ERRATA
for
Database System Concepts, 6th Edition, 2010
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ERRATA FOR FIRST PRINTING:

CHAPTER 3

1. Page 69, Figure 3.6: The department name and salary of all instructors except Einstein are wrong (and have been copied incorrectly from Einstein's values). The correct values can be found in the *instructor* relation shown in Figure 2.1, Page 40, which should be: (Comp. Sci., 65000) for Srinivasan, (Finance, 90000) for Wu, and (Music, 40000) for Mozart; the same value should occur in all rows for that instructor.

    Also, the ID of the instructor of FIN-201 has been shown as 10101 in multiple lines in the table, in the column preceding FIN-201; the ID should be 12121.

2. Page 85, para 2: "The average balance is ..." → "The average salary is ...".

3. Page 88, Figure 3.17: in the second column header: "*avg(avg_salary)*" → "*avg_salary*"

4. Page 95, In the query at the top of the page:
   "**where** $1 <= ($**select count**$(R.course\_id)$ ..."
   →
   "**where** $1 >= ($**select count**$(R.course\_id)$ ..."

5. Page 94, top of page: in "**select distinct** *S.ID, S.name*", the use of **distinct** is not required, although it is not incorrect.

6. Page 96, Para 3:
   "However, some SQL implementations, notably Oracle, do not support renaming of the result relation in the **from** clause."
   →
   "Note that some SQL implementations require that each subquery result relation be given a name, even if the name is never referenced; Oracle allows a subquery result relation to be given a name (with the keyword **as** omitted) but does not allow renaming of attributes of the relation."

    Oracle does allow renaming of result relations (although it does not require it), but as in other kinds of renaming in Oracle, the keyword **as** should be omitted.

7. Page 101, third SQL query:
   select *student*
   from *student*

   →

   select *ID*
   from *student*

8. Page 105, Practice Exercise 3.1, Parts e, f, g: "Autumn" → "Fall"

9. Page 109, Exercise 3.12, Part b: "Autumn" → "Fall"

CHAPTER 4

1. Page 126, Figure 4.7: In the last row of the *department* relation, change 'Painter' to 'Taylor'.

2. Page 148, Para 1: "*branch_name* of the *branch* relation" → "*dept_name* of the *department* relation"

3. Page 155, Question 4.11: "Music" → "Taylor". (We need a building name, not a department name here.)

CHAPTER 5

1. Page 163, Para 1 (Java expression): "balance" → "salary".

2. Page 167, Figure 5.4, in the printf statement: "depthname" → "deptname"

3. Page 174, first query of Section 5.2.1: "**from** *instructor*" → "**from** *department*".

4. Page 175, Figure 5.6, Line 1: "*instructors_of*" → " *instructor_of*"

5. Page 184, Figure 5.10: "**update on** *takes*" → "**update of** *takes*"

6. Page 185, Figure 5.11, first line: "amount" → "level".

7. Page 191 Fig 5.15:
   (a) Change all 5 occurrences of *c_prereq* → *rec_prereq*;
   (b) "**select** *prereq.prereq_id*, *c_prereq.course_id*"
   →
   "**select** *rec_prereq.course_id*, *prereq.prereq_id*"

8. Page 194, Section 5.5.1: "**select** *ID*, *GPA*)" → "**select** *ID*, *GPA*"

9. Page 200, Figure 5.18, in the cell for "white" "dress": "8" → "5"

CHAPTER 6

1. Page 224, Figure 6.8: All corrections noted for Figure 3.6 (Page 69) above should be applied to Figure 6.8 also.

2. Page 235, Section 6.1.4.1: Replace ÷ by / in two occurrences in this section (this is to avoid confusion with the division operator of relational algebra).

3. Page 241, in both tuple relational calculus queries on this page:
   "$s[year] = 2009$}" → "$s[year] = 2009$" and "$t[course\_id])$}" → "$t[course\_id])$"

4. Page 242, in the tuple relation calculus query at the top of the page:
   "$s[year] = 2009$}" → "$s[year] = 2009$", and
   "$t[course\_id])$}" → "$t[course\_id])$".

5. Page 244, Section 6.2.4, Line 2: "σ, and ρ, ..." → "σ, Π, and ρ, ..."

6. Page 246:
   $\{< n > \ | \ \exists \ i, d, s \ (< i, n, d, s > \in \ instructor \ \wedge \ s > 80000)\}$
   →
   $\{< i > \ | \ \exists \ n, d, s \ (< i, n, d, s > \in \ instructor \ \wedge \ s > 80000)\}$

7. Page 246, 3rd bullet:
   $\{< n, c > \ | \ \exists \ i, a \ (< i, c, a, s, y > \in \ teaches \ ...$
   →
   $\{< n, c > \ | \ \exists \ i, a, se, y \ (< i, c, a, se, y > \in \ teaches \ ...$

8. Page 246, 4th bullet:

$$\{< c > \ | \ \exists\, s\, (< c, a, s, y, b, r, t > \in \ section$$
$$\land\, s \ = \ \text{``Fall''} \land y \ = \ \text{``2009''})$$
$$\lor \exists\, u\, (< c, a, s, y, b, r, t > \in \ section$$
$$\land\, s \ = \ \text{``Spring''} \land y \ = \ \text{``2010''})\}$$

$\rightarrow$

$$\{< c > \ | \ \exists\, a, s, y, b, r, t\, (< c, a, s, y, b, r, t > \in \ section$$
$$\land\, s \ = \ \text{``Fall''} \land y \ = \ \text{``2009''})$$
$$\lor \exists\, a, s, y, b, r, t\, (< c, a, s, y, b, r, t > \in \ section$$
$$\land\, s \ = \ \text{``Spring''} \land y \ = \ \text{``2010''})\}$$

9. Page 246, bottom of page:

$$\{< i > \ | \ \exists\, n, \ d, t\, (< i, n, d, t > \ \in \ student) \ \land$$
$$\forall\, x, y, z, w\, (< x, y, z, w > \ \in \ course \ \land \qquad z \ = \ \text{``Biology''} \Rightarrow$$
$$\exists\, a, b\, (< a, x, b, r, p, q > \ \in \ takes \ \land \ < c, a > \ \in\, > depositor))\}$$

$\rightarrow$

$$\{< i > \ | \ \exists\, n, \ d, tc\, (< i, n, d, tc > \ \in \ student) \ \land$$
$$\forall\, ci, ti, dn, cr\, (< ci, ti, dn, cr > \ \in \ course \ \land \ dn \ = \ \text{``Biology''} \Rightarrow$$
$$\exists\, si, se, y, g\, (< i, ci, si, se, y, g > \ \in \ takes \ ))\}$$

CHAPTER 7

1. Page 284, paras 2 and 5: Change the two occurrences of "*middle_name*" to "*middle_initial*".

CHAPTER 11

1. Page 486, first para of Section 11.3.1: After $K_i \ < \ K_j$ add "(we assume for now that there are no duplicate key values)."

2. Page 487, 5th para: Delete the sentence: "We have shown instructor names abbreviated to 3 characters in order to depict the tree clearly; in reality, the tree nodes would contain the full names."

3. Page 487, last para: Delete the sentence: "As before, we have abbreviated instructor names only for clarity of presentation."

4. Page 488, first para of Section 11.3.2: "Suppose that we wish to find records with a search-key value of V. Figure 11.11 presents pseudocode for a function `find()` to carry out this task." $\rightarrow$
" Suppose that we wish to find a record with a search-key value of V. Figure 11.11 presents pseudocode for a function `find()` to carry out this task, assuming there are no duplicates."

5. Page 489, Figure 11.11, function find(): Change
"/* Returns leaf node C and index i such that $C.P_i$ points to first record with search key value V */"
$\rightarrow$
"/* Assumes no duplicate keys, and returns leaf node C and index i such that $C.P_i$ points to record with search key value V, if such a record exists */"

6. Page 489, Figure 11.11, function printAll(): "Set $(L, i) = \text{find}(V)$;"
$\rightarrow$ "Set $(L, i) = \text{findFirst}(V)$;"

7. Page 490, Para 2: Replace this entire paragraph starting with "If there is at most one record .." with the following new paragraph:

"The `find` function of Figure 11.11 needs to be modified to handle duplicates keys. With duplicate keys, for both leaf and internal nodes, if $i < j$, then $K_i < K_j$ may not hold, but certainly $K_i \leq K_j$ holds. Further, records in the subtree pointed to by P_i may contain values that are less than or equal to K_i (to understand why, consider two adjacent leaf nodes pointed to by P_i and P_{i+1} that both contain a duplicate key value v, in which case $K_i = v$). To fix this, we must modify the loop in the `find` function to set $C = C.P_i$, even if $V = C.K_i$. Further, the leaf node C reached thereby may contain only search keys less than V (even if V does exist in the tree); in this case the `find` procedure must set $C =$ right sibling C, and recheck if C contains V. The modified `find` procedure, which we call `findFirst`, returns the first occurrence of value V in the tree."

8. Page 490, Para 3, Line 2:
"The procedure first steps through the remaining keys in the node L, to find other records with search-key value V."
$\rightarrow$

"The `printAll` procedure calls `findFirst` to find the node L with the first occurrence of V, and then steps through the remaining keys in the node L, to find other records with search-key value V."

9. Page 494, Figure 11.15, procedure insert_in_leaf: Change
"Let K_i be the highest value in L that is less than K
$\rightarrow$

"Let K_i be the highest value in L that is less than or equal to K

and also change
"Insert P, K into L just after $T.K_i$"
$\rightarrow$

"Insert P, K into L just after $L.K_i$"

10. Page 513, Para 2:
"The form of hash structure that we have just described is sometimes referred to as closed hashing. Under an alternative approach called open hashing ..."

$\rightarrow$

"The form of hash structure that we have just described is called closed ad- dressing (or, less commonly, closed hashing). Under an alternative approach called open addressing (or, less commonly, open hashing) ..."

Also in the same para: change all occurrences of "open hashing" $\rightarrow$ "open addressing" and "closed hashing" $\rightarrow$ "closed addressing'.

Why this change?: The form of hashing which we refer to as **closed hashing** is referred to more commonly as **closed addressing**, while the form of hashing we refer to as **open hashing** is referred to more commonly as **open addressing**.

But many sources also use the term "closed hashing" synonymously with "open addressing", and "open hashing" synonymously with "closed addressing", which is the exact opposite of our notation. To avoid this confusion, we suggest using the term closed addressing and open addressing, instead of closed hashing and open hashing.

11. Page 534, exercise 11.19: "closed and open hashing" $\rightarrow$ "closed and open addressing".

12. Page 519, Figure 11.29: Change salary value of Srinivasan from 90000 $\rightarrow$ 65000.

13. Page 533, Question 11.11: "Outline the steps in ..." → "Assuming the availability of the above bitmap index on *salary*, and a bitmap index on *dept_name*, outline the steps in ...".

CHAPTER 12

1. Page 549, formula for total number of seeks:

   "The total number of seeks is then:

   $$2\lceil b_r/M \rceil + \lceil b_r/b_b \rceil (2\lceil \log_{M-1}(b_r/M) \rceil - 1)"$$

   →

   "Assuming the output run is also allocated b_b blocks, each pass can merge $\lfloor M/b_b \rfloor - 1$ runs. The total number of seeks is then:

   $$2\lceil b_r/M \rceil + \lceil b_r/b_b \rceil (2\lceil \log_{\lfloor M/b_b \rfloor - 1}(b_r/M) \rceil - 1)$$

CHAPTER 13

1. Page 595, Line 4: "$n(r)$" → "n_r"

2. Page 601-602: "We have already seen equivalence rules with aggregation operation, and equivalence rules can also be created for outer joins."
   →
   "Equivalence rules can also be defined for the aggregation and outer join operations, as illustrated in Practice Exercises 13.1 and 13.2."

CHAPTER 14

1. Page 631, bullet item 2: "Information about the updates carried out by the transaction and written to disk is sufficient to enable ..."
   →
   "Information about the updates carried out by the transaction is written to the disk, and such information is sufficient to enable ..."

2. Page 646, Para 2: "addition and subtraction are commutative." → "the increment and decrement operations are commutative".

CHAPTER 15

1. Page 664, Figure 15.4: "concurreny" → "concurrency"

2. Page 671, Figure 15.10: "1" → "I" in the following places: 17 → I7, 123 → I23, 1912 → I912, 14 → I4, and 144 → I44.

3. Page 675, Section 15.2.1, in the para for "wait-die":
   "If T_{24} requests...", → "If T_{16} requests..."

4. Page 679, last para, line 5 and 8: Change both occurrences of "F_c" → "F_b". (This change is required for consistency with the following paragraph on page 680.)

5. Page 696, line 3: "phantom phenomenon" → "phantom phenomenon, which is described later in Section 15.8.3"

6. Page 715, 5th line from bottom: "time," → "time."

CHAPTER 16

1. Page 724, Line 2: Change
   "replaces the content of the first block with the value of the second. This recovery procedure ..."
   →
   "can either replace the content of the first block with the value of the second, or replace the content of the second block with the value of the first. Either way, the recovery procedure ..."

2. Page 725: Last para: "The system then performs ..." → "The transaction then performs...".

3. Page 765, Exercise 16.20: "just after before" → "just before".

CHAPTER 23

1. Page 987, Figure 23.5, 3rd line from the bottom: "coursr_id" → "course_id"

2. Page 992, Figure 23.10: Delete the ">" symbol at the end of "IID ID #REQUIRED >"

3. Page 995, Figure 23.12: <xs:complexType> and <xs:sequence> elements should be added to enclose the subelements of the course element, in the same way as the department and instructor elements.