

ERRATA
for
Database System Concepts, 4th Edition
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ERRATA FOR FIRST PRINTING:

Chapter 1

Page 12, line 12 from the bottom: 192-83-7465 → ‘192-83-7465’

Page 12, line 2 from the bottom: 192-83-7465 → ‘192-83-7465’

Page 16, line 5 from the bottom: responsabilites → responsibilities

Page 24, line 4 from the bottom: PostgresSQL → PostgreSQL, and www.postgresql.org → www.postgresql.org.

Chapter 2

Page 43, Figure 2.9 (b): Underline *loan-number*

Page 53, 4th line: “*person*” → “*savings-account*”

Page 54, last line: “many not have” → “may not have”

Page 63, first paragraph under 2.9.1 after the last sentence add:

“(We describe how to handle composite and multivalued attributes later, in Sections 2.9.4 and 2.9.5.)”

Page 66, at the end of section 2.9.3.2 add the following new paragraph:

“In the case of one-to-one relationships, the table for the relationship set can be combined with the tables for either of the entity sets. We can combine tables even if the participation is partial, by using null values; in the above example we would store null values for the *branch-name* attribute for accounts that have no associated branch.”

Page 67, line 4 under 2.9.6: “*savings-account* and *checking-account*” → “*employee* and *customer*. We assume that *name* is the primary key of *person*.”

Page 67, bullets under item number 1 should read:

- *person*, with attributes *name*, *street* and *city*
- *employee*, with attributes *name* and *salary*
- *customer*, with attributes *name* and *credit-rating*

Page 67, bullets under item number 2 and the following 2 lines should read:“

- *employee*, with attributes *name*, *street*, *city* and *salary*

¹Errors reported by: Raj Ashar, Janek Bogucki, Gavin M. Bierman, Christian Breimann, Tom Chappell, Y. C. Chin, Laurens Damen, Prasanna Dhandapani, Arvind Hulgeri, Graham J.L. Kemp, Hae Choon Lee, Sang-Won Lee, D. B. Phatak, Juan Altmayer Pizzorno, Greg Riccardi, N. L. Sarda, Max Smolens, Nikhil Sethi, Tim Wahls, and the authors.

We are particularly grateful to Juan Altmayer Pizzorno for his careful reading of many chapters, and detecting a significant fraction of the errors listed here.

- *customer*, with attributes *name*, *street*, *city* and *credit-rating*

The *employee* and *customer* relations corresponding to these tables both have *name* as the primary key.”

Page 67, section 2.9.6 last paragraph should read:

“If the second method were used for an overlapping generalization, some values would be stored multiple times, unnecessarily. For instance if a person is both an employee and a customer, values for *street* and *city* would be stored twice. If the generalization were not complete—that is, if some person is neither an employee nor a customer—then an extra table *person* would be required to represent such persons.”

Page 69: The UML 1.3 standard for class diagrams differs from that illustrated in Figure 2.28 in several ways.

1. Nonbinary (N-ary) relationships can be specified using diamonds, just as in E-R diagrams. Change the last para of Page 69 to read:
“Nonbinary relationships could not be directly represented in earlier versions of UML—they had to be converted to binary relationships by the technique we have seen earlier in Section 2.4.3. UML 1.3 supports nonbinary relationships, using the same diamond notation used in E-R diagrams.”
2. The lines representing generalization should end with hollow triangles (\triangle) as arrow heads, instead of solid arrow heads (\uparrow) as shown.
3. Overlapping and disjoint generalizations are indicated by explicitly specifying the keywords “overlapping” or “disjoint”, not by the shared-arrowhead notation shown in Figure 2.28 part 4.

More details can be found in Section 3 of OMG’s UML 1.3 specification, available on the Web at <http://www.rational.com/media/uml/post.pdf>.

Page 70, 4th bullet item: Replace “The collection of all entities of the same type is an **entity set**, and the collection of all relationships of the same type is a **relationship set**.” by

“A **relationship set** is a collection of relationships of the same type, and an **entity set** is a collection of entities of the same type.”

Chapter 3

Page 120, last line before Section 3.6.2: Replace “*depositor* relation” by “*customer* relation”

Page 124, second bullet item, line 3: $n \rightarrow s, t$ in two places.

