

Real World Algorithms: A Beginners Guide

Errata to the First Printing

Last updated 8 February 2018

This document lists the changes that should be made to *Real World Algorithms* to correct mistakes that made their way to printing, to improve infelicities that the author spotted too late, or update the material with something that the author did not know at the time of writing the book.

There are three different kinds of changes noted here. In all of them the date that they became known to the author is given at the first line of each item. The name of the person who suggested the change is also given at the end of each change.

► **Page 1, line 1** _____ 1 Jan 1

These are technical or typographical errors.

Page 1, line 1 _____ 1 Jan 1

These are changes that improve the book, even if they do not correct an error. They include small rewordings, or material that became known to the author after the book was published.

Page 1, line 1 _____ 1 Jan 1

These are minor fixes that although they do not make a big difference they do hurt the author. Some of them might strain the reader's eye to see where the improvement is exactly.

- **Page xii, line 2** _____ 24 Apr 2017
they can proved $\wedge \rightarrow$ they can be proved (S. Subramanya)
- Page 5, line –17* _____ 08 Feb 2018
and its last element is the $(n - 1)$ th $\wedge \rightarrow$ and so its last element is the $(n - 1)$ th
- Page 5, line –10* _____ 08 Feb 2018
Move “y;” to previous line.
- Page 8, line –8 and –2* _____ 12 Aug 2017
big-Oh $\wedge \rightarrow$ big O
- Page 9, line 4* _____ 12 Aug 2017
big-Ohs $\wedge \rightarrow$ big Os
- Page 9, line –11* _____ 12 Aug 2017
In terms of big-Oh notation, we have by definition that $\wedge \rightarrow$ In terms of big O notation, we have, by definition, that
- Page 10, line –15* _____ 08 Feb 2018
Move “of” to the next line.
- **Page 11, line –2** _____ 01 Apr 2017
 $f(n) = e^x \wedge \rightarrow f(n) = e^n$ (P. Tsanakas)
- Page 13, line –11* _____ 12 Aug 2017
big-Oh $\wedge \rightarrow$ big O
- **Page 13, line –8** _____ 12 Aug 2017
This is called “big-Omega,” or $\Omega(n)$, and the precise definition $\wedge \rightarrow$ This is called “big Omega,” $\Omega(f(n))$; the precise definition
- Page 13, line –6* _____ 12 Aug 2017
Having defined big-Oh and big-Omega $\wedge \rightarrow$ Having defined big O and big Omega
- Page 13, line –5* _____ 12 Aug 2017
big-Theta $\wedge \rightarrow$ big Theta
- **Page 20, line –4** _____ 30 Mar 2017
line 3 $\wedge \rightarrow$ line 4
- **Page 20, line –3** _____ 30 Mar 2017
line 11 $\wedge \rightarrow$ line 12
- **Page 20, line –1** _____ 30 Mar 2017
line 6 $\wedge \rightarrow$ line 7
- Page 40, line 17* _____ 12 Aug 2017
Using big-Oh notation $\wedge \rightarrow$ Using the big O notation

- **Page 41**, lines -4 to -3 _____ 30 Jan 2018
Room 6 still has one unvisited room $\wedge \rightarrow$ Room 5 still has one unvisited room
(Yi-Ming Lai)
- **Page 57**, line 4 _____ 24 Apr 2017
When you insert an item in the queue, you increase the index of the head;
similarly, when you remove an item from the queue, you increase the index
of the tail. $\wedge \rightarrow$ When you insert an item in the queue, you increase the index
of the tail; similarly, when you remove an item from the queue, you increase
the index of the head. (S. Subramanya)
- **Page 65**, line 2 _____ 06 Mar 2017
011110 $\wedge \rightarrow$ 011011
- **Page 71**, algorithm 3.1, line 1 _____ 26 Mar 2017
Size $\wedge \rightarrow$ SizePQ
- **Page 73**, line -11 _____ 24 Apr 2017
root of the three $\wedge \rightarrow$ root of the tree (S. Subramanya)
- **Page 80**, line -6 _____ 25 May 2017
Joyces's $\wedge \rightarrow$ Joyce's
- **Page 80**, line -5 _____ 29 Jun 2017
41% $\wedge \rightarrow$ 53%
- **Page 84**, line 6 _____ 30 Jan 2018
by assigning it to *wc* in line 13 $\wedge \rightarrow$ by assigning to it *wc* in line 13 (Yi-Ming Lai)
Page 91, line -17 _____ 14 Dec 2017
"1110" $\wedge \rightarrow$ "1110"
- **Page 95**, figure 4.1, caption _____ 21 Apr 2017
An encryption $\wedge \rightarrow$ A decryption
- **Page 140**, line -2 to -1 _____ 17 Jul 2017
SHA-2 (Secure Hash Standard-2) $\wedge \rightarrow$ SHA-2 (Secure Hash Algorithm 2)
Page 144, line 2 _____ 21 Apr 2017
command packet $\wedge \rightarrow$ *command packet*
- **Page 145**, line -14 _____ 01 Jun 2017
 $OR_3 \wedge \rightarrow OR_2$

