows the SQL command: `DELETE FROM "HR"."DEPARTMENT" WHERE ROWID = 'AABH1+AAHAAAASVAAB' AND ORA_ROWSCN = '3366189605' and ("DNAME" is null or "DNAME" is not null)`. The status bar at the bottom indicates 'Confirmación Correcta'.

DNAME	DNUMBER	MGRSNN	MGRSTARTDATE
Administration	4987654321		01/01/85
(null)	(null)	(null)	(null)

SQL Developer: Insert Data





SQL Developer: Add Foreign key

Agregar Clave Ajena

Peticiónes de Datos SQL

Propietario: MMAR

Nombre: DEPARTMENT

Nombre de la Restricción: MGRSSS_FK

Nombre de la Columna: MGRSNN

Nombre de Tabla de Referencias: EMPLOYEE

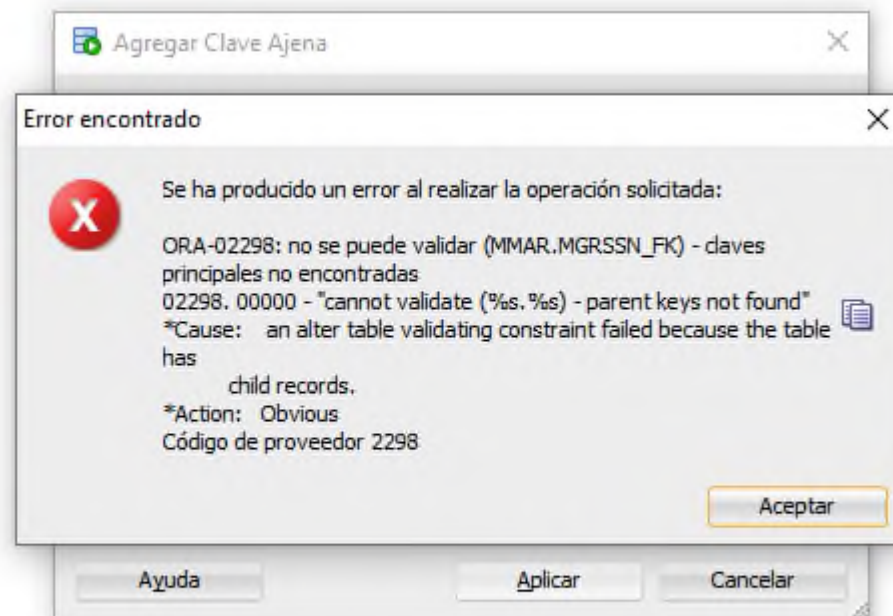
Columna de Referencia: SSN

Ayuda Aplicar Cancelar

EMPLOYEE TABLE HAVE TO EXISTS!!!

