

CSC343 Worksheet 7 Solution

June 22, 2020

1. a)

```
1 void askUserForPrice() {
2     EXEC SQL BEGIN DECLARE SECTION;
3         int model;
4         float speed;
5         int ram;
6         int hd;
7         float price;
8         char maker;
9         float targetPrice;
10
11         float minDiff;
12         int modelSol;
13         float speedSol;
14         char makerSol;
15     EXEC SQL END DECLARE SECTION;
16
17     EXEC SQL DECLARE execCursor CURSOR FOR
18         SELECT * FROM Product NATURAL JOIN PC
19
20     EXEC SQL OPEN execCursor;
21
22     printf("Enter target price:");
23     scanf("%f", &targetPrice);
24
25     while(1) {
26         EXEC SQL FETCH FROM execCursor INTO :model,
27             :speed, :ram, :hd, :price, :maker;
28
29         if (NO_MORE_TUPLES) break;
30
31         if (abs(price - targetPrice) >= minDiff) {
32             continue;
33         }
34
35         minDiff = abs(price - targetPrice);
36         modelSol = model;
37         speedSol = speed;
38         makerSol = maker;
39     }
```

```

40
41     EXEC SQL CLOSE execCursor;
42
43     printf("maker=%c, model=%d, speed=%.2f\n", makerSol, modelSol
44     , speedSol);
45 }
46

```

Notes:

- EXEC SQL
 - Allows to use SQL statements within a host-language program
- The DECLARE Section
 - is used to declare shared variables
 - **Syntax:**

```
EXEC SQL BEGIN DECLARE SECTION;
... // Variable declarations in any language
EXEC SQL END DECLARE SECTION;
```

Example:

```

1     void getStudio() {
2         EXEC SQL BEGIN DECLARE SECTION;
3         char studioName[50], studioAddr[256]; // <- c
4         variables
5         char SQLSTATE[6];
6         EXEC SQL END DECLARE SECTION;
7
8         EXEC SQL INSERT INTO Studio(name, address)
9             VALUES (:studioName, :studioAddr);
10    }

```

- Cursors
 - Is the most versatile way to connect SQL queries
 - **Syntax:**

```
EXEC SQL DECLARE < cursor name > CURSOR FOR < query >

EXEC SQL OPEN < cursor name >;
...
EXEC SQL CLOSE < cursor name >;
```

Example:

```

1      void getStudio() {
2          EXEC SQL BEGIN DECLARE SECTION;
3              char studioName[50], studioAddr[256]; // <- c
variables
4              char SQLSTATE[6];
5          EXEC SQL END DECLARE SECTION;
6
7          EXEC SQL INSERT INTO Studio(name, address)
8              VALUES (:studioName, :studioAddr);
9      }
10

```

Example in Python:

```

1      import sqlite3
2      connection = sqlite3.connect("company.db")
3
4      cursor = connection.cursor()
5
6      staff_data = [ ("William", "Shakespeare", "m", "
1961-10-25"),
7                      ("Frank", "Schiller", "m", "1955-08-17"
8                      ),
9                      ("Jane", "Wall", "f", "1989-03-14") ]
10
11      for p in staff_data:
12          format_str = """INSERT INTO employee (staff_number,
13                      fname, lname, gender, birth_date)
14                      VALUES (NULL, "{first}", "{last}", "{gender}", "{
15                      birthdate}");"""
16
17          sql_command = format_str.format(first=p[0], last=p
18          [1], gender=p[2], birthdate = p[3])
19          cursor.execute(sql_command)
20

```

• Fetch Statement

– fetch data from the result table one row at a time

– Syntax:

EXEC SQL FETCH FROM < cursor name > INTO < list of variables >

Example:

```

1      void worthRanges() {
2          int i, digits, counts[15];
3          EXEC SQL BEGIN DECLARE SECTION;
4              int worth;
5              char SQLSTATE[6];
6          EXEC SQL END DECLARE SECTION;
7          EXEC SQL DECLARE execCursor CURSOR FOR
8              SELECT netWorth FROM MovieExec;
9

```

```

9
10         EXEC SQL OPEN execCursor;
11         for (i=1; i < 15; i++) counts[i] = 0;
12         while(1) {
13             EXEC SQL FETCH FROM execCursor INTO :worth; //
fetches a row of value from movieExec and stores in worth
14             if (NO_MORE_TUPLES) break;
15
16             ...
17         }
18     }
19

```

b)

```

2     void findLaptops() {
3         EXEC SQL BEGIN DECLARE SECTION;
4         int model;
5         float speed;
6         int ram;
7         int hd;
8         int screen;
9         float price;
10
11         float minSpeed;
12         int minRam;
13         int minHd;
14         float minPrice;
15     EXEC SQL END DECLARE SECTION;
16
17     EXEC SQL DECLARE execCursor CURSOR FOR
18         SELECT model, speed, ram, hd, screen, price, maker
19         FROM Product NATURAL JOIN Laptop;
20
21     EXEC SQL OPEN execCursor;
22
23     printf("Enter minimum speed:");
24     scanf("%f", &minSpeed);
25
26     printf("Enter minimum ram:");
27     scanf("%f", &minRam);
28
29     printf("Enter minimum hard-drive space:");
30     scanf("%f", &minHd);
31
32     printf("Enter minimum price:");
33     scanf("%f", &minPrice);
34
35     while(1) {
36         EXEC SQL FETCH FROM execCursor INTO :model,
37             :speed, :ram, :hd, :screen, :price, :maker;
38
39         if (NO_MORE_TUPLES) break;
40
41         if (
            speed >= minSpeed &&

```

```

42         ram >= minRam &&
43         hd >= minHd &&
44         screen >= minScreen
45     ) {
46         printf("model=%d, speed=%.2f, ram=%d, hd=%d, screen=%d, price=%.2f, maker=%c",
47             model, speed, ram, hd, screen, price, maker);
48     }
49 }
50
51 EXEC SQL CLOSE execCursor;
52 }
53

```

```

c) void findLaptops() {
2     EXEC SQL BEGIN DECLARE SECTION;
3         int model;
4         float speed;
5         int ram;
6         int hd;
7         int screen;
8         float price;
9
10        float minSpeed;
11        int minRam;
12        int minHd;
13        float minPrice;
14    EXEC SQL END DECLARE SECTION;
15
16    EXEC SQL DECLARE execCursor CURSOR FOR
17        SELECT model, speed, ram, hd, screen, price, maker
18        FROM Product NATURAL JOIN Laptop;
19
20    EXEC SQL OPEN execCursor;
21
22    printf("Enter minimum speed:");
23    scanf("%f", &minSpeed);
24
25    printf("Enter minimum ram:");
26    scanf("%f", &minRam);
27
28    printf("Enter minimum hard-drive space:");
29    scanf("%f", &minHd);
30
31    printf("Enter minimum price:");
32    scanf("%f", &minPrice);
33
34    while(1) {
35        EXEC SQL FETCH FROM execCursor INTO :model,
36            :speed, :ram, :hd, :screen, :price, :maker;
37
38        if (NO_MORE_TUPLES) break;
39
40        if (

```

```

41         speed >= minSpeed &&
42         ram >= minRam &&
43         hd >= minHd &&
44         screen >= minScreen
45     ) {
46         printf("model=%d, speed=%.2f, ram=%d, hd=%d, screen=%d, price=%.2f, maker=%c",
47             model, speed, ram, hd, screen, price, maker);
48     }
49 }
50
51 EXEC SQL CLOSE execCursor;
52 }
53

```

d)

```

2  #include <stdbool.h>
3  #include <string.h>
4  ...
5  void printSpecifications() {
6      EXEC SQL BEGIN DECLARE SECTION;
7          int model;
8          bool color;
9          char printType[50];
10         float price;
11
12         float speed;
13         int ram;
14         int hd;
15         int screen;
16
17         char maker;
18         int productModel;
19         char productType[50];
20
21         char targetMaker;
22     EXEC SQL END DECLARE SECTION;
23
24     EXEC SQL DECLARE execCursor CURSOR FOR
25         SELECT model, maker, productType FROM Product;
26
27     printf("Enter manufacturer:");
28     scanf("%f", &targetMaker);
29
30     EXEC SQL OPEN execCursor;
31     while (1) {
32         EXEC SQL FETCH FROM execCursor INTO :model,
33             :maker, :productType;
34
35         if (NO_MORE_TUPLES) break;
36
37         if (strcmp(productType, 'pc')) {
38             EXEC SQL DECLARE pcCursor CURSOR FOR
39                 SELECT speed, ram, hd, price FROM PC

```

```
40         NATURAL JOIN Product
41         WHERE type=productType;
42
43     EXEC SQL OPEN pcCursor;
44     while(1) {
45         EXEC SQL FETCH FROM pcCursor INTO :speed,
46             :ram, :hd, :price;
47
48         if (NO_MORE_TUPLES) break;
49
50         printf("model=%d, speed=%.2f, ram=%d, hd=%d,
51 price=%.2f, maker=%c, type=%s",
52             model, speed, ram, hd, screen, price, maker,
53             productType);
54     }
55     EXEC SQL CLOSE pcCursor;
56
57 } else if (strcmp(productType, 'laptop')) {
58
59     EXEC SQL DECLARE laptopCursor CURSOR FOR
60         SELECT model, speed, ram, hd, price FROM PC
61         NATURAL JOIN Product
62         WHERE type=productType;
63
64     EXEC SQL OPEN laptopCursor;
65     while(1) {
66
67     }
68
69 } else if (strcmp(productType, 'printer')) {
70
71     EXEC SQL DECLARE printerCursor CURSOR FOR
72         SELECT model, speed, ram, hd, price FROM PC
73         NATURAL JOIN Product
74         WHERE type=productType;
75
76     while(1) {
77
78     }
79
80 }
81 EXEC SQL CLOSE execCursor;
82 }
83
```