HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY, VNU-HCM
FACULTY OF COMPUTER SCIENCE & ENGINEERNG

DATABASE SYSTEMS

Assignment 2

ORACLE DATABASE AND DBMS APPLICATION

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I. SIGNATURE:

Function ***TOTALMEDPRICE****:*

Declare new types:
+ TypeForFunction which keeps two parameters: TreatmentOrExaminationID (number) and Price (number) → TypeForFunction is a record storing the ID of treatement or ID of examination
+ TableForFunction which keeps TypeForFunction → TableForFunction is a table have many records TypeForFunction

Declare another function checkExist (Input: PatientID (char) and Return: checkExist (number)) in order to check the patient is inpatient or outpatient. If patient is outpatient, checkExist = 0, otherwise, checkExist>0.

- Input: PatientID (CHAR)
- Return: OutTable (TableForFunction)

Procedure ***LISDOC***(*STR_DATE, END_DATE, OUPUT_TABLE_DOC*):

where:

+ *STR_DATE (DATE)*: is the start date that we would like to estimate
+ *END_DATE (DATE)*: is the end date that we would like to estimate
+ *OUTPUT_LIST_DOC (DOC_TABLE)*: is the return list doctor

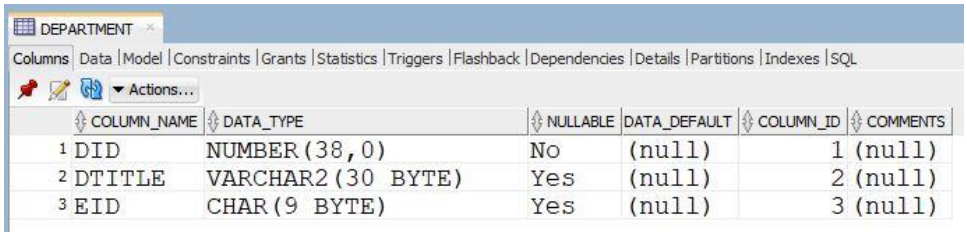
*Note : we declare new data type in DMBS which are

- DOC_TYPE : is the type as object to store each return data
- DOC_TABLE: is the the tables with DOC_TYPE for each element for storing the list doctor

II. Explanation of our ***data types, data length and constraints:***

1. DEPARTMENT table:

a. Data types and their length:


DEPARTMENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	DID	NUMBER(38,0)	No	(null)	1	(null)
2	DTITLE	VARCHAR2(30 BYTE)	Yes	(null)	2	(null)
3	EID	CHAR(9 BYTE)	Yes	(null)	3	(null)

- DID: Department ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with a large number of departments, we must set the length to 38.
- DTITLE: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, title can come up to 30 characters so we set length to 30.
- EID: We use CHAR because every ID of a person is a fix sequence of 9 characters.

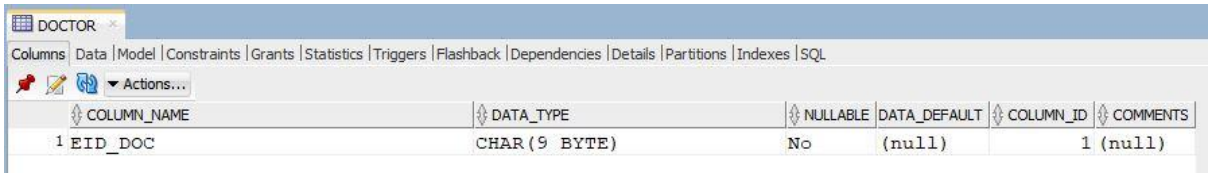
b. Constraints:

```
CREATE TABLE "MANAGER"."DEPARTMENT"
 (    "DID" NUMBER(*,0) NOT NULL ENABLE,
  "DTITLE" VARCHAR2(30 BYTE),
  "EID" CHAR(9 BYTE),
   CONSTRAINT "SYS_C0012950" PRIMARY KEY ("DID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012951" FOREIGN KEY ("EID")
    REFERENCES "MANAGER"."DOCTOR" ("EID_DOC") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use "Check" constraint to prevent NULL value from being inserted into DID column.
- We use "Primary_Key" constraint to ensure that DID column is unique.
- We use "Foreign_Key" constraint to maintain the link between DEPARTMENT and DOCTOR tables through EID column of DEPARTMENT table (prevent data that is not belong to EID_DOC column of DOCTOR table from being inserted into the EID column).

2. DOCTOR table:

a. Data types and their length:


DOCTOR

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID_DOC	CHAR(9 BYTE)	No	(null)	1	(null)

- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.

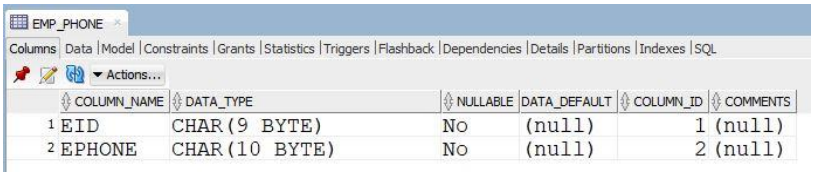
b. Constraints:

