**INFORMATION TECHNOLOGY AND MANAGEMENT**

**HOMEWORK #3 – Fall 2020**

**Due November 17, 2020**

1. **Using the following relations and subordinate dependencies convert these relations into an NER diagram. (1) Draw the subordinate dependency graph, (2) “circle” RHMOs, (3) draw NER diagram, and (4) repeat these steps for each complex object at the next (more detailed) level of abstraction.**

**CORP-UNITS ( UNIT-ID, CORP-ID, V-PRES )**

**SALES-DIVISION (SALES-MGR#, UNIT-ID)**

**EMPLOYEES ( EMP#, UNIT-ID, JOB-TITLE)**

**DELIVERY-EMPS ( D-EMP#, WAREHOUSE-ID, VEH-RATING )**

**STOCKING-EMPS (STK-EMP#, WAREHOUSE-ID,**

**VEHICLE-FLEET ( VEHICLE-ID, WAREHOUSE-ID )**

**DAILY-DELIVERY ( CUST-ORDER#, DATE, VEHICLE-ID,**

**D-EMP#, SCHEDULE-TIME )**

**WAREHOUSE-EMP ( W-EMP#, WAREHOUSE-ID )**

**WAREHOUSES (WAREHOUSE-ID, WAREHOUSE-SITE,**

**WRHSE-DIR# )**

**WAREHOUSE-ITEM-LOC ( WAREHOUSE-ID, ITEM-ID, AISLE#, BIN#, QNTY )**

**INV-ITEMS ( ITEM-ID, ITEM-DESCR, UNIT-PRICE )**

**PRICING ( SUPPLIER-ID, ITEM-ID, CURRENT-UNIT-PRICE )**

**SALES-EMP ( S-EMP#, SALES-DISTRICT )**

**SUP-ORDERS ( SUP-ORDER#, DATE, S-EMP#, SUPPLIER-ID, WAREHOUSE-ID )**

**SUP-ORDER-ITEMS ( SUP-ORDER#, ITEM-ID, QNTY-ORDERED )**

**SUPPLIER ( SUPPLIER-ID, SALES-CONTACT )**

**SUPPLIER-STOCK ( SUPPLIER-ID, ITEM-ID, UNIT-PRICE )**

**CUSTOMERS ( CUST-ID, CUST-SITE, CUST-ACCT )**

**CUSTOMER-REP ( CUST-REP-ID, CUST-ID, S-EMP# )**

**CUST-ORDERS ( CUST-ORDER#, CUST-ID, DEL-DATE, S-EMP#, WAREHOUSE-ID )**

**CUST-ORDER-ITEMS ( CUST-ORDER#, ITEM-ID, QNTY- ORDERED )**

**SALES-DIVISION.UNIT-ID 🡪 CORP-UNIT.UNIT-ID**

**SALES-DIVISION.S-MGR# 🡪 EMPLOYEES.EMP#**

**EMPLOYEES.UNIT-ID 🡪 CORP-UNIT.UNIT-ID**

**DELIVERY-EMPS.D-EMP# 🡪 WAREHOUSE-EMP.W-EMP#**

**DELIVERY-EMPS.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**VEHICLE-FLEET.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**DAILY-DELIVERY.VEHICLE-ID 🡪 VEHICLE-FLEET.VEHICLE-ID**

**DAILY-DELIVERY.CUST-ORDER# 🡪 CUST.ORDRS.CUST-ORDER#**

**DAILY-DELIVERY.D-EMP# 🡪 DELIVERY-EMPS.D-EMP#**

**WAREHOUSE-EMP.W-EMP# 🡪 EMPLOYEES.EMP#**

**WAREHOUSE-EMP.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**STOCKING-EMPS.STK-EMP# 🡪 WAREHOUSE-EMP.W-EMP#**

**STOCKING-EMPS.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**WAREHOUSE-ITEM.LOC.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**WAREHOUSE-ITEM.LOC.ITEM-ID 🡪 INV-ITEMS.ITEM-ID**