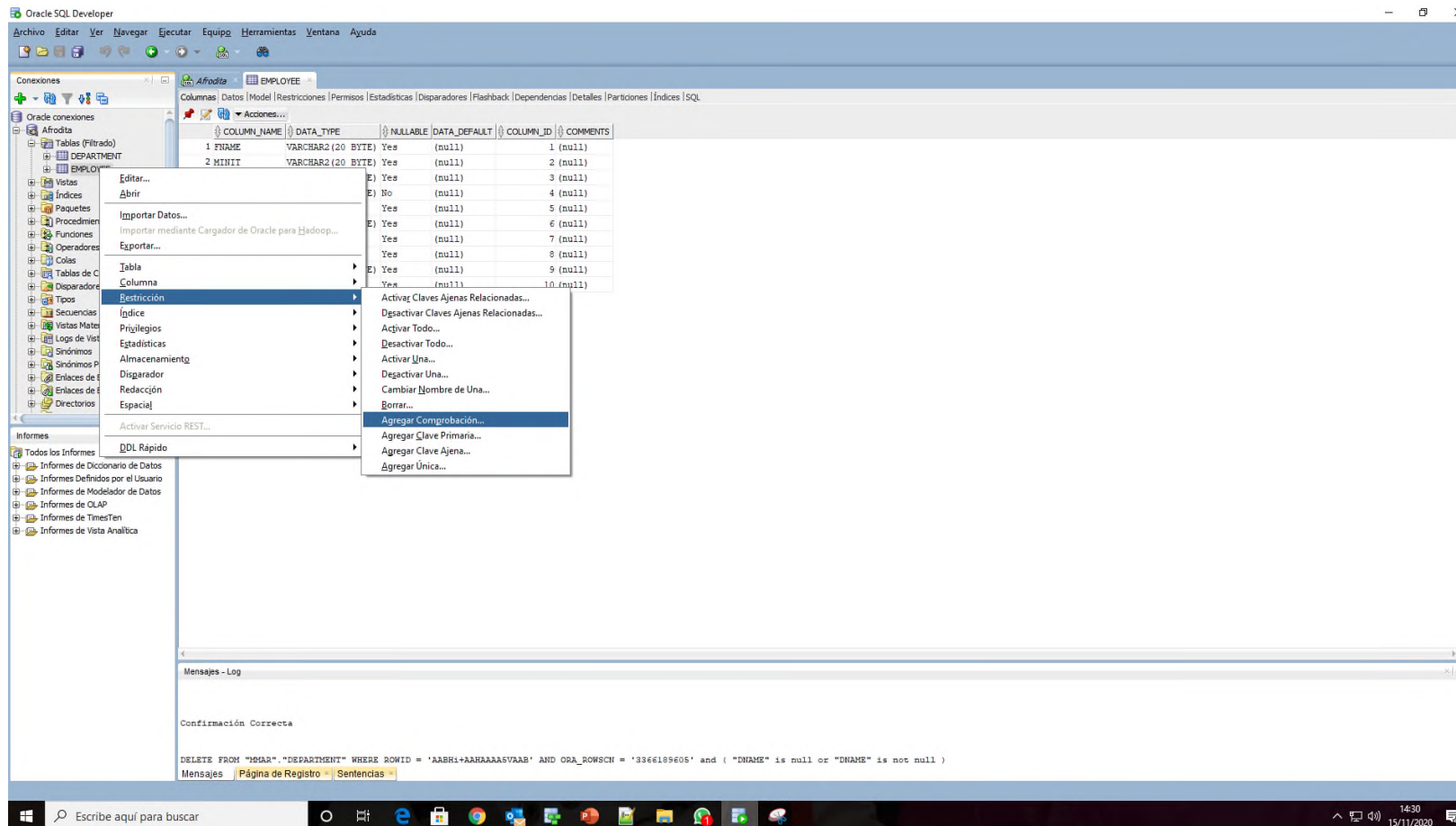
SAME DATATYPE!!!!

SQL Developer: Add Foreign key



IF DEPARTMENT ALREADY CONTAINS DATA, THEY CANNOT VIOLATE THE NEW RESTRICTION!!!!

SQL Developer: Add Check Constraint





SQL Developer: Add Check Constraint

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	FNAME	VARCHAR2(20 BYTE)	Yes	(null)	1	(null)
2	MINIT	VARCHAR2(20 BYTE)	Yes	(null)	2	(null)
3	LNAME	VARCHAR2(20 BYTE)	Yes	(null)	3	(null)
4	SSN	VARCHAR2(20 BYTE)	No	(null)	4	(null)
5	BDATE	DATE	Yes	(null)	5	(null)
6	ADDRESS	VARCHAR2(40 BYTE)	Yes	(null)	6	(null)
7	SEX	CHAR(1 BYTE)	Yes	(null)	7	(null)
8	SALARY	NUMBER(38,0)	Yes	(null)	8	(null)
9	SUPERSSN	VARCHAR2(20 BYTE)	Yes	(null)	9	(null)
10	DNO	NUMBER(38,0)	Yes	(null)	10	(null)