- **Page 145**, line -12 _____ 01 Jun 2017
Alice $\wedge \rightarrow OR_1$
- **Page 147**, line -13 _____ 17 Jul 2017
SHA-224. $\wedge \rightarrow$ SHA-224,
- **Page 157**, figure 6.6, caption _____ 21 Mar 2017
weighed $\wedge \rightarrow$ weighted
- **Page 162**, line -1 _____ 30 Jan 2018
prev, that is, *prev*[*i*] $\wedge \rightarrow$ *pred*, that is, *pred*[*i*] (Yi-Ming Lai)
Page 165, lines -2 to -1 _____ 01 Feb 2018
move line break before “then”
- **Page 166**, figure 6.13, second panel, label under *t* _____ 21 Apr 2017
 $13 \wedge \rightarrow 13/-\infty$
- **Page 166**, figure 6.13, fourth panel, label under *t* _____ 21 Apr 2017
 $13 \wedge \rightarrow 13/-\infty$
- **Page 166**, figure 6.13, fifth panel, label under *t* _____ 21 Apr 2017
-inf ty $\wedge \rightarrow -\infty$
- **Page 170**, figure 7.1, caption _____ 30 Jan 2018
Breaking lines into paragraphs $\wedge \rightarrow$ Breaking paragraphs into lines (Yi-Ming Lai)
Page 178, algorithm 7.1, line 12 _____ 23 Apr 2017
ExtractMinFromPQ(pq) $\wedge \rightarrow$ *ExtractMinFromPQ(pq)*
- **Page 179**, line 10 _____ 24 Apr 2017
line 11 $\wedge \rightarrow$ line 14 (S. Subramanya)
- **Page 179**, line 12 _____ 24 Jul 2017
line 11 $\wedge \rightarrow$ line 14
- **Page 180**, line 13 _____ 26 Mar 2017
lines 1-7 $\wedge \rightarrow$ lines 1-10
Page 181, line -4 _____ 23 Jul 2017
re-weighting $\wedge \rightarrow$ reweighting
- **Page 182**, figure 7.11 _____ 22 Jul 2017
link $0 \xrightarrow{0} 2 \wedge \rightarrow 0 \xrightarrow{8} 2$ and link $0 \xrightarrow{8} 3 \wedge \rightarrow 0 \xrightarrow{7} 3$

- Page 182, figure 7.11, caption _____ 23 Jul 2017
re-weighted $\wedge \rightarrow$ reweighted
- Page 184, line –12, exercise 1 _____ 19 Dec 2017
a better path goes through u , we can check whether $u \wedge \rightarrow$ a better path goes through v , we can check whether v
- Page 196, line 10 _____ 30 Jan 2018
We underline edges $\wedge \rightarrow$ We underline nodes (Yi-Ming Lai)
Page 206, line 1 _____ 23 Apr 2017
Euros $\wedge \rightarrow$ euros
- Page 214, line 8 _____ 04 Apr 2017
 $P_{B_j} \wedge \rightarrow B_{P_j}$
- Page 217, line –3 _____ 04 Apr 2017
page 3 $\wedge \rightarrow$ page 6
- Page 217, line –2 _____ 04 Apr 2017
page 4 $\wedge \rightarrow$ page 5
- Page 219, line 10 _____ 30 Jan 2018
from node 4 to nodes 3 and 2 $\wedge \rightarrow$ from node 4 to nodes 2 and 1 (Yi-Ming Lai)
Page 222, figure 9.6 _____ 28 Apr 2017
arrow tips $\rightarrow \wedge \rightarrow \rightarrow$
- Page 229, line –16 _____ 04 May 2017
support $\wedge \rightarrow$ supported
- Page 230, line –3 _____ 23 Apr 2017
If there are n voters, then candidate A gets $(60 \times 2)n = 120n$ points $\wedge \rightarrow$ If there are 100m voters, candidate A gets $(60 \times 2)m = 120m$ points
- Page 230, line –2 _____ 23 Apr 2017
 $(60 + 2 \times 40)n = 140n \wedge \rightarrow (60 + 2 \times 40)m = 140m$
- Page 230, line –2 _____ 23 Apr 2017
 $40n \wedge \rightarrow 40m$
- Page 231, heading 10.2 _____ 23 Apr 2017
Shulze $\wedge \rightarrow$ Schulze

