

COSC 304 – Midterm Two Exam (2020) Solution

Questions 1: a

Questions 2: d

Questions 3: b

Questions 4: b

Questions 5: d

Questions 6: e

Question 7:

The obvious ones are

$d, a \rightarrow b$

$c \rightarrow e$

$d, a \rightarrow e$ (not as obvious)

Question 8:

The obvious proof is

$d, a \rightarrow b$ (3,4 trans)

The next most obvious proof is:

5. $c \rightarrow d, b$ (2,4 Notation)

$c \rightarrow e$ (5,1 Trans)

Question 9:

Candidate Keys are (a, d, f) and (a, c, f)

Question 10:

T1 ($\#A, \#B, C, \#D, G$) Foreign key on (C, D) referencing (C, D) in T2.

T2 ($\#C, \#D, E, F$)

Question 11:

$B, C \rightarrow \text{All}$

$B \rightarrow A$ (Partial dependency)

$E \rightarrow D, F$ (Transitive dependency)

Decompose with respect to $B \rightarrow A$ gives

T1 ($\#B, \#C, D, E, F$) and T2 ($\#B, A$) with T1_FK_B

Now decompose T1 with respect to $E \rightarrow D, F$ gives

T3 ($\#B, \#C, E$) and T4 ($\#E, D, F$) with T3_FK_E

Final tables:

T3 ($\#B, \#C, E$) with T1_FK_B and T3_FK_E

T2 ($\#B, A$)

T4 ($\#E, D, F$)

Question 12:

		TRUE	FALSE	CANNOT TELL
1.	$C, E \rightarrow D$		X	
2.	$C, D, E \rightarrow F$	X		
3.	$C \rightarrow E$			X
4.	$E \rightarrow D$		X	

Question 16:

```
SELECT d.ID, SUBSTR(d.name, INSTR(d.name, ' ') + 1) Last_Name,  
COUNT(pro_ID) NUMBER_OF_PROCEDURES  
FROM L4_Dentists d, L4_Pro_Dens pd  
WHERE d.ID = pd.den_ID (+)  
GROUP BY d.ID, SUBSTR(d.name, INSTR(d.name, ' ') + 1)
```

```
ORDER BY SUBSTR(d.name, INSTR(d.name, ' ') + 1);
```

Question 17:

```
SELECT TO_CHAR(app_date, 'DD/MON/YYYY - ') || description ||  
       DECODE(cat_code, 'C', '(Cosmetic)', 'M', '(Medical)', 'P', '(Procedural)', '(Other)') ||  
       ' on tooth ' || tooth || '.'  
FROM L4_Appointments a, L4_Patients pa, L4_App_pros ap, L4_Procedures pr  
WHERE ap.App_ID = a.ID AND  
      ap.Pro_ID = pr.ID AND  
      a.pat_ID = pa.ID AND  
      fName = 'Gary' AND  
      lName = 'Gleam'  
ORDER BY app_date;
```

Question 18:

-- Must have an outer join

```
SELECT pa.fname, pa.lname,  
       SUM(DECODE(temp.cat_code, 'C', 1, 0)) Cosmetic,  
       SUM(DECODE(temp.cat_code, 'M', 1, 0)) Medical,  
       SUM(DECODE(cat_code, 'C', 0, 'M', 0, 1)) NON_C_OR_M,  
       COUNT(temp.pro_ID) TOTAL  
FROM L4_Patients pa, (SELECT cat_code, a.pat_ID, ap.pro_ID  
                      FROM L4_Appointments a, L4_App_pros ap, L4_Procedures pr  
                      WHERE ap.App_ID = a.ID AND  
                            ap.Pro_ID = pr.ID AND  
                            SYSDATE - 365 < a.app_date) temp  
WHERE pa.ID = temp.pat_ID (+)  
GROUP BY pa.fname, pa.lname  
ORDER BY pa.lname;
```