Agregar Comprobación

Peticiones de Datos SQL

Propietario: MMAR

Nombre: EMPLOYEE

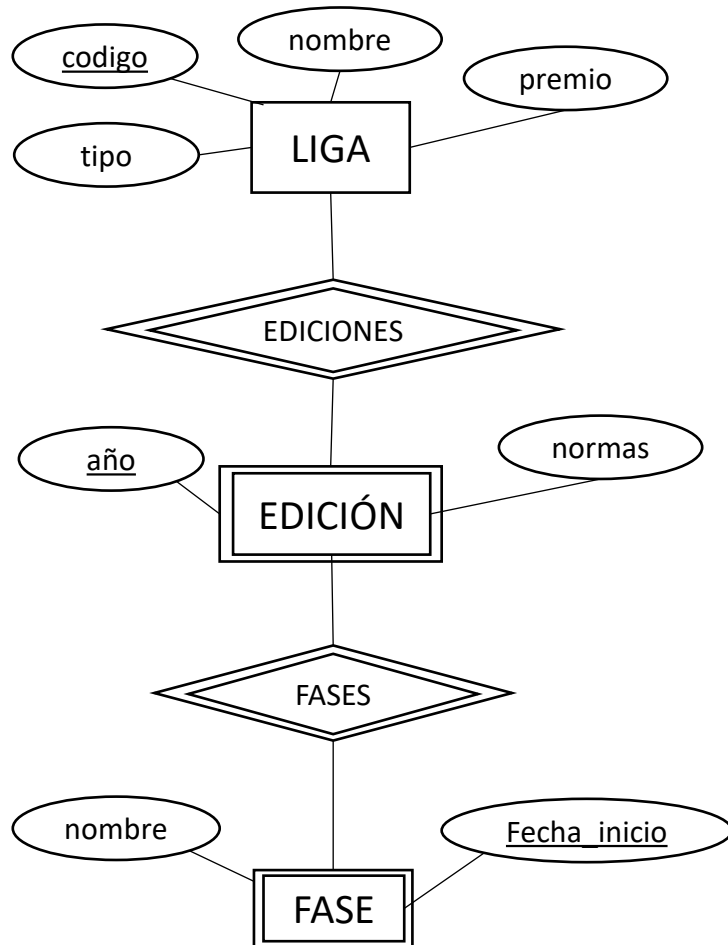
Nombre de la Restricción: SEX_CK

Condición de Control: SEX IN ('M','F')

Estado: ENABLE

Ayuda Aplicar Cancelar

SQL Developer: Foreign key with multiple components



SQL Developer: Foreign key with multiple components

```
create table liga (  
  codigo number primary key,  
  nombre varchar2(30) not null,  
  tipo varchar2(10) not null,  
  premio number,  
  UNIQUE (nombre)  
);
```

```
create table fase (  
  liga number,  
  año number,  
  fecha_inicio date,  
  nombre varchar2(20) not null,  
  UNIQUE(nombre),  
  PRIMARY KEY (liga, año, fecha_inicio),  
  FOREIGN KEY (liga, año) REFERENCES edicion  
)
```

```
create table edicion (  
  liga number,  
  año number,  
  normas varchar2(100),  
  PRIMARY KEY (liga,año),  
  FOREIGN KEY (liga) REFERENCES LIGA  
)
```

SQL Developer: Foreign key with multiple components (SAME PROCESS FOR UNIQUE KEYS)