- Page 233, algorithm 10.1, line 4 _____ 23 Apr 2017
 $P[i][j] \wedge \rightarrow P[i, j]$
- Page 234, line -8 _____ 04 May 2017
 $P[i, j] \wedge \rightarrow P[c_i, c_j]$
- Page 234, line -7 _____ 04 May 2017
 $P[j, i] \wedge \rightarrow P[c_j, c_i]$
- Page 234, line -6 _____ 04 May 2017
 $P[i, j] - P[j, i] \wedge \rightarrow P[c_i, c_j] - P[c_j, c_i]$
- Page 236, line -4 _____ 28 Apr 2017
 $(k + 1) \wedge \rightarrow k + 1$
- Page 238, algorithm 10.2, line 6 _____ 23 Apr 2017
 $S[i][j] \wedge \rightarrow S[i, j]$
- Page 238, algorithm 10.2, line 9 _____ 23 Apr 2017
 $S[i][j] \wedge \rightarrow S[i, j]$
- Page 241, algorithm 10.3, second line of output _____ 23 Apr 2017
 $s[i, j_k] > s[j_k, i] \wedge \rightarrow S[i, j_k] > S[j_k, i]$
- Page 242, line 6 _____ 30 Jan 2018
 D would beat B, C , and D , while A would beat C, B would beat $D \wedge \rightarrow D$ would beat both B and C , while A would beat C, B would beat C (Yi-Ming Lai)
- Page 244, algorithm 10.4 _____ 23 Apr 2017
all $pred$ and $dist \wedge \rightarrow pred$ and $dist$
- Page 249, algorithm 11.1 _____ 24 Apr 2017
a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- Page 249, algorithm 11.1 _____ 24 Apr 2017
a element we are searching for $\wedge \rightarrow$ an element we are searching for (S. Subramanya)

Page 249, figure 11.1 _____ 28 Apr 2017

Change the array to:

114	480	149	903	777	65	680	437	4	181	613	551	10	31	782	507
-----	-----	-----	-----	-----	----	-----	-----	---	-----	-----	-----	----	----	-----	-----

We need not use sequential search in a sorted array.

- **Page 250, line -3** _____ 30 Jan 2018
 real and complex parts \nrightarrow real and imaginary parts (Yi-Ming Lai)
- **Page 254, line -5** _____ 24 Apr 2017
 figure 11.3 \nrightarrow figure 11.6
- **Page 259, line -8** _____ 30 Jan 2018
 whether the match is in the head of the list \nrightarrow whether the match is not in
 the head of the list (Yi-Ming Lai)
- **Page 260, algorithm 11.2** _____ 24 Apr 2017
 a element we are searching for \nrightarrow an element we are searching for (S. Subra-
 manya)
- **Page 260, algorithm 11.2, line 10** _____ 24 Apr 2017
 NULL; \nrightarrow NULL
- **Page 261, algorithm 11.3** _____ 28 Jul 2017
 TranspositionSearch(A, s) \nrightarrow TranspositionSearch(L, s)
Page 261, algorithm 11.3 _____ 24 Apr 2017
 a list of items, \nrightarrow a list of items
- **Page 261, algorithm 11.3** _____ 24 Apr 2017
 a element we are searching for \nrightarrow an element we are searching for (S. Subra-
 manya)
- **Page 261, algorithm 11.3, line 12** _____ 25 Apr 2017
 NULL; \nrightarrow NULL
- **Page 262, algorithm 11.4** _____ 24 Apr 2017
 a array of items \nrightarrow an array of items (S. Subramanya)
- **Page 262, algorithm 11.4** _____ 24 Apr 2017
 a element we are searching for \nrightarrow an element we are searching for (S. Subra-
 manya)
- **Page 262, line 1** _____ 30 Jan 2018
 the same search as in figure 11.11 \nrightarrow the same search as in figure 11.10 (Yi-
 Ming Lai)
- **Page 264, algorithrm 11.5** _____ 25 Apr 2017
 SecretarySearch(A, s) \nrightarrow SecretarySearch(A)

