IS-664 Database Programming
Fall 2022

hlocklear@pace.edu

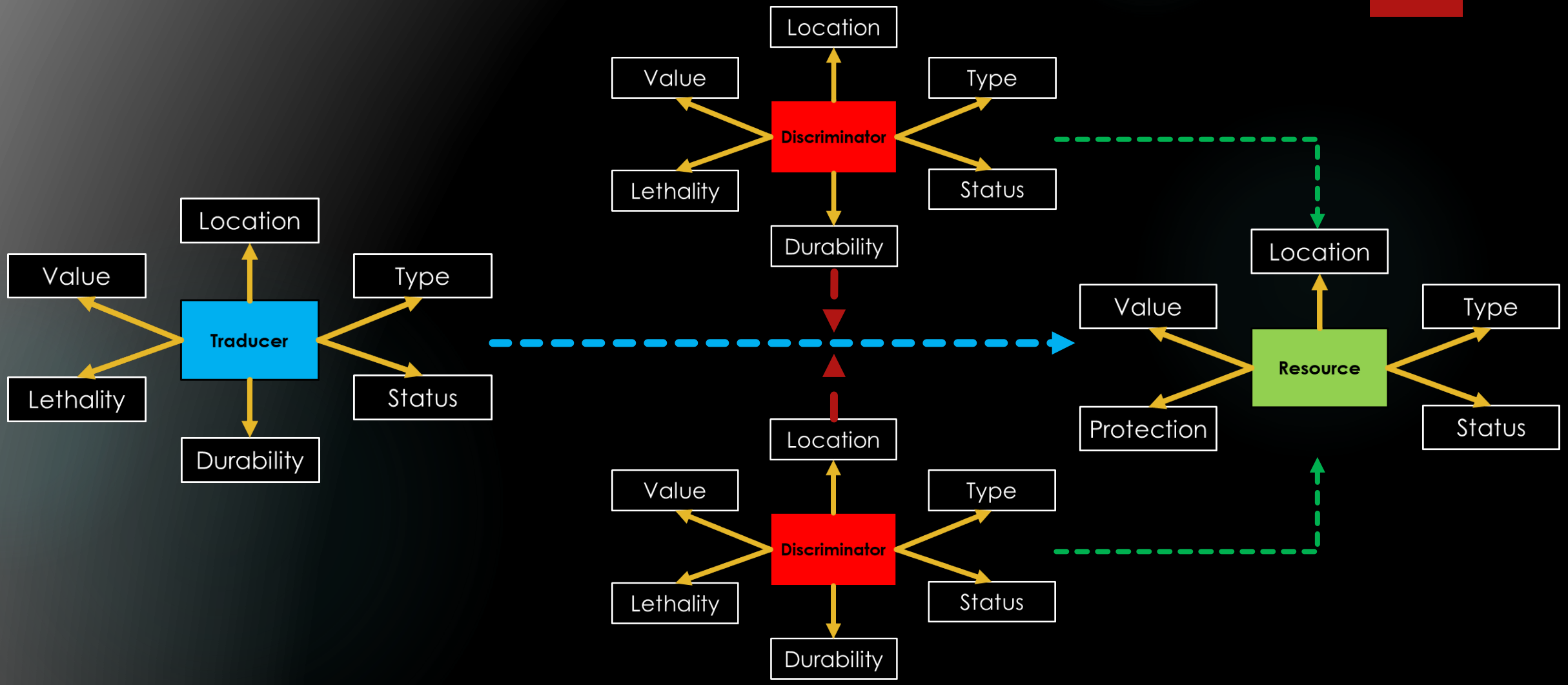
Advanced SQL

Data Modelling Exercise 4

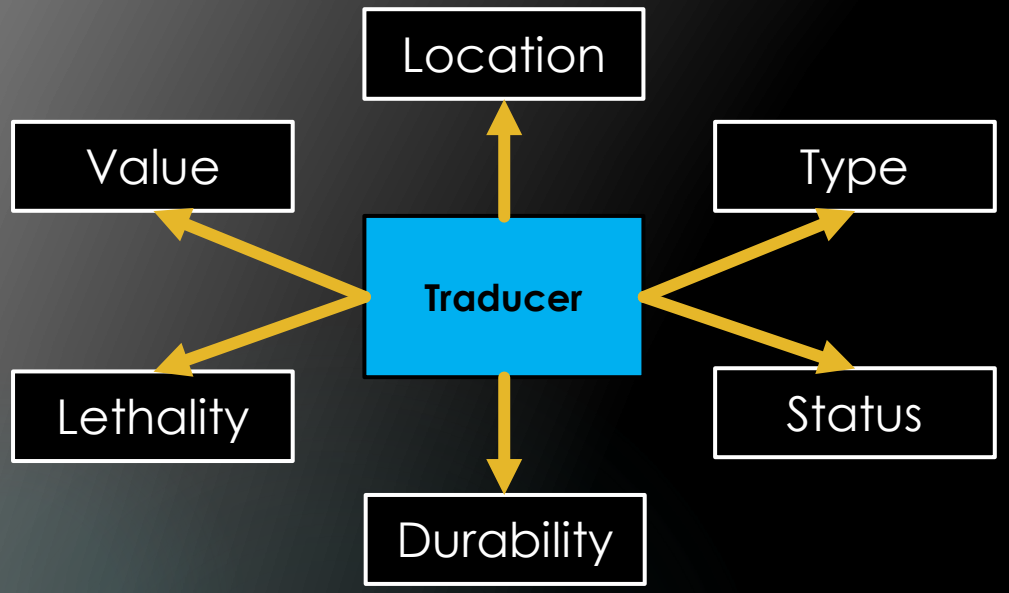
USE OF JUPYTER LAB WITH MYSQL

Professor HG Locklear

Aggressor System



Traducer Agent



State	Value Range