```
CREATE TABLE "MANAGER"."DOCTOR"
 (    "EID_DOC" CHAR(9 BYTE) NOT NULL ENABLE,
   CONSTRAINT "EID_DOC" PRIMARY KEY ("EID_DOC")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012954" FOREIGN KEY ("EID_DOC")
    REFERENCES "MANAGER"."EMPLOYEE" ("EID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into EID_DOC column.
- We use “Primary_Key” constraint to ensure that EID_DOC column is unique.
- We use “Foreign_Key” constraint to maintain the link between EMPLOYEE and DOCTOR tables through EID_DOC column of DOCTOR table (prevent data that is not belong to EID column of EMPLOYEE table from being inserted into EID_DOC column of DOCTOR).

3. EMP_PHONE table:

a. Data types and their length:


EMP_PHONE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID	CHAR(9 BYTE)	No	(null)	1	(null)
2	EPHONE	CHAR(10 BYTE)	No	(null)	2	(null)

- EID: We use CHAR because every ID of an employee is a fix sequence of 9 characters.
- EPHONE: We use CHAR because every phone number is a fix sequence of 9 characters.

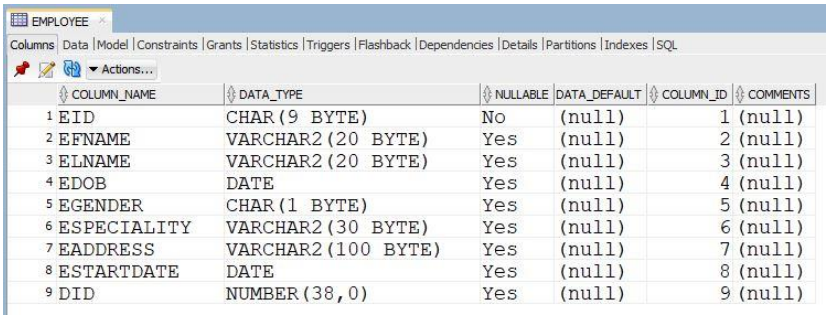
b. Constraints:

```
CREATE TABLE "MANAGER"."EMP_PHONE"
 (    "EID" CHAR(9 BYTE) NOT NULL ENABLE,
  "EPHONE" CHAR(10 BYTE) NOT NULL ENABLE,
   CONSTRAINT "SYS_C0012955" PRIMARY KEY ("EID", "EPHONE")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012956" FOREIGN KEY ("EID")
    REFERENCES "MANAGER"."EMPLOYEE" ("EID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into EID, EPHONE columns.
- We use “Primary_Key” constraint to ensure that combination of EID and EPHONE columns are unique.
- We use “Foreign_Key” constraint to maintain the link between EMP_PHONE and EMPLOYEE tables through EID column of EMP_PHONE table (prevent data that is not belong to EID column of EMPLOYEE table from being inserted into the EID column of EMP_PHONE).

4. EMPLOYEE table:

a. Data types and their length:


EMPLOYEE

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID	CHAR(9 BYTE)	No	(null)	1	(null)
2	EFNAME	VARCHAR2(20 BYTE)	Yes	(null)	2	(null)
3	ELNAME	VARCHAR2(20 BYTE)	Yes	(null)	3	(null)
4	EDOB	DATE	Yes	(null)	4	(null)
5	EGENDER	CHAR(1 BYTE)	Yes	(null)	5	(null)
6	ESPECIALITY	VARCHAR2(30 BYTE)	Yes	(null)	6	(null)
7	EADDRESS	VARCHAR2(100 BYTE)	Yes	(null)	7	(null)
8	ESTARTDATE	DATE	Yes	(null)	8	(null)
9	DID	NUMBER(38,0)	Yes	(null)	9	(null)

- EID: We use CHAR because every ID of an employee is a fix sequence of 9 characters.
- EFNAME, ELNAME: We choose VARCHAR2 to optimize the system’s memory because VARCHAR2 can delete unused space. Next, name can come up to 20 characters so we set length to 20.
- EDOB: We choose DATE data type because this column store date of birth of an employee.
- EGENDER: We use CHAR because every gender of a patient is a fix sequence of 1 character (M for male or F for female).
- ESPECIALITY: We choose VARCHAR2 to optimize the system’s memory because VARCHAR2 can delete unused space. Next, name of speciality can come up to 30 characters so we set length to 30.

- EADDRESS: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, address can come up to 100 characters so we set length to 100.
- ESTARTDATE: We choose DATE data type because this column store first day of an employee.
- DID: Department ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with a large number of departments, we must set the length to 38.

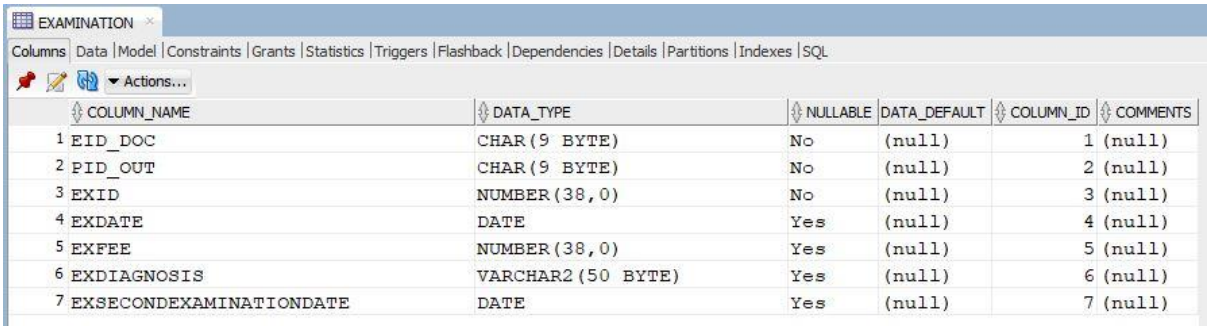
b. Constraints:

```
CREATE TABLE "MANAGER"."EMPLOYEE"
 (    "EID" CHAR(9 BYTE) NOT NULL ENABLE,
  "EFNAME" VARCHAR2(20 BYTE),
  "ELNAME" VARCHAR2(20 BYTE),
  "EDOB" DATE,
  "EGENDER" CHAR(1 BYTE),
  "ESPECIALITY" VARCHAR2(30 BYTE),
  "EADDRESS" VARCHAR2(100 BYTE),
  "ESTARTDATE" DATE,
  "DID" NUMBER(*,0),
   CONSTRAINT "SYS_C0012952" PRIMARY KEY ("EID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_CC0012953" FOREIGN KEY ("DID")
    REFERENCES "MANAGER"."DEPARTMENT" ("DID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use "Check" constraint to prevent NULL value from being inserted into EID column.
- We use "Primary_Key" constraint to ensure that EID column is unique.
- We use "Foreign_Key" constraint to maintain the link between DEPARTMENT and EMPLOYEE tables through DID column of EMPLOYEE table (prevent data that is not belong to DID column of DEPARTMENT table from being inserted into the DID column of EMPLOYEE).

5. EXAMINATION table:

a. Data types and their length:



EXAMINATION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID_DOC	CHAR(9 BYTE)	No	(null)	1	(null)
2	PID_OUT	CHAR(9 BYTE)	No	(null)	2	(null)
3	EXID	NUMBER(38,0)	No	(null)	3	(null)
4	EXDATE	DATE	Yes	(null)	4	(null)
5	EXFEE	NUMBER(38,0)	Yes	(null)	5	(null)
6	EXDIAGNOSIS	VARCHAR2(50 BYTE)	Yes	(null)	6	(null)
7	EXSECONDEXAMINATIONDATE	DATE	Yes	(null)	7	(null)

- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.
- PID_OUT: We use CHAR because every ID of an outpatient is a fix sequence of 9 characters.
- EXID: Examination ID can be counted from 0 to current number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of examination, we must set the length to 38.
- EXDATE: We choose DATE data type because this column store date of examination.
- EXFEE: Because this column stores money so we choose NUMBER data type with length of 38 in order to contain a large amount of money.
- EXDIAGNOSIS: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, diagnosis text can come up to 50 characters so we set length to 50.
- EXSECONDEXAMINATIONDATE: We choose DATE data type because this column store date of re-examination.

b. Constraints:

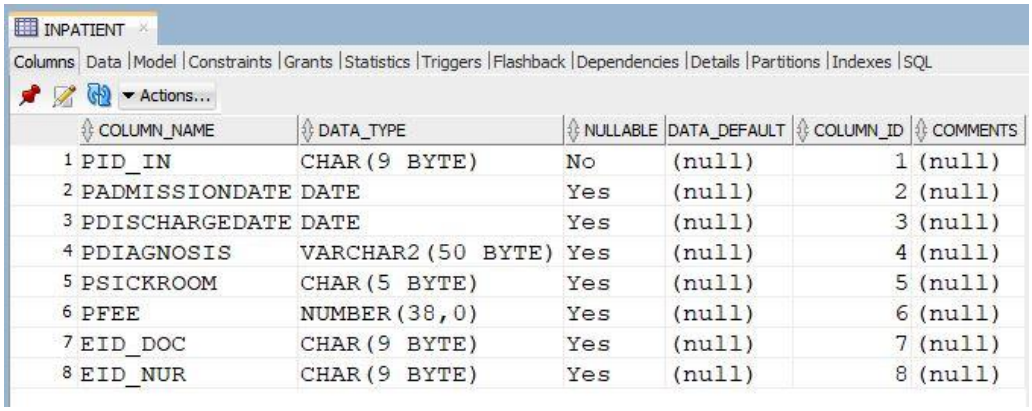
```
CREATE TABLE "MANAGER"."EXAMINATION"
 (    "EID_DOC" CHAR(9 BYTE) NOT NULL ENABLE,
  "PID_OUT" CHAR(9 BYTE) NOT NULL ENABLE,
  "EXID" NUMBER(*,0) NOT NULL ENABLE,
  "EXDATE" DATE,
  "EXFEE" NUMBER(*,0),
  "EXDIAGNOSIS" VARCHAR2(50 BYTE),
  "EXSECONDEXAMINATIONDATE" DATE,
   CONSTRAINT "SYS_C0012965" PRIMARY KEY ("EID_DOC", "PID_OUT", "EXID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012966" FOREIGN KEY ("EID_DOC")
    REFERENCES "MANAGER"."DOCTOR" ("EID_DOC") ENABLE,
   CONSTRAINT "SYS_C0012967" FOREIGN KEY ("PID_OUT")
    REFERENCES "MANAGER"."OUTPATIENT" ("PID_OUT") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use "Check" constraint to prevent NULL value from being inserted into EID_DOC, PID_OUT and EXID columns.
- We use "Primary_Key" constraint to ensure that the combination of EID_DOC, PID_OUT and EXID columns are unique.

- We use “Foreign_Key” constraint to maintain the link between EXAMINATION, OUTPATIENT and DOCTOR tables through EID_DOC, PID_OUT columns of EXAMINATION table (prevent data that is not belong to EID_DOC or PID_OUT columns of DOCTOR or OUTPATIENT tables from being inserted into the EID_DOC or PID_OUT columns of EXAMINATION).

6. INPATIENT table:

a. Data types and their length:


INPATIENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	PID_IN	CHAR(9 BYTE)	No	(null)	1	(null)
2	PADMISSIONDATE	DATE	Yes	(null)	2	(null)
3	PDISCHARGEDATE	DATE	Yes	(null)	3	(null)
4	PDIAGNOSIS	VARCHAR2(50 BYTE)	Yes	(null)	4	(null)
5	PSICKROOM	CHAR(5 BYTE)	Yes	(null)	5	(null)
6	PFEE	NUMBER(38,0)	Yes	(null)	6	(null)
7	EID_DOC	CHAR(9 BYTE)	Yes	(null)	7	(null)
8	EID_NUR	CHAR(9 BYTE)	Yes	(null)	8	(null)

- PID_IN: We use CHAR because every ID of an inpatient is a fix sequence of 9 characters.
- PADMISSIONDATE: We choose DATE data type because this column stores date of admission.
- PDISCHARGEDATE: We choose DATE data type because this column stores discharging date.
- PDIAGNOSIS: We choose VARCHAR2 to optimize the system’s memory because VARCHAR2 can delete unused space. Next, diagnosis text can come up to 50 characters so we set length to 50.
- PSICKROOM: We use CHAR because ID of a sick room is a fix sequence of 5 characters.
- PFEE: Because this column stores money so we choose NUMBER data type with length of 38 in order to contain a large amount of money.

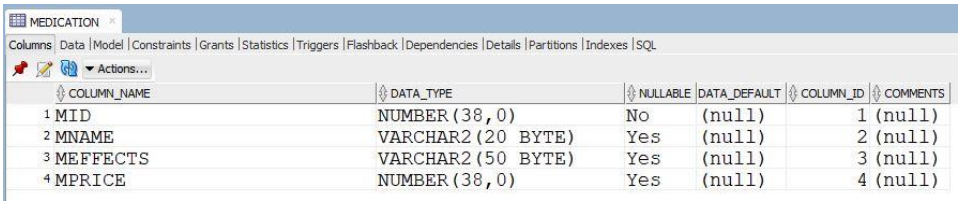
b. Constraints:

```
CREATE TABLE "MANAGER"."INPATIENT"
 (    "PID_IN" CHAR(9 BYTE) NOT NULL ENABLE,
  "PADMISSIONDATE" DATE,
  "PDISCHARGEDATE" DATE,
  "PDIAGNOSIS" VARCHAR2(50 BYTE),
  "PSICKROOM" CHAR(5 BYTE),
  "PFEE" NUMBER(*,0),
  "EID_DOC" CHAR(9 BYTE),
  "EID_NUR" CHAR(9 BYTE),
   CONSTRAINT "SYS_C0012960" PRIMARY KEY ("PID_IN")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012961" FOREIGN KEY ("EID_DOC")
    REFERENCES "MANAGER"."DOCTOR" ("EID_DOC") ENABLE,
   CONSTRAINT "SYS_C001292" FOREIGN KEY ("EID_NUR")
    REFERENCES "MANAGER"."NURSE" ("EID_NUR") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into PID_IN column.
- We use “Primary_Key” constraint to ensure that PID_IN column is unique.
- We use “Foreign_Key” constraint to maintain the link between INPATIENT, DOCTOR and NURSE tables through EID_DOC, EID_NUR columns of INPATIENT table (prevent data that is not belong to EID_DOC or EID_NUR columns of DOCTOR or NURSE table from being inserted into the EID_DOC or EID_NUR columns of INPATIENT).

7. MEDICATION table:

a. Data types and their length:


MEDICATION

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	MID	NUMBER(38,0)	No	(null)	1	(null)
2	MNAME	VARCHAR2(20 BYTE)	Yes	(null)	2	(null)
3	MEFFECTS	VARCHAR2(50 BYTE)	Yes	(null)	3	(null)
4	MPRICE	NUMBER(38,0)	Yes	(null)	4	(null)

- MID: Medication ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with a large number of departments, we must set the length to 38.
- MNAME: We choose VARCHAR2 to optimize the system’s memory because VARCHAR2 can delete unused space. Next, medication name can come up to 20 characters so we set length to 20.
- MEFFECTS: We choose VARCHAR2 to optimize the system’s memory because VARCHAR2 can delete unused space. Next, medication effect can come up to 50 characters so we set length to 50.
- MPRICE: Because this column stores money so we choose NUMBER data type with length of 38 in order to contain a large amount of money.

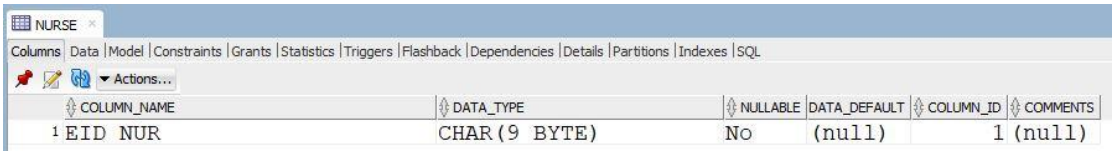
b. Constraint:

```
CREATE TABLE "MANAGER"."MEDICATION"
 (    "MID" NUMBER(*,0) NOT NULL ENABLE,
  "MNAME" VARCHAR2(20 BYTE),
  "MEFFECTS" VARCHAR2(50 BYTE),
  "MPRICE" NUMBER(*,0),
   CONSTRAINT "SYS_C0012971" PRIMARY KEY ("MID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into MID column.
- We use “Primary_Key” constraint to ensure that MID column is unique.

8. NURSE table:

a. Data types and their length:



- EID_NUR: We use CHAR because every ID of a nurse is a fix sequence of 9 characters.

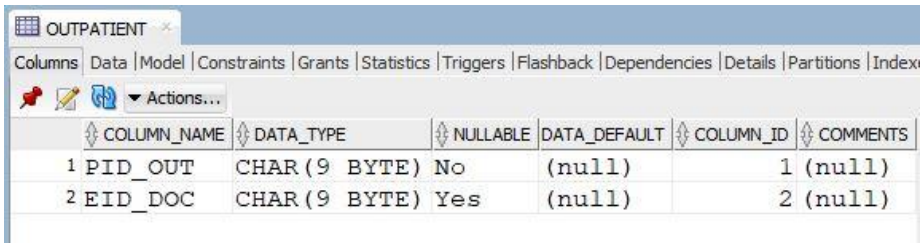
b. Constraints:

```
CREATE TABLE "MANAGER"."NURSE"
 (    "EID_NUR" CHAR(9 BYTE) NOT NULL ENABLE,
   CONSTRAINT "SYS_C0012963" PRIMARY KEY ("EID_NUR")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012964" FOREIGN KEY ("EID_NUR")
    REFERENCES "MANAGER"."EMPLOYEE" ("EID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into EID_NUR column.
- We use “Primary_Key” constraint to ensure that both EID_NUR column is unique.
- We use “Foreign_Key” constraint to maintain the link between EMPLOYEE and NURSE tables through EID_NUR column of NURSE table (prevent data that is not belong to EID column of EMPLOYEE table from being inserted into the EID_NUR column of NURSE).

9. OUTPATIENT table:

a. Data types and their length:



OUTPATIENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Index

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	PID_OUT	CHAR(9 BYTE)	No	(null)	1	(null)
2	EID_DOC	CHAR(9 BYTE)	Yes	(null)	2	(null)

- PID_OUT: We use CHAR because every ID of an outpatient is a fix sequence of 9 characters.
- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.

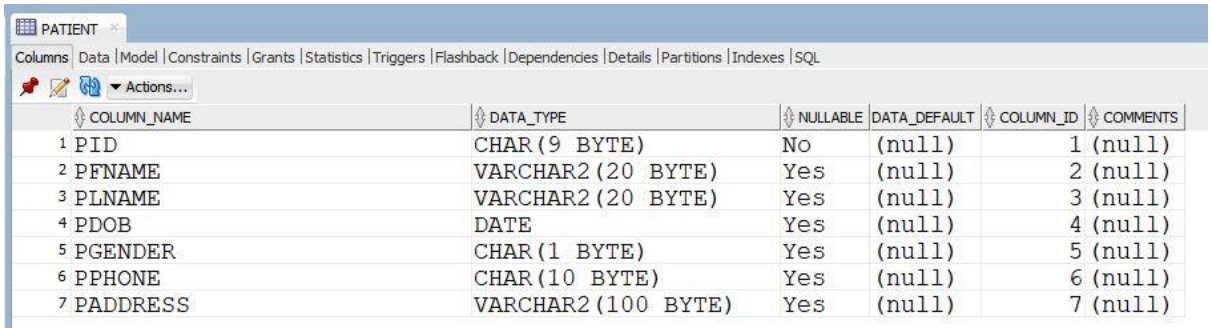
b. Constraints:

```
CREATE TABLE "MANAGER"."OUTPATIENT"
 (    "PID_OUT" CHAR(9 BYTE) NOT NULL ENABLE,
  "EID_DOC" CHAR(9 BYTE),
   CONSTRAINT "SYS_C0012958" PRIMARY KEY ("PID_OUT")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012959" FOREIGN KEY ("EID_DOC")
    REFERENCES "MANAGER"."DOCTOR" ("EID_DOC") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into PID_OUT column.
- We use “Primary_Key” constraint to ensure that both PID_OUT column is unique.
- We use “Foreign_Key” constraint to maintain the link between OUTPATIENT and DOCTOR tables through EID_DOC column of OUTPATIENT table (prevent data that is not belong to EID_DOC column of DOCTOR table from being inserted into the EID_DOC column of OUTPATIENT).

10. PATIENT table:

a. Data types and their length:



PATIENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	PID	CHAR(9 BYTE)	No	(null)	1	(null)
2	PFNAME	VARCHAR2(20 BYTE)	Yes	(null)	2	(null)
3	PLNAME	VARCHAR2(20 BYTE)	Yes	(null)	3	(null)
4	PDOB	DATE	Yes	(null)	4	(null)
5	PGENDER	CHAR(1 BYTE)	Yes	(null)	5	(null)
6	PPHONE	CHAR(10 BYTE)	Yes	(null)	6	(null)
7	PADDRESS	VARCHAR2(100 BYTE)	Yes	(null)	7	(null)

- PID: We use CHAR because every ID of a patient is a fix sequence of 9 characters.
- PFNAME: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, patient's first name can come up to 20 characters so we set length to 20.
- PLNAME: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, patient's last name can come up to 20 characters so we set length to 20.
- PDOB: We choose DATE data type because this column store date of birth.
- PGENDER: We use CHAR because every gender of a patient is a fix sequence of 1 character (M for male or F for female).
- PPHONE: We use CHAR because every phone number of a patient is a fix sequence of 10 characters.
- PADDRESS: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, patient's address can come up to 100 characters so we set length to 100.

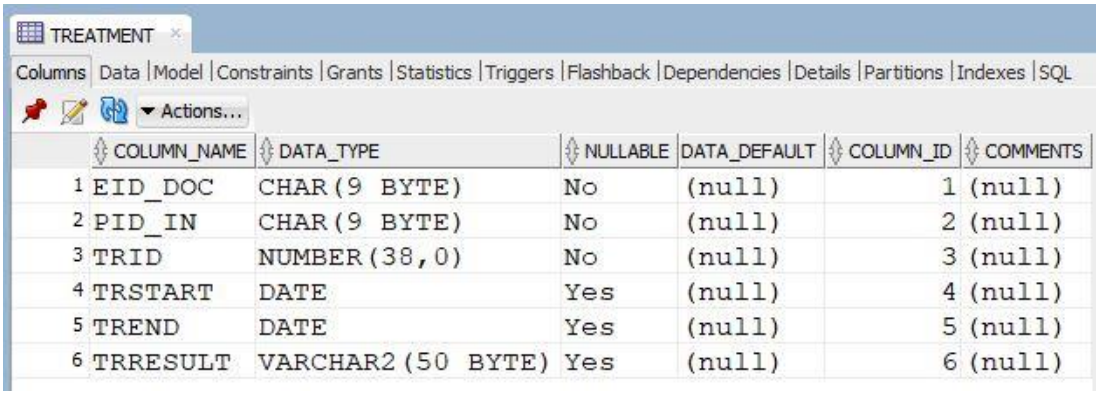
b. Constraints:

```
CREATE TABLE "MANAGER"."PATIENT"
 (    "PID" CHAR(9 BYTE) NOT NULL ENABLE,
  "PFNAME" VARCHAR2(20 BYTE),
  "PLNAME" VARCHAR2(20 BYTE),
  "PDOB" DATE,
  "PGENDER" CHAR(1 BYTE),
  "PPHONE" CHAR(10 BYTE),
  "PADDRESS" VARCHAR2(100 BYTE),
   CONSTRAINT "SYS_C0012957" PRIMARY KEY ("PID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use "Check" constraint to prevent NULL value from being inserted into PID column.
- We use "Primary_Key" constraint to ensure that PID column is unique.

11. TREATMENT table:

a. Data types and their length:



TREATMENT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID_DOC	CHAR(9 BYTE)	No	(null)	1	(null)
2	PID_IN	CHAR(9 BYTE)	No	(null)	2	(null)
3	TRID	NUMBER(38,0)	No	(null)	3	(null)
4	TRSTART	DATE	Yes	(null)	4	(null)
5	TREND	DATE	Yes	(null)	5	(null)
6	TRRESULT	VARCHAR2(50 BYTE)	Yes	(null)	6	(null)

- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.
- PID_IN: We use CHAR because every ID of an inpatient is a fix sequence of 9 characters.
- TRID: Treatment ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of treatment, we must set the length to 38.
- TRSTART: We choose DATE data type because this column store start date of treatment.
- TREND: We choose DATE data type because this column store end date of treatment.
- TRRESULT: We choose VARCHAR2 to optimize the system's memory because VARCHAR2 can delete unused space. Next, patient's result after treatment can come up to 50 characters so we set length to 50.

b. Constraints:

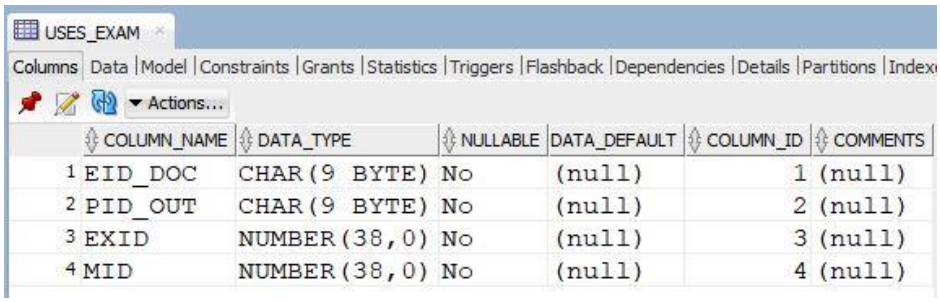
```
CREATE TABLE "MANAGER"."TREATMENT"
 (    "EID_DOC" CHAR(9 BYTE) NOT NULL ENABLE,
  "PID_IN" CHAR(9 BYTE) NOT NULL ENABLE,
  "TRID" NUMBER(*,0) NOT NULL ENABLE,
  "TRSTART" DATE,
  "TREND" DATE,
  "TRRESULT" VARCHAR2(50 BYTE),
   CONSTRAINT "SYS_C0012968" PRIMARY KEY ("EID_DOC", "PID_IN", "TRID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012969" FOREIGN KEY ("EID_DOC")
    REFERENCES "MANAGER"."DOCTOR" ("EID_DOC") ENABLE,
   CONSTRAINT "SYS_C0012970" FOREIGN KEY ("PID_IN")
    REFERENCES "MANAGER"."INPATIENT" ("PID_IN") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use "Check" constraint to prevent NULL value from being inserted into EID_DOC, PID_IN and TRID column.

- We use “Primary_Key” constraint to ensure that the combination of EID_DOC, PID_IN and TRID columns are unique.
- We use “Foreign_Key” constraint to maintain the link between TREATMENT, INPATIENT and DOCTOR tables through PID_IN, EID_DOC column of TREATMENT table (prevent data that is not belong to PID_IN or EID_DOC columns of INPATIENT or DOCTOR tables from being inserted into PID_IN or EID_DOC columns of TREATMENT).

12. USES_EXAM table:

a. Data types and their length:


USES_EXAM

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Index

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID_DOC	CHAR(9 BYTE)	No	(null)	1	(null)
2	PID_OUT	CHAR(9 BYTE)	No	(null)	2	(null)
3	EXID	NUMBER(38,0)	No	(null)	3	(null)
4	MID	NUMBER(38,0)	No	(null)	4	(null)

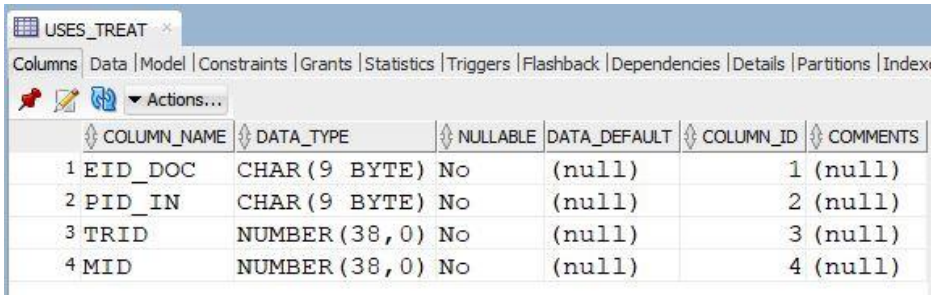
- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.
- PID_OUT: We use CHAR because every ID of an outpatient is a fix sequence of 9 characters.
- EXID: Examination ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of examination, we must set the length to 38.
- MID: Medication ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of medication, we must set the length to 38.

```
CREATE TABLE "MANAGER"."USES_EXAM"
 (    "EID_DOC" CHAR(9 BYTE) NOT NULL ENABLE,
  "PID_OUT" CHAR(9 BYTE) NOT NULL ENABLE,
  "EXID" NUMBER(*,0) NOT NULL ENABLE,
  "MID" NUMBER(*,0) NOT NULL ENABLE,
   CONSTRAINT "SYS_C0012977" PRIMARY KEY ("EID_DOC", "PID_OUT", "EXID", "MID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012976" FOREIGN KEY ("MID")
    REFERENCES "MANAGER"."MEDICATION" ("MID") ENABLE,
   CONSTRAINT "SYS_C0012975" FOREIGN KEY ("EID_DOC", "PID_OUT", "EXID")
    REFERENCES "MANAGER"."EXAMINATION" ("EID_DOC", "PID_OUT", "EXID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into all columns.
- We use “Primary_Key” constraint to ensure that all columns are unique, that means this examintaion of patient can’t be duplicated.
- We use first “Foreign_Key” constraint to maintain the link between USES_EXAM and MEDICATION tables through column MID of MEDICATION table (prevent data that is not belong to column MID of MEDICATION table from being inserted into this column).
- We use second “Foreign_Key” constraint to maintain the link between USES_EXAM and EXAMINATION tables through EID_DOC, PID_OUT and EXID columns of EXAMINATION table (prevent data that is not belong to EID_DOC, PID_OUT and EXID columns of EXAMINATION table from being inserted into these columns in USES_EXAM).

13. USES_TREAT table:

a. Data types and their length:


USES_TREAT

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Index

Actions...

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EID_DOC	CHAR(9 BYTE)	No	(null)	1	(null)
2	PID_IN	CHAR(9 BYTE)	No	(null)	2	(null)
3	TRID	NUMBER(38,0)	No	(null)	3	(null)
4	MID	NUMBER(38,0)	No	(null)	4	(null)

- EID_DOC: We use CHAR because every ID of a doctor is a fix sequence of 9 characters.
- PID_IN: We use CHAR because every ID of an inpatient is a fix sequence of 9 characters.
- TRID: Treatment ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of treatment, we must set the length to 38.
- MID: Medication ID can be counted from 0 to a specific number and therefore, we use NUMBER data type. Next, because a system can be imported with large amount of medication, we must set the length to 38.

```
CREATE TABLE "MANAGER"."USES_TREAT"
 (    "EID_DOC" CHAR(9 BYTE) NOT NULL ENABLE,
  "PID_IN" CHAR(9 BYTE) NOT NULL ENABLE,
  "TRID" NUMBER(*,0) NOT NULL ENABLE,
  "MID" NUMBER(*,0) NOT NULL ENABLE,
   CONSTRAINT "SYS_C0012972" PRIMARY KEY ("EID_DOC", "PID_IN", "TRID", "MID")
USING INDEX PCTFREE 10 INITRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS"  ENABLE,
   CONSTRAINT "SYS_C0012973" FOREIGN KEY ("EID_DOC", "PID_IN", "TRID")
    REFERENCES "MANAGER"."TREATMENT" ("EID_DOC", "PID_IN", "TRID") ENABLE,
   CONSTRAINT "SYS_C0012974" FOREIGN KEY ("MID")
    REFERENCES "MANAGER"."MEDICATION" ("MID") ENABLE
 ) SEGMENT CREATION IMMEDIATE
PCTFREE 10 PCTUSED 40 INITRANS 1 MAXTRANS 255 NOCOMPRESS LOGGING
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS 2147483645
PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_POOL DEFAULT FLASH_CACHE DEFAULT CELL_FLASH_CACHE DEFAULT)
TABLESPACE "USERS" ;
```

- We use “Check” constraint to prevent NULL value from being inserted into all columns.
- We use “Primary_Key” constraint to ensure that all columns are unique, that means this treatment of patient can’t be duplicated.
- We use first “Foreign_Key” constraint to maintain the link between USES_TREAT and MEDICATION tables through column MID of MEDICATION table (prevent data that is not belong to column MID of MEDICATION table from being inserted into this column).
- We use second “Foreign_Key” constraint to maintain the link between USES_TREAT and TREATMENT tables through EID_DOC, PID_IN and TRID columns of TREATMENT table (prevent data that is not belong to EID_DOC, PID_IN and TRID column of TREATMENT table from being inserted into these columns).