- Page 264, algorithm 11.5 _____ 24 Apr 2017
a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- Page 264, algorirthm 11.5, line 4 _____ 24 Apr 2017
 $\text{Compare}(A[i], A[b]) \wedge \rightarrow \text{Compare}(A[i], A[c])$ (S. Subramanya)
- Page 264, algorirthm 11.5, line 6 _____ 25 Apr 2017
 $i \leftarrow m + 1 \wedge \rightarrow i \leftarrow m$
- Page 267, line 18 _____ 6 May 2017
Unless you are not psychic $\wedge \rightarrow$ Unless you are psychic
- Page 268, algorithm 11.6 _____ 24 Apr 2017
a element we are searching for $\wedge \rightarrow$ an element we are searching for (S. Subramanya)
- Page 270, figure 11.14b, last row _____ 31 May 2017

$$\begin{array}{ccc} l = 7 & \wedge \rightarrow & l = 8 \\ m = 7 & & m = 8 \end{array}$$
(I. Kafetzaki)
- Page 275, line -2 _____ 02 May 2017
one's complement $\wedge \rightarrow$ ones' complement
- Page 278, algorithm 11.7 _____ 24 Apr 2017
a element we are searching for $\wedge \rightarrow$ an element we are searching for (S. Subramanya)
- Page 287, algorithm 12.1 _____ 24 Apr 2017
a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- Page 289, algorithm 12.2 _____ 24 Apr 2017
a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- Page 291, algorithm 12.3 _____ 24 Apr 2017
a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- Page 297, line -5 _____ 30 Jan 2018
we want to have $A[i] \geq A[i] \wedge \rightarrow$ we want to have $A[0] \geq A[i]$ (Yi-Ming Lai)
- Page 298, caption of figure 12.6b _____ 28 Apr 2017
 $1 \wedge \rightarrow$ one

- **Page 299, algorithm 12.4** _____ 24 Apr 2017
 a array of items $\wedge \rightarrow$ an array of items (S. Subramanya)
- **Page 310, figure 12.12, third panel** _____ 08 May 2017
 $i \rightarrow 5 \wedge \rightarrow i \rightarrow 37$
 Page 327, line –16, exercise 2 _____ 20 Dec 2017
 characters like “|”, “_”, and “+” $\wedge \rightarrow$ characters like “|”, “_”, and “+”
- **Page 327, line –15, exercise 3** _____ 20 Dec 2017
 The in-place array merge, algorithm 12.7 $\wedge \rightarrow$ The in-place array merge, algo-
 rithm 12.7,
 Page 333, line –11 _____ 09 May 2017
 minimal perfect mapping $\wedge \rightarrow$ *minimal perfect mapping*
 Page 340, line –3 _____ 09 May 2017
 456, 976 $\wedge \rightarrow$ 456, 976
 Page 343, figure 13.5 _____ 09 May 2017
 4, 847 $\wedge \rightarrow$ 4, 847
 Page 343, figure 13.5 _____ 09 May 2017
 126, 033 $\wedge \rightarrow$ 126, 033
 Page 343, figure 13.5 _____ 09 May 2017
 3, 276, 872 $\wedge \rightarrow$ 3, 276, 872
- **Page 343, line 8** _____ 30 Jan 2018
 in line 4 $\wedge \rightarrow$ in line 3 (Yi-Ming Lai)
 Page 346, line 3 _____ 09 May 2017
 binary fractional number $\wedge \rightarrow$ *binary fractional number*
- **Page 353, line –12** _____ 23 Jul 2017
 An successful search cannot take longer than a successful one $\wedge \rightarrow$ A success-
 ful search cannot take longer than an unsuccessful one
 Page 359, line –9 _____ 13 May 2017
 z-values $\wedge \rightarrow$ z-values
 Page 359, line –9 _____ 13 May 2017
 z-axis $\wedge \rightarrow$ z-axis
 Page 361, line 7 _____ 31 May 2017
 the number of frequency peaks in the song, and there is even a notation for it: $\wedge \rightarrow$ being the
 number of frequency peaks in the song, and there is even a notation for it:
 Page 361, line 16 _____ 31 May 2017
 move “of” to the next line