Type	'Medium' or 'Heavy'
Location	X [0-200] Y [0-200]
Value	Medium = 10 Heavy = 25
Lethality	Medium = 100 Heavy = 300
Status	'Available' or 'Not Available'
Durability	[5-10%] of Lethality

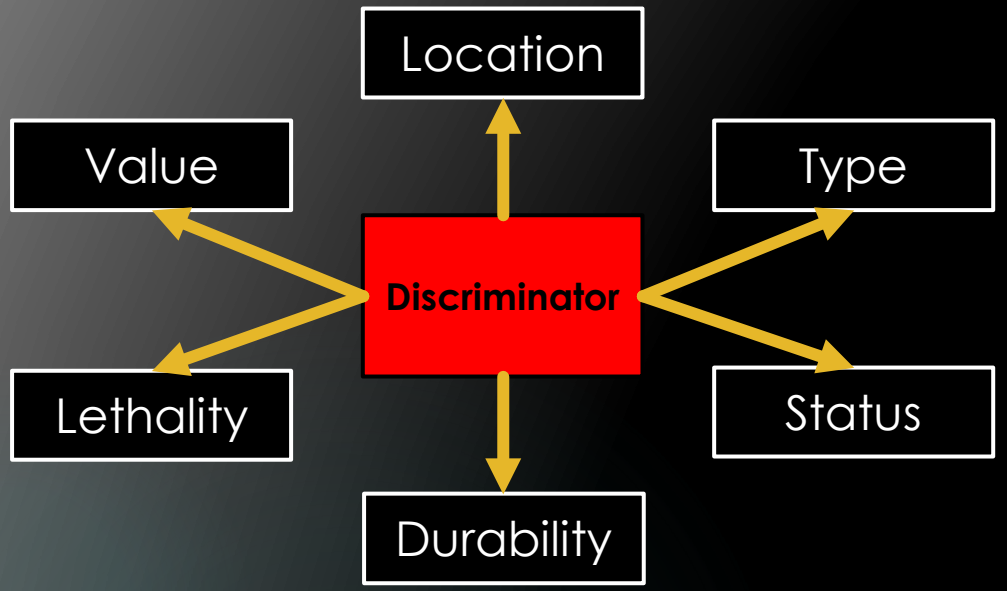
Values in brackets are random-generated permissible range

MySQL 8.0 Command Line Cli

```
mysql> describe traducer;
+----------+-----------------------------------+------+-----+---------+-------+
| Field    | Type                              | Null | Key | Default | Extra |
+----------+-----------------------------------+------+-----+---------+-------+
| TID      | varchar(20)                       | NO   | PRI | NULL    |       |
| TType    | enum('Medium','Heavy')            | YES  |     | NULL    |       |
| TLoc_X   | int                               | YES  |     | NULL    |       |
| TLoc_Y   | int                               | YES  |     | NULL    |       |
| TValue   | int                               | YES  |     | NULL    |       |
| TLethal  | int                               | YES  |     | NULL    |       |
| TStatus  | enum('Available','Not Available') | YES  |     | NULL    |       |
| TDurable | decimal(10,2)                     | YES  |     | NULL    |       |
+----------+-----------------------------------+------+-----+---------+-------+
```

TID PATTERN = 'TA-'[1-5]'-'[1-100]

Discriminator Agent



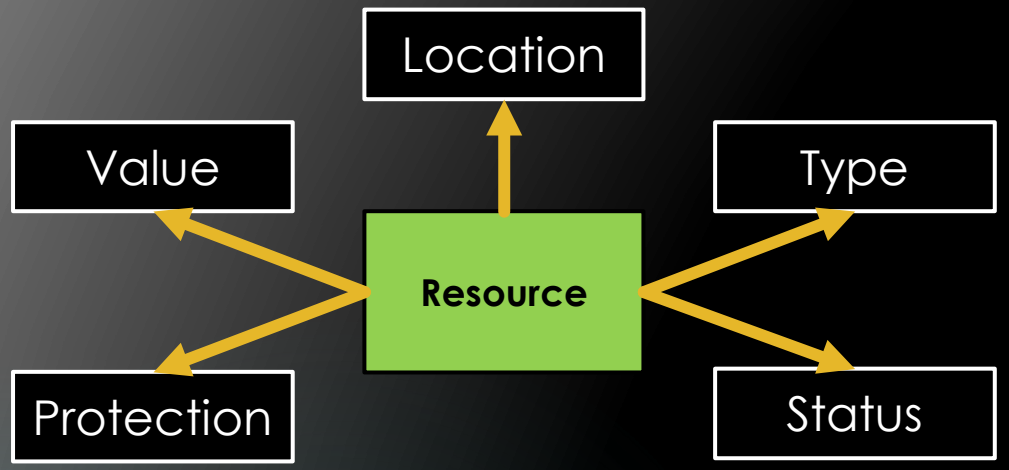
State	Value Range
Type	'Standard' or 'Multi-Role'
Location	X [400-900] Y [4-900]
Value	Standard = 4 Multi-Role = 7
Lethality	Standard = 10 Multi-Role = 12
Status	'Available' or 'Not Available'
Durability	[5-10%] of Lethality
Values in brackets are random-generated permissible range	

MySQL 8.0 Command Line Cli

```
mysql> describe discriminator;
+----------+----------------------------------+------+-----+---------+-------+
| Field    | Type                             | Null | Key | Default | Extra |
+----------+----------------------------------+------+-----+---------+-------+
| DID      | varchar(20)                      | NO   | PRI | NULL    |       |
| DType    | enum('Standard','Multi-Role')    | YES  |     | NULL    |       |
| DLoc_X   | int                              | YES  |     | NULL    |       |
| DLoc_Y   | int                              | YES  |     | NULL    |       |
| DValue   | int                              | YES  |     | NULL    |       |
| DLethal  | int                              | YES  |     | NULL    |       |
| DStatus  | enum('Available','Not Available') | YES  |     | NULL    |       |
| DDurable | decimal(10,2)                    | YES  |     | NULL    |       |
+----------+----------------------------------+------+-----+---------+-------+
```

DID PATTERN = 'TA-'[1-5]'-'[1-100]

Resource



State	Value Range
Type	'TAC' or 'OP' or 'STRAT'
Location	X [700-950] Y [700-950]
Value	TAC = [10-150] OP = [75-300] STRAT = [250-500]
Status	'Active' or 'Dormant'
Protection	TAC = Active [100-300] Dormant [50-150] OP = Active [750-1000] Dormant [50-150] STRAT = Active [2500-3000] Dormant [50-150]
Values in brackets are random-generated permissible range	

MySQL 8.0 Command Line Cli

```
mysql> describe resource;
+----------+-------------------------+------+-----+---------+-------+
| Field    | Type                    | Null | Key | Default | Extra |
+----------+-------------------------+------+-----+---------+-------+
| RID      | varchar(20)             | NO   | PRI | NULL    |       |
| RType    | enum('TAC','OP','STRAT') | YES  |     | NULL    |       |
| RLoc_X   | int                     | YES  |     | NULL    |       |
| RLoc_Y   | int                     | YES  |     | NULL    |       |
| RValue   | int                     | YES  |     | NULL    |       |
| RStatus  | enum('Active','Dormant') | YES  |     | NULL    |       |
| RProtect | decimal(10,2)           | YES  |     | NULL    |       |
+----------+-------------------------+------+-----+---------+-------+
```

RID PATTERN = 'R-'[1-5]'#'[1-100]

Task 1: Entity Generation

Create the function **traducerAgent** that accepts no parameters and returns an SQL-formatted string that represents a traducer based on the information on slide 3.

```
+-----------------------------------------------------------------------------------+
| MSG                                                                               |
+-----------------------------------------------------------------------------------+
| INSERT INTO traducer VALUES('TA-5-26','Heavy',82,30,25,300,'Not Available',24.00) |
+-----------------------------------------------------------------------------------+
```

Create the function **desciminatorAgent** that accepts no parameters and returns an SQL-formatted string that represents a discriminator based on the information on slide 4.

```
+-----------------------------------------------------------------------------------+
| MSG                                                                               |
+-----------------------------------------------------------------------------------+
| INSERT INTO discriminator VALUES('DA-2-36','Standard',77,14,4,10,'Available',0.60) |
+-----------------------------------------------------------------------------------+
```

Create the function **resourceBuilder** that accepts no parameters and returns an SQL-formatted string that represents a resource based on the information on slide 5.

```
+-----------------------------------------------------------------+
| MSG                                                             |
+-----------------------------------------------------------------+
| INSERT INTO resource VALUES('R-1#100','OP',868,793,242,'Active',202) |
+-----------------------------------------------------------------+
```

Task 2: Database Generation

Create the stored procedure buildAggressor that builds the database aggressor_system as shown below.

traducer							
TID	TType	TLoc_X	TLoc_Y	TValue	TLethal	TStatus	TDurable

discriminator							
DID	DType	DLoc_X	DLoc_Y	DValue	DLethal	DStatus	DDurable

resource						
RID	RType	RLoc_X	RLoc_Y	RValue	RStatus	RProtect

Task 3: Database Population

Create the stored procedure aggressorPopulator that accepts the number of traducer records, discriminator records, and resource records and populates the database aggressor_system with the specified number, which have been generated using the functions defined in slide 6.

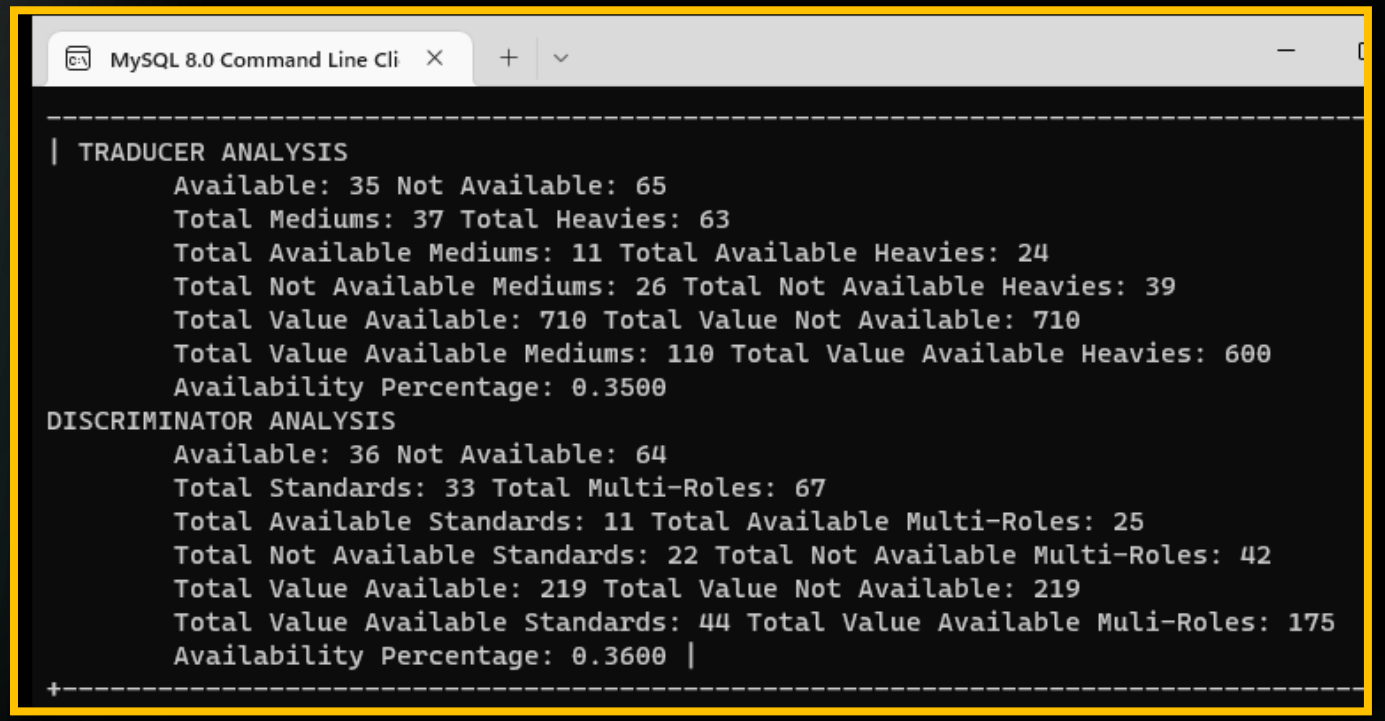
MySQL 8.0 Command Line Cli

```
+---------+--------+--------+--------+--------+---------+--------------+----------+
| TID     | TType  | TLoc_X | TLoc_Y | TValue | TLethal | TStatus      | TDurable |
+---------+--------+--------+--------+--------+---------+--------------+----------+
| TA-2-88 | Medium |     19 |     88 |     10 |     100 | Not Available |     7.00 |
| TA-3-26 | Medium |    163 |    183 |     10 |     100 | Available     |     9.00 |
| TA-3-65 | Heavy  |     29 |     55 |     25 |     300 | Not Available |    27.00 |
+---------+--------+--------+--------+--------+---------+--------------+----------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM DISCRIMINATOR;
+---------+------------+--------+--------+--------+---------+--------------+----------+
| DID     | DType      | DLoc_X | DLoc_Y | DValue | DLethal | DStatus      | DDurable |
+---------+------------+--------+--------+--------+---------+--------------+----------+
| DA-2-14 | Multi-Role |    151 |     56 |      7 |      12 | Not Available |     1.08 |
| DA-3-92 | Multi-Role |    150 |     88 |      7 |      12 | Not Available |     0.72 |
| DA-5-91 | Standard   |    109 |     29 |      4 |      10 | Not Available |     0.90 |
+---------+------------+--------+--------+--------+---------+--------------+----------+
3 rows in set (0.00 sec)

mysql> SELECT * FROM RESOURCE;
+--------+-------+--------+--------+--------+---------+----------+
| RID    | RType | RLoc_X | RLoc_Y | RValue | RStatus | RProtect |
+--------+-------+--------+--------+--------+---------+----------+
| R-1#19 | OP    |    927 |    947 |    205 | Dormant |    78.00 |
| R-3#55 | OP    |    936 |    721 |     95 | Dormant |   131.00 |
| R-4#52 | TAC   |    721 |    914 |     21 | Active  |   145.00 |
+--------+-------+--------+--------+--------+---------+----------+
```

Task 4: Data Analysis

*Modify your build_aggressor to remove the primary keys from the aggressor_system database.
*Build 100 traducers 100 discriminators 25 resource records.

Create the stored procedure TD_analysis that accepts no parameters and produces the analysis of the traducer and discriminator records in the format shown below.



Task 5: Data Cleaning

Create the stored procedure RemoveDuplicates that accepts no parameters and removes all duplicate Traducers (TID), Discriminators (DID), and Resources(RID) from their associated tables.

* Your stored procedure must make use of a cursor for all data retrieval and must utilize the Delete command for duplicate record removal.