Chapter 4

Page 135, para 1: “query language, SQL.” → “query language.”

Page 155, last line: *result* → *branch-avg*

Page 156, line 2: *result* → *branch-avg*

Page 157, line 9: “less than” → “greater than”

Page 161, 2nd SQL statement: add parantheses around the nested subquery, that is, replace “**select avg (balance) from account**” by “(**select avg (balance) from account**)”

Page 162, last para, bullet item: at the end of the sentence replace “database.” by “database – and without using aggregation.”

Page 177, Figure 4.9: Replace “int ODBCexample()” by “void ODBCexample()”

Replace “SQLFetch(stmt) >= SQL_SUCCESS” by SQLFetch(stmt) == SQL_SUCCESS

Page 177, Figure 4.9: Move `SQLAllocStmt(..)` to just after the following line. Move `SQLFreeStmt(..)` to just before the preceding line.

Page 181, para 3, line 6: “for for” → “for”

Page 184, Figure 4.12: Drop “#” from “*driver-id#*” in two places, and remove the underline from the *date* attribute of *accident*.

Chapter 5

Page 192, 2nd QBE query: Delete the quotes in “Smith” and “Jones”.

Page 207, 7th line from bottom: Replace $v_{1,2}$ by $v_{i,2}$.

Page 208 last para: Change “Consider the program in Figure 5.6.” →

“Consider the program in Figure 5.6 with the additional rule: *perryridge-account*(X, Y) :- *account*($X, \text{“Perryridge”}, Y$).”

Page 213, para 2: “*Infer*(\mathcal{R}, I) = I ” → “*Infer*(\mathcal{R}, I) $\cup D$ = I , where D is the set of facts in the database,”

Page 215, Sectin 5.2.8: “**select** *emp, empl.mgr*” → “**select** *manager.emp, empl.mgr*”

232, para 3, line 5: “name that is present in the person table.” → “name that is present in the marriedperson table.”

234, para 2: In “... if the level is at or below the minimum ...”, delete “at or”.

Page 237, Figure 6.4: In “**when** *nrow.level* <= (**select** *level*”, change <= to < and in “**and** *orow.level* > (**select** *level*” change > to >=.

Page 237, Para 2: In “... falls from above the minimum level ...” → change “from above” → “at or above”.

Page 238, Figure 6.5

Chapter 6

Page 243, Figure 6.7: In part (b) of this figure, the arrow from DBA to U_2 should be replaced by an arrow from DBA to U_3 .

Page 247: Just before Section 6.6.4, add the following paragraph: “Cascading of revokes is inappropriate in many situations. Suppose Mary has the role of *manager*, grants *teller* to John, and later the role *manager* is revoked from Mary (perhaps because Mary leaves the company); John continues to be employed, and should retain the *teller* role. To deal with the above situation, SQL:1999 permits Mary to execute **set role** *manager* during an SQL session; any privileges granted subsequently in the session, such as granting of role *teller* to John, are taken to be granted by the role *manager*, rather than directly by Mary (only privileges of *manager* are available, however). Revoking of roles/privileges from Mary will not result in revoking of privileges granted by the role *manager*; thus, John would retain the *teller* role.”

Chapter 7

Page 262, Figure 7.2: In the last-but-one line of the figure, which reads a_2, b_2, c_2, d_3 , change b_2 to b_3 .

Page 271, Section 7.4, para 2: “... new relations *branch-customer*(*Branch-customer*) ...” → “... new relations *branch-customer*(*Branch-customer-schema*) ...”

Page 275, one line from bottom: Section 7.2 → Section 7.4.

Page 288, six lines from bottom: “keep up up to date” → “keep it up to date”.

Chapter 8

Page 317, para 2, line 3: *reference* → **reference**

Page 320, last bullet item: Replace the second of the first para and the first sentence of the second para in this bullet item by

“All other objects are persistent if (and only if) they are reachable from the root object through a sequence of one or more references.

Thus, all objects referenced by (that is, whose object identifiers are stored in) the root persistent objects are persistent.”

Page 324, 5 lines from bottom: “Owner classes” → “Customer classes”

Chapter 9

Page 349, second query: “A.name” → “A”

Chapter 10

Page 367, Figure 10.6: “account–customer–depositor” → “account | customer | depositor”

Page 373, para 2: Change “/bank-2/customer/name” → “/bank-2/customer/customer-name”

Change “<name>” . . . “</name>” → “<customer-name>” . . . “</customer-name>” in three lines.