- **Page 362, line –1** _____ 31 May 2017
the data are not the $\wedge \rightarrow$ the data are not in the
Page 367, line 7 _____ 13 May 2017
 $(1 - 1/m)^{m(\frac{k}{m})} \wedge \rightarrow (1 - 1/m)^{m(\frac{k}{m})}$
- **Page 370, figure 13.20, third panel** _____ 13 May 2017
The solid arrows should emanate from “this”.
- **Page 371, line 2** _____ 30 Jan 2018
Our hash algorithms take a specific and produce a specific output. $\wedge \rightarrow$ Our
hash algorithms take a specific input and produce a specific output. (Yi-Ming
Lai)
Page 383, table 14.1, caption _____ 14 May 2017
letter $\wedge \rightarrow$ letters
Page 385, line 3 _____ 14 May 2017
Move “J.” to the next line.
- **Page 386, line 9, 12, 19** _____ 25 May 2017
Gibb’s $\wedge \rightarrow$ Gibbs’s
Page 387, line –14 _____ 16 May 2017
“ineligible” $\wedge \rightarrow$ “ineligible.”
- **Page 390, line 3** _____ 16 May 2017
six $\wedge \rightarrow$ five
- **Page 395, line –15** _____ 30 Jan 2018
we get the values shown in figure 14.7 $\wedge \rightarrow$ we get the values shown in fig-
ure 14.8 (Yi-Ming
Lai)
- **Page 396, figure 14.8, fourth panel** _____ 17 May 2017
 $H = 0.40 \wedge \rightarrow H = 0.940$
- **Page 397, line –9** _____ 16 May 2017
tox $\wedge \rightarrow$ to
- **Page 400, figure 14.10** _____ 08 Jun 2017
 $\{1, 2, \dots, 14\}$: outlook $\wedge \rightarrow$ $\{1, 2, \dots, 15\}$: outlook (V. Malandrakis)
- **Page 400, line 5** _____ 30 Jan 2018
happens in the normal branch $\wedge \rightarrow$ happens in the high branch (Yi-Ming Lai)

- **Page 402, algorithm 15.2, line 1** _____ 30 Jan 2018

$r \leftarrow \text{CreateMap}()$ $\wedge \rightarrow dt \leftarrow \text{CreateMap}()$ (Yi-Ming Lai)

Page 413, figure 14.12 _____ 22 Dec 2017

add label “high” on the first, left, edge emanating from the root node

Page 414, line 3 _____ 12 Aug 2017

because in terms of the big-Oh notation it is $\wedge \rightarrow$ because in terms of the big O notation they are

Page 417, line -3 _____ 26 Feb 2017

Witten, Frank, and Hall $\wedge \rightarrow$ Witten, Frank, Hall, and Pal

Page 426, figure 15.1 _____ 03 Feb 2018

Change the gray letters from 40% gray to gray.

Page 427, graphics _____ 03 Feb 2018

Change the gray letters from 40% gray to gray.

Page 428, second and fourth graphics _____ 03 Feb 2018

Change the gray letters from 40% gray to gray.

Page 430, line -17 _____ 23 May 2017

at the start of a string $\wedge \rightarrow$ at the start of the string

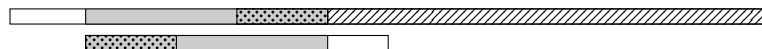
Page 430, line -16 _____ 23 May 2017

at the end of a string is its *suffix* $\wedge \rightarrow$ at the end of the string is a *suffix*

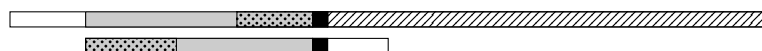
- **Page 430, line -4** _____ 14 Sep 2017

all A, AB, and ABA are $\wedge \rightarrow$ substrings A and ABA are (P. Mpellos)