**PRICING.SUPPLIER-ID 🡪 SUPPLIER.SUPPLIER-ID**

**PRICING.ITEM-ID 🡪 INV-ITEMS.ITEM-ID**

**SALES-EMP.S-EMP# 🡪 EMPLOYEES.EMP#**

**SUP-ORDERS.S-EMP# 🡪 SALES-EMP.S-EMP#**

**SUP-ORDERS.SUPPLIER-ID 🡪 SUPPLIER.SUPPLIER-ID**

**SUP-ORDERS.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOURSE-ID**

**SUP-ORDER-ITEMS.SUP-ORDER# 🡪 SUP-ORDERS.SUP-ORDER#**

**SUP-ORDER-ITEMS.ITEM-ID 🡪 INV-ITEMS.ITEM-ID**

**SUPPLIER-STOCK.SUPPLIER-ID 🡪 SUPPLIER.SUPPLIER-ID**

**SUPPLIER-STOCK.ITEM-ID 🡪 INV-ITEMS.ITEM-ID**

**CUSTOMER-REP.CUST-ID 🡪 CUSTOMERS.CUST-ID**

**CUSTOMER-REP.S-EMP# 🡪 SALES-EMP.S-EMP#**

**CUST-ORDERS.CUST-ID 🡪 CUSTOMERS.CUST-ID**

**CUST-ORDERS.WAREHOUSE-ID 🡪 WAREHOUSES.WAREHOUSE-ID**

**CUST-ORDERS.S-EMP# 🡪 SALES-EMP.S-EMP#**

**CUST-ORDER-ITEMS.CUST-ORDER# 🡪 CUST-ORDERS.CUST-ORDER#**

**CUST-ORDER-ITEMS.ITEM-ID 🡪 INV-ITEMS.ITEM-ID**

**2. Given the following Database and Attribute Value Classification Schema, generate the following four rules for COLRANK:**

**Characteristic Rules: Classification Rules:**

**TOP50 🡪 TOP50 🡨**

**BOT50 🡪 BOT50 🡨**

**Provide tables after the complete data substitution step and after the simplification step. Include count numbers for each profile.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **NAME** | **HIGHSCH** | **CLSRANK** | **ACT** | **MAJOR** | **ENTTEST** | **COLRANK** |
| JANE | CLASS1 | TOP10 | 26 | ITM | A | TOP50 |
| JILL | CLASS2 | TOP50 | 18 | ART | C | BOT50 |
| JACK | CLASS1 | TOP25 | 29 | ME | B | TOP50 |
| KIM | CLASS2 | TOP10 | 25 | ITM | B | TOP50 |
| BILL | CLASS2 | TOP25 | 24 | EE | C | BOT50 |
| CRIS | CLASS2 | TOP25 | 24 | ITM | B | BOT50 |
| JIM | CLASS2 | TOP25 | 26 | ITM | A | TOP50 |
| LEE | CLASS1 | TOP25 | 24 | CE | C | TOP50 |
| DON | CLASS1 | TOP50 | 28 | EE | B | TOP50 |
| EARL | CLASS2 | TOP10 | 24 | BUS | C | BOT50 |
| MIRA | CLASS2 | TOP10 | 32 | SS | A | TOP50 |
| TONI | CLASS2 | TOP25 | 22 | CE | C | BOT50 |
| LEN | CLASS1 | TOP25 | 20 | BUS | B | BOT50 |
| ALLIE | CLASS1 | TOP10 | 33 | PREMED | A | TOP50 |
| CRISTEN | CLASS1 | TOP25 | 32 | PREMED | B | TOP50 |
| PETE | CLASS1 | TOP50 | 32 | HUM | B | TOP50 |
| JAY | CLASS1 | TOP50 | 25 | ME | B | TOP50 |
| KATE | CLASS2 | TOP50 | 21 | HUM | C | BOT50 |
| BRUCE | CLASS2 | TOP50 | 24 | SS | C | BOT50 |
| STU | CLASS1 | TOP50 | 28 | SS | B | BOT50 |

ATRIBUTE VALUE CLASSIFICATION SCHEMA

**CLSRANK:**

(TOP10, TOP25) A: ACCEPTABLE

(TOP50) Q: QUESTIONABLE

**ACT:**

(12-25) Q: QUESTIONABLE

(26-36) A: ACCEPTABLE

**MAJOR:**

(HUM, PREMED, SS, ART, MIS, BUS) SOL: SCHOOL OF LETTERS

(MATH, PHYS, ITM, EE, CE, ME) SOT: SCHOOL OF TECHNOLOGY

**ENTTEST:**

(A, B) A: ACCEPTABLE

(C, D) Q: QUESTIONABLE

**3. Using the table in problem #1,**

* 1. **Develop a decision tree based on the method discussed in class which uses HIGHSCH, and CLSRANK information as a possible predictor of who will end up in the TOP50 or BOT50 in their COLRANK.**
  2. **Develop a second decision tree using HIGHSCH, CLSRANK, ACT, MAJOR, and ENTTEST information as a possible predictor of who will end up in the TOP50 and BOT50 in their COLRANK.**
  3. **In what ways did the second decision tree change the predictability of student outcomes over the first decision tree (and improve your decision making capability)?**

**4. Using the Market Basket Analysis Technique develop a co-occurrence matrix of the courses that the students have registered for in a single semester. Based on this analysis and budget decision that you can only offer five of these courses each semester, which five courses would you offer together in the same semester and what other five courses would you offer together in the next semester.**

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