Change “/bank-2/customer/name/text()” → “/bank-2/customer/customer-name/text()”

Page 374, 4th bullet: Change “/bank-2//name finds any name element *anywhere* under the /bank-2 element, regardless of the element in which it is contained.”

to

“/bank-2//customer-name finds all customer-name elements *anywhere* under the /bank-2 element, regardless of the elements in which they are contained, and regardless of how many levels of enclosing elements are present between the bank-2 and customer-name elements.”

Page 375, 376 and 377: Replace “match=.”” by “match=“*”” in the last line of all XSLT examples (2 occurrences on page 375, 1 on page 376 and 2 on page 377)

Page 375, 6 lines from bottom: “This is required because the default behavior of XSLT on subtrees of the input document that do not match any template is to copy the subtrees to the output document.” →

“This is required because the default behavior of XSLT on elements of the input document that do not match any template is to copy their text contents to the output document, and apply templates recursively to their subelements.”

Page 375, last paragraph: Change “XSLT copies any tag that is not in the xsl namespace unchanged to the output.” → “Any text or tag in the XSLT stylesheet that is not in the xsl namespace is copied unchanged to the output.”

Page 376, before first line: Add the sentence: “Creating an attribute, such as Customer-id in the generated Customer element, is trickier and requires the use of xsl:attribute; see an XSLT manual for further details.”

Page 379, XQuery example at top of the page: Change first loop variable from \$b to \$a.

Page 379, last sentence: Change “name” → “customer-name”

Page 380, top of page: Change “**sortby(name)**” → “**sortby(customer-name)**”

Change “**sortby(name descending)**” → “**sortby(customer-name descending)**”

Page 389, Exercise 10.7: “customer” → “depositor”

Chapter 11

Page 396, 2 lines at the bottom of the page: Delete the sentence “There may be hundreds of concentric tracks on a disk surface, containing thousands of sectors.”

Page 399, para 2, line 4: Replace the sentence “The disks are usually .. reliable disk.” by “The disks are usually organized locally using a storage organization technique called “redundant arrays of independent disks (RAID)” (described later, in Section 11.3), to give the servers a logical view of a very large and very reliable disk.”

Page 433, end of page: Add the sentence “After updating all persistent pointers, every entry (p_i, P_i) in the translation table is replaced by (v_i, P_i) where v_i is the virtual-memory page allocated to P_i .”

Chapter 12

Page 453, Figure 12.5: Exchange the first two records, that is, swap (A-101, Downtown, 500) with (A-217, Brighton, 750).

Page 485, Para 2, last two lines: “L1 (10100) gives the bitmap 00100.” → “L2 (01000) gives the bitmap 01000.”

Chapter 13

Page 502, Figure 13.3: In the second row of the initial relation, replace “a 24” by “a 19”.

Page 511, last para: Change: “3000 blocks” → “3K (3072) blocks”, “9 million blocks” → “up to 3K*3K blocks” and “ $\sqrt{250000}$, or about” → “just over $\sqrt{256K}$ blocks, or”

Chapter 14

Page 546, Figure 14.5: Change

“**else for each** non-empty subset $S1$ of S such that $S1 \neq S$ ”

to

if (S contains only 1 relation)

set $bestplan[S].plan$ and $bestplan[S].cost$ based on best way of accessing S

else for each non-empty subset $S1$ of S such that $S1 \neq S$

Page 546, Para 3: Before the sentence starting with “Otherwise” insert the lines: “If S contains only 1 relation, the best way of accessing S (taking selections on S , if any, into account) is found and recorded in $bestplan$.”

Chapter 15

Page 571, Para 4, line 3: Replace flush by fsync

Chapter 16

Page 605, middle of page: “Transaction T_{15} transfers \$50 from account A to account B ,”

→

“Transaction T_{15} transfers \$50 from account B to account A ,”

Page 614, Section 16.5.2: In the 3rd paragraph of the section, in the sentence: “Thus, when a read-only transaction T_i issues ... timestamp is the largest timestamp less than $TS(T_i)$.”, change “less than $TS(T_i)$ ” to “less than or equal to TST_i ”.