- **Page 431, fourth graphic** _____ 23 May 2017



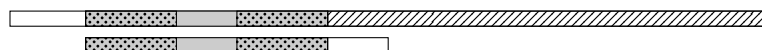
$\wedge \rightarrow$



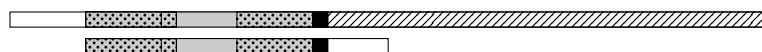
- **Page 431, line -10** _____ 23 May 2017

of the pattern $\wedge \rightarrow$ of the matched pattern

- **Page 431, fifth graphic** _____ 23 May 2017



$\wedge \rightarrow$



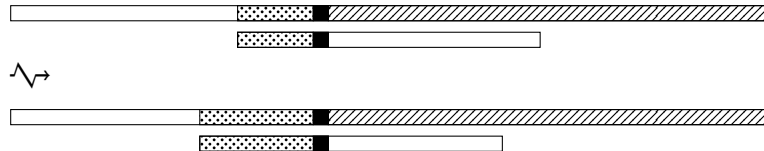
- Page 431, line -9 _____ 24 May 2017

So we get: $\wedge \rightarrow$ So we get, indicating the mismatched character:

Page 431, line -1 _____ 24 May 2017

longer shifts $\wedge \rightarrow$ longer shifts

- Page 432, second graphic _____ 23 May 2017



- Page 432, line 7 _____ 24 May 2017

AABAABAA $\wedge \rightarrow$ AABAABAAAA

- Page 432, third graphic _____ 24 May 2017

A A B A A B A A A A B A A B A A A A
A A B A A A $\wedge \rightarrow$ A A B A A A

Page 432, fifth graphic _____ 03 Feb 2018

Change the gray letters from 40% gray to gray.

- Page 432, line -4 _____ 24 May 2017

define its length to be zero $\wedge \rightarrow$ define its border length as zero

- Page 433, line 13 _____ 25 May 2017

borders array $\wedge \rightarrow$ border array

- Page 434, algorithm 15.2, line 9 _____ 02 Jun 2017

$p[i] \wedge \rightarrow p[j]$ (A. Tsalapatis)

Page 434, line 4 _____ 22 Dec 2017

to a queue $q \wedge \rightarrow$ to the queue q

- Page 435, figure 15.5 caption _____ 24 May 2017

Another trace the Knuth-Morris-Pratt algorithm; the borders array is at the bottom. $\wedge \rightarrow$ Another trace of the Knuth-Morris-Pratt algorithm; the border array is at the bottom.

- Page 437, line 3 _____ 25 May 2017

borders array $\wedge \rightarrow$ border array

Page 439, figure 15.8 _____ 03 Feb 2018

Change the gray letters from 40% gray to gray.

- **Page 440**, line 12 _____ 30 May 2017
 mattern \leadsto pattern
 Page 441, figure 15.9b _____ 02 Feb 2018
 S E P T E M B E R
 E M B E R
 $r = 1$
 \leadsto
 S E P T E M B E R
 E M B E R
 $r = 1$

► **Page 443**, algorithm 15.4 _____ 23 Dec 2017
 CreateRtOccurrencesTable(p, t, s) \leadsto CreateRtOccurrencesTable(p, s)

► **Page 448**, line 7 _____ 23 Dec 2017
 Try using a different data structure, like a hash table or a set, instead. \leadsto Try then using a different data structure, like a hash table, instead.
 Page 449, line 16 _____ 23 May 2017
 50-50 \leadsto 50-50

► **Page 462**, line 10 _____ 20 May 2017
 line 6 \leadsto line 7

► **Page 463**, line 4 _____ 20 May 2017
 change \leadsto maybe fix

► **Page 466**, lines 18, 21, 23 _____ 20 May 2017
 ECC \leadsto EEC

► **Page 466**, line -17 _____ 30 Jan 2018
 Counting of Ministers \leadsto Council of Ministers (Yi-Ming Lai)

► **Page 467**, lines 12, 19, 23 _____ 20 May 2017
 ECC \leadsto EEC

► **Page 467**, paragraph -2 _____ 22 May 2017
 Rewrite the paragraph as follows:
 To tackle this kind of question, we must adopt a systematic approach. We have a set of voters, $V = \{v_1, v_2, \dots, v_n\}$, and a set of weights, $W = \{w_1, w_2, \dots, w_m\}$. