Scott Fenton

Homework 1

1. Copy of typescript:

Script started on Mon 11 Sep 2017 02:28:46 AM EDT

sfenton@pe07:~/cs630/hw1$ exit\_\_\_\_quit\_\_\_\_sqlplus sfenton/sfenton@//dbs3.cs.umb.edu/dbs3

SQL\*Plus: Release 12.1.0.2.0 Production on Mon Sep 11 02:28:49 2017

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Last Successful login time: Mon Sep 11 2017 02:27:25 -04:00

Connected to:

Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production

With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

SQL> select \* from boats;

BID BNAME COLOR

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101 Interlake blue

102 Interlake red

103 Clipper green

104 Marine red

SQL> exit

Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production

With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

sfenton@pe07:~/cs630/hw1$ exit

exit

Script done on Mon 11 Sep 2017 02:29:04 AM EDT

2a) Find the three candidate keys for this table. One of the keys has two columns.

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **C** | **D** |
| a1 | b1 | c1 | d1 |
| a2 | b3 | c1 | d2 |
| a3 | b4 | c2 | d2 |
| a4 | b2 | c2 | d1 |

The three candidate keys for this table are A, B, and CD.

b. Find the two candidate keys for this table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **E** |
| a1 | b1 | c1 | d1 | e1 |
| a2 | b1 | c1 | d1 | e2 |
| a3 | b1 | c2 | d1 | e1 |
| a4 | b2 | c1 | d1 | e1 |

The two candidate keys for this table are A, and BCDE.

3. Keys. Exercise 3.5, page 95

1. An attribute or set of attributes that is not a candidate key based on this instance being legal is the **name**, and **age** because there are two records with the **name** “smith”, and many records containing duplicate **age**.

2. An attribute that is a candidate key based on this instance being legal is either **sid**, or **login**, because each login is unique, and sid must be unique. In this instance **gpa** may be a candidate key because there are no duplicate gpa’s, but it would be a poor choice since It is likely that there will be a duplicate gpa if the table grows.

4. Keys. Answer the same questions of Exercise 3.5 for the table Enrolled, in Figure 3.4.

1. An attribute that is not a candidate key is **grade**, because there are two records with the grade “B”.

2. Attributes that are candidate keys are the **studid** or **cid**.

3.

|  |  |  |
| --- | --- | --- |
| **cid** | **grade** | **studid** |
| Carnatic101 | C | 53831 |
| Reggae203 | B | 53832 |
| Topology112 | A | 53650 |
| History105 | B | 53666 |
| History105 | B | 53831 |

4. The only candidate key of this table is **cid**. “Studid” is no longer a candidate key because there are two records with a value of “53831”.

5. Relational Algebra. Exercise 4.3,

2. πsid ((σcolor=’red’vcolor= ’green’ P) ⨝ C)

4. (πsid ((σcolor=’red’ P) ⨝ C)) ∩ (πsid ((σcolor=’green’ P) ⨝ C)

10. p(a, C) p(b, C)

p(temp1, πa.pid(σa.pid=b.pid)

p(temp2, a.sid<>b.sid(a x b))

temp1 ∩ temp2

6. Relational Algebra. Using the tables of Exercise 4.3:

1. Find the addresses of suppliers supplying Green parts.

πaddress ((σcolor=’green’ P) ⨝ C ⨝ S)

2. Find the names of suppliers supplying parts of cost over 100.

πsname ((σcost>100 P) ⨝ C ⨝ S)

3. Find the names of suppliers which supply a part named 'Acme Widget Washer'.

πsname ((σpname=’Acme Widget Washer’ P) ⨝ C ⨝ S)

4. Find the name of suppliers that supply Red parts costing over 10.

(πsname ((σcolor=’red’ P) ⨝ C ⨝ S)) ∩ (πsname ((σcost>10 P) ⨝ C ⨝ S))

5. Find the names of suppliers that supply only parts that cost 1.

πsname ((σcost=1 P) ⨝ C ⨝ S)

6. Find the names of suppliers that supply a Green part or the part "Smoke Shifter End", in either case costing less than 100.

ρ(G, πsname ((σcost<100^color=’green’ P) ⨝ C ⨝ S)

ρ(SSE, πsname ((σcost<100^pname=’Smoke Shifter End’) ⨝ C ⨝ S)

G U SSE

7. Find the addresses of suppliers that supply part "Smoke Shifter End", but do not supply any Green parts.

ρ(G, πsname ((σcolor=’green’ P) ⨝ C ⨝ S)

ρ(SSE, πsname ((σpname=’Smoke Shifter End’ P) ⨝ C ⨝ S)

SSE - G

8. Find the names of suppliers that supply only one part.

P(part, πsid ((σpname=’Smoke Shifter End’) ⨝ C))

P(partother, πsid ((σpname<>’Smoke Shifter End’) ⨝ C )

πsname((part – partother) ⨝ S))

7. Relational Algebra. Exercise 4.4 Explaining what a given query returns.

1. This query asks to find the name of suppliers who supply a red part that cost less than 100.

2. This query should return the same as problem 1, find the name of suppliers who supply a red part that cost less than 100.

3. This query asks to find the name of suppliers who supply a red part costing less than 100, and supply a green part costing less than 100.

4. This query asks to find the sid of suppliers who supply a red part costing less than 100, and supply a green part costing less than 100.

5. This query asks to find the name of name of suppliers that supply a red part costing less than 100, and supply a green part costing less than 100. Even though the second part of the query projects both sid and sname, it can only return sname, because the first part of the query only projects sname.