In the last paragraph of the page, in the sentence “Suppose there are two versions, Q_k and Q_j , of a data item, and that both versions have a timestamp less than the timestamp of the oldest read-only transaction in the system.”, change “less than” to “less than or equal to”.

Page 626, bullet item 1, sub-bullet 1: Change “obtains only shared locks” → “obtains (and releases) only shared locks”

Page 626, bullet item 1, sub-bullet 4, para 2: “protocol” → “protocol”

Page 627, Split algorithm: Change “releases the exclusive lock on the original node” → “releases the exclusive lock on the original node (provided it is an internal node; leaf nodes are locked in two-phase manner)”

At the end of the paragraph, add the sentence “(There is no need to lock or unlock the new node.)”

Page 627, Figure 16.21: Replace the tree in this figure by the tree in Figure 12.8 (Page 455).

Chapter 19

Page 724, 1st bullet item: “ $2(n/2 + 1)$ ” → “at least $2(n/2 + 1)$ ”

Page 724, Section 19.5.1.4 (Majority Protocol): Add the following lines at the beginning of the second paragraph (which starts as “This scheme deals with ..”)

“We assume for now that writes are performed on all replicas, requiring all sites containing replicas to be available. However, the major benefit of the majority protocol is that it can be extended to deal with site failures, as we will see in Section 19.6.1.

Page 725, Section 19.5.1.6 (Quorum Consensus): In the second para, starting “To execute a read operation ...”, replace “must be read” by “must be locked” and “must be written” also by “must be locked”

Replace the third para (starting with “The benefit of the quorum...”) by

“A benefit of the quorum consensus approach is that it can permit the cost of either read or write locking to be selectively reduced by appropriately defining the read and write quorums. For instance, with a small read quorum, reads need to obtain fewer locks, but the write quorum will be higher, hence writes need to obtain more locks. Also, if higher weights are given to some sites (for example, those less likely to fail), fewer sites need to be accessed for acquiring locks.

Like the majority protocol, quorum consensus can be extended to work even in the presence of site failures, as we will see in Section 19.6.1.

Page 734, end of Section 19.6.5: Add the sentence: “If the network partitions, the bully algorithm elects a separate coordinator in each partition; to ensure that at most one coordinator is elected, winning sites should additionally verify that a majority of the sites are in their partition.”

Page 736, in para 2 and in the last para: Change “Chapter 13” → “Chapter 14”.

Page 737, first line: Change “Chapter 13” → “Chapter 14”.

Page 737, last para of Section 19.7.2: Change: “If we ship all three relations to S_I , and indices exist on these relations, we may need to re-create these indices at S_I .”

to

“Suppose indices present at S_2 and S_3 are useful for computing the join. If we ship all three relations to S_I , we would need to either re-create these indices at S_I , or use a different, possibly more expensive, join strategy.”

and

“(customer \bowtie account) must be shipped from S_2 to S_3 . This relation repeats the address data for a customer once for each account that the customer has.”

to

“(account \bowtie depositor) must be shipped from S_2 to S_3 . This relation repeats the name of a customer once for each account that the customer has.”

Page 745, Figure 19.6: Add a parenthesis “)” at the end of the line entry = ldap.next_entry(ld, entry)

Chapter 20

Page 767, Section 20.5.2.3, Bullet item 3, line 2: Replace “ m ” by “ n ”.

Chapter 22

Page 824, Figure 22.5, second row, second column: “skirt” → “pants”, and “dress” → “shirt”

Page 826, second SQL query: “**from sales, category**” → “**from sales, itemcategory**”

Page 861: Change “Agrawal and Srikant [1994] was an early paper on association rule mining” → “Agrawal et al. [1993a] introduced the notion of association rules, while Agrawal and Srikant [1994] presents an efficient algorithm for association rule mining”

Also add the following reference to page 1007 of the bibliography:

[Agrawal et al. (1993a)] R. Agrawal, T. Imielinski, and A. Swami, “Mining Association Rules between Sets of Items in Large Databases”, In *Proc. of the ACM SIGMOD Conf. on Management of Data* (1993).

Chapter 24

Page 892, last para, lines 1 and 5: “Single-server” → “single server” (do not change other occurrences of “single-server”).

Chapter 26

Page 962: “withhold” → “with hold”