CSCE 310 – Database Systems  
Fall 2020 – Dr. McGuire  
Homework Assignment #5

A system crash has occurred while processing this database. The DBMS uses a deferred-write (deferred update) technique. The crash has left the database in an inconsistent state. Using the information in the transaction log, go through the recovery process so that the database is once again in a consistent state. Highlight all the changes made to the database systems when reporting your answer.  
  
CUSTOMER

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CUS\_CODE** | **CUS\_LNAME** | **CUS\_FNAME** | **CUS\_INITIAL** | **CUS\_AREACODE** | **CUS\_PHONE** | **CUS\_BALANCE** |
| 10010 | Ramas | Alfred | A | 615 | 844-2573 | 0.00 |
| 10011 | Dunne | Leona | K | 713 | 894-1238 | 675.72 |
| 10012 | Smith | Kathy | W | 615 | 894-2285 | 345.86 |
| 10013 | Olowski | Paul | F | 615 | 894-2180 | 536.75 |
| 10014 | Orlando | Myron |  | 615 | 222-1672 | 0.00 |
| 10015 | O'Brian | Amy | B | 713 | 442-3381 | 0.00 |
| 10016 | Brown | James | G | 615 | 297-1228 | 277.55 |
| 10017 | Williams | George |  | 615 | 290-2556 | 768.93 |
| 10018 | Farriss | Anne | G | 713 | 382-7185 | 216.55 |
| 10019 | Smith | Olette | K | 615 | 297-3809 | 0.00 |

PRODUCT

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **P\_CODE** | **P\_DESCRIPT** | **P\_INDATE** | **P\_QTYOH** | **P\_MIN** | **P\_PRICE** | **P\_DISCOUNT** | **V\_CODE** |
| 11QER/31 | Power painter, 15 psi., 3-nozzle | 1/2/2019 | 8 | 5 | 109.99 | 0 | 25595 |
| 13-Q2/P2 | 7.25-in. pwr. saw blade | 1/12/2019 | 32 | 15 | 14.99 | 0.05 | 21344 |
| 14-Q1/L3 | 9.00-in. pwr. saw blade | 2/12/2019 | 18 | 12 | 17.49 | 0 | 21344 |
| 1546-QQ2 | Hrd. cloth, 1/4-in., 2x50 | 1/14/2019 | 15 | 8 | 39.95 | 0 | 23119 |
| 1558-QW1 | Hrd. cloth, 1/2-in., 3x50 | 8/14/2018 | 23 | 5 | 43.99 | 0 | 23119 |
| 2232/QTY | B&D jigsaw, 12-in. blade | 2/28/2019 | 8 | 5 | 109.92 | 0.05 | 24288 |
| 2232/QWE | B&D jigsaw, 8-in. blade | 1/23/2019 | 6 | 5 | 99.87 | 0.05 | 24288 |
| 2238/QPD | B&D cordless drill, 1/2-in. | 12/19/2018 | 12 | 5 | 38.95 | 0.05 | 25595 |
| 23109-HB | Claw hammer | 2/19/2019 | 23 | 10 | 9.95 | 0.1 | 21225 |
| 23114-AA | Sledge hammer, 12 lb. | 11/1/2018 | 8 | 5 | 14.40 | 0.05 |  |
| 54778-2T | Rat-tail file, 1/8-in. fine | 1/14/2019 | 43 | 20 | 4.99 | 0 | 21344 |
| 89-WRE-Q | Hicut chain saw, 16 in. | 11/6/2018 | 11 | 5 | 256.99 | 0.05 | 24288 |
| PVC23DRT | PVC pipe, 3.5-in., 8-ft | 2/19/2019 | 188 | 75 | 5.87 | 0 |  |
| SM-18277 | 1.25-in. metal screw, 25 | 2/28/2019 | 172 | 75 | 6.99 | 0 | 21225 |
| SW-23116 | 2.5-in. wd. screw, 50 | 1/23/2019 | 237 | 100 | 8.45 | 0 | 21231 |
| WR3/TT3 | Steel matting, 4'x8'x1/6", .5" mesh | 2/16/2019 | 18 | 5 | 119.95 | 0.1 | 25595 |

INVOICE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **INV\_NUMBER** | **CUS\_CODE** | **INV\_DATE** | **INV\_TOTAL** | **INV\_TERMS** | **INV\_STATUS** |
| 1001 | 10014 | 3/18/2019 | 24.95 | CASH | PAID |
| 1002 | 10011 | 3/18/2019 | 9.98 | CASH | PAID |
| 1003 | 10012 | 3/18/2019 | 153.85 | CASH | PAID |
| 1004 | 10011 | 3/19/2019 | 34.87 | CASH | PAID |
| 1005 | 10018 | 3/19/2019 | 70.44 | CASH | PAID |
| 1006 | 10014 | 3/19/2019 | 397.83 | CASH | PAID |
| 1007 | 10015 | 3/19/2019 | 34.97 | CASH | PAID |
| 1008 | 10011 | 3/19/2019 | 399.15 | CASH | PAID |
| 1009 | 10016 | 3/19/2019 | 9.98 | CHARGE | UNPAID |

LINE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **INV\_NUMBER** | **LINE\_NUMBER** | **P\_CODE** | **LINE\_UNITS** | **LINE\_PRICE** |
| 1001 | 1 | 13-Q2/P2 | 1 | 14.99 |
| 1001 | 2 | 23109-HB | 1 | 9.95 |
| 1002 | 1 | 54778-2T | 2 | 4.99 |
| 1003 | 1 | 2238/QPD | 1 | 38.95 |
| 1003 | 2 | 1546-QQ2 | 1 | 39.95 |
| 1003 | 3 | 13-Q2/P2 | 5 | 14.99 |
| 1004 | 1 | 54778-2T | 3 | 4.99 |
| 1004 | 2 | 23109-HB | 2 | 9.95 |
| 1005 | 1 | PVC23DRT | 12 | 5.87 |
| 1006 | 1 | SM-18277 | 3 | 6.99 |
| 1006 | 2 | 2232/QTY | 1 | 109.92 |
| 1006 | 3 | 23109-HB | 1 | 9.95 |
| 1006 | 4 | 89-WRE-Q | 1 | 256.99 |
| 1007 | 1 | 13-Q2/P2 | 2 | 14.99 |
| 1007 | 2 | 54778-2T | 1 | 4.99 |
| 1008 | 1 | PVC23DRT | 5 | 5.87 |
| 1008 | 2 | WR3/TT3 | 3 | 119.95 |
| 1008 | 3 | 23109-HB | 1 | 9.95 |
| 1009 | 1 | 89-WRE-Q | 1 | 277.55 |

ACCT\_TRANSACTION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ACCT\_TRANS\_NUM** | **ACCT\_TRANS\_DATE** | **CUST\_NUMBER** | **ACCT\_TRANS\_TYPE** | **ACCT\_TRANS\_AMOUNT** |
| 10003 | 3/17/2019 | 10014 | charge | 329.66 |
| 10004 | 3/17/2019 | 10011 | charge | 615.73 |
| 10006 | 3/17/2019 | 10014 | payment | 329.66 |
| 10007 | 3/19/2019 | 10016 | charge | 277.55 |

***TRANSACTION LOG FILE***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TRL\_ID** | **TRX\_NUM** | **PREV\_PTR** | **NEXT\_PTR** | **OPERATION** | **TABLE** | **ROW\_ID** | **ATTRIBUTE** | **BEFORE\_VAL** | **AFTER\_VAL** |
| 341 | 101 | NULL | 352 | START | \*\*\*Begin  Transaction | | |  |  |
| 352 | 101 | 341 | 363 | UPDATE | PRODUCT | 54778-2T | PROD\_QOH | 45 | 43 |
| 355 | \*\*\*\* |  |  | **CHECKPOINT** |  |  |  |  |  |
| 363 | 101 | 352 | 365 | UPDATE | CUSTOMER | 10011 | CUS\_BALANCE | 615.73 | 675.72 |
| 365 | 101 | 363 | NULL | COMMIT | \*\*\* End Transaction |  |  |  |  |
| 397 | 106 | NULL | 405 | START | \*\*\*Begin  Transaction |  |  |  |  |
| 405 | 106 | 397 | 415 | INSERT | INVOICE | 1009 |  |  | 1009, 10016, 3/19/2019, 9.98. CHARGE, UNPAID |
| 415 | 106 | 405 | 419 | INSERT | LINE | (1009,1) |  |  | 1009,1, 89-WRE-Q, 1,277.55 |
| 419 | 106 | 415 | 427 | UPDATE | PRODUCT | 89-WRE-Q | PROD\_QOH | 12 | 11 |
| 427 | 106 | 419 | 431 | UPDATE | CUSTOMER | 10016 | CUS\_BALANCE | 0.00 | 277.55 |
| 431 | 106 | 427 | 521 | INSERT | ACCT\_ TRANSACTION | 10007 |  |  | 10007, 3/19/2019, 10016, CHARGE, 277.55 |
| 457 | 155 | NULL | 525 | START | \*\*\*Begin  Transaction |  |  |  |  |
| 521 | 106 | 431 | NULL | COMMIT | \*\*\* End Transaction |  |  |  |  |
| 525 | 155 | 521 | ???? | UPDATE | PRODUCT | 2232/QWE | PROD\_QOH | 6 | 26 |
|  | \*\*\*\* |  |  | **CRASH** |  |  |  |  |  |

The changes made to the database in recovery were apart of transactions 101 and 106. The transaction 155 was not taken into account because no commit operation had been called.