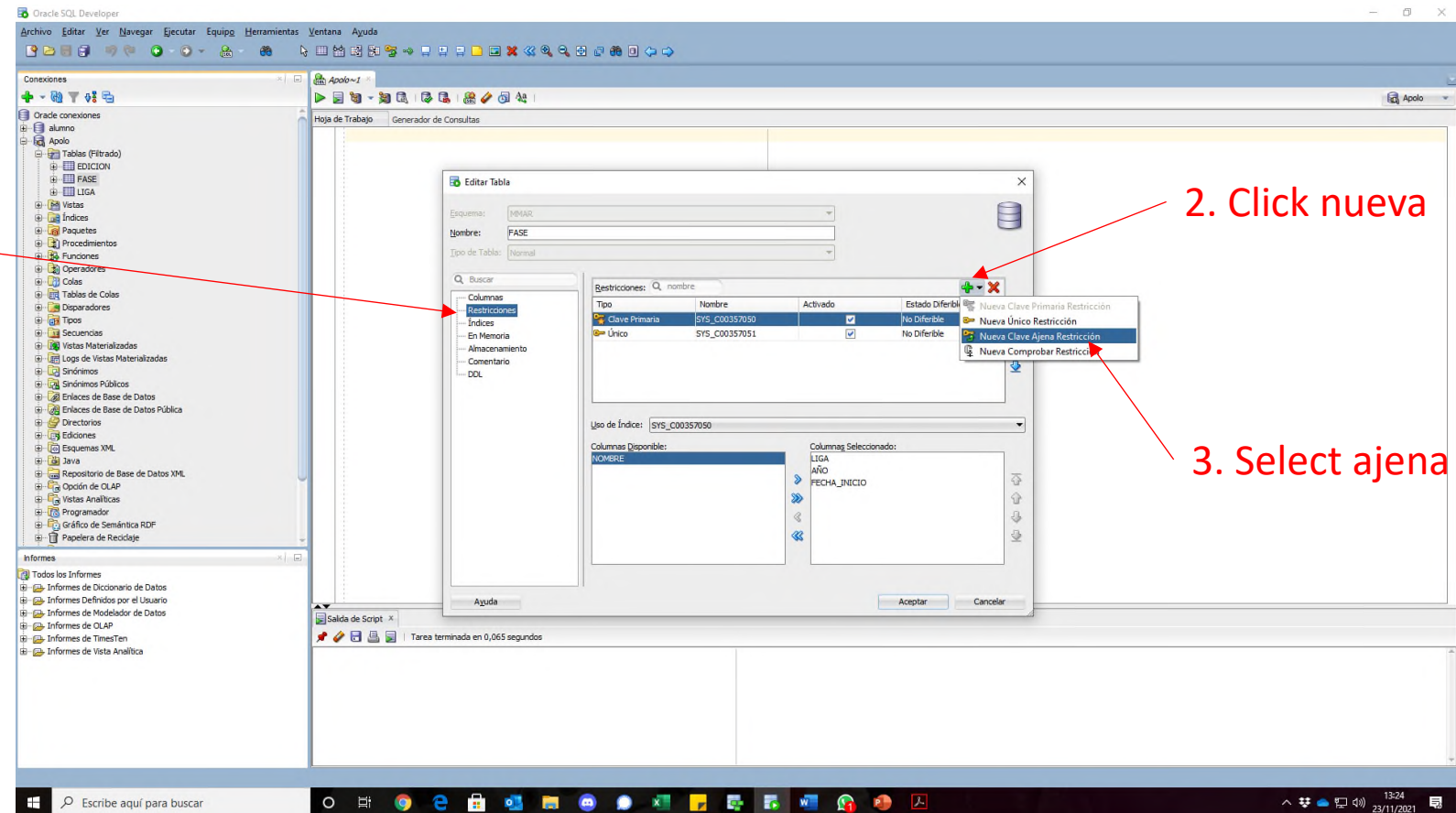
The screenshot displays the Oracle SQL Developer interface. The 'Editar Tabla' (Edit Table) dialog box is open, showing the 'Columnas' (Columns) tab. The table being edited is 'FASE' in the 'MMAR' schema. The columns listed are:

PK	Nombre	Tipo de Dato	Tamaño	No Nulo	Valor por De...	Comentario
	LIGA	NUMBER		<input checked="" type="checkbox"/>		
	AÑO	NUMBER		<input checked="" type="checkbox"/>		
	FECHA_INICIO	DATE		<input checked="" type="checkbox"/>		
	NOMBRE	VARCHAR2	20	<input checked="" type="checkbox"/>		

The 'Columnas' tab is selected, and the 'Tipo de Dato' (Data Type) is set to 'Normal'. The 'Nombre' (Name) is 'FASE'. The 'Tipo de Tabla' (Table Type) is 'Normal'. The 'Columnas' list shows the columns and their properties, including 'No Nulo' (Not Null) and 'Valor por De...' (Default Value). The 'Comentario' (Comment) field is empty.

SQL Developer: Foreign key with multiple components

1. Click on restricciones



2. Click nueva

3. Select ajena restriccion

SQL Developer: Foreign key with multiple components

1. Give a restriction name

2. Select the referenced table

3. Select the primary key

4. Chose the FK components

5. Chose the referenced table PK components

The screenshot shows the 'Editar Tabla' dialog in Oracle SQL Developer. The 'Restricciones' tab is active, showing a list of constraints. The 'Clave Ajena' (Foreign Key) constraint is selected. The 'Restricción de Referencia' section shows the 'Esquema' (Schema) as 'MMAR', the 'Tabla' (Table) as 'EDICION', and the 'Restricción' (Constraint) as 'EDICION_PK'. The 'Asignaciones' (Assignments) section shows the mapping of columns: 'LIGA' and 'AÑO' from the local table to the referenced table. The 'Clave Primaria' (Primary Key) is 'SYS_C00357050' and the 'Clave Ajena' (Foreign Key) is 'SYS_C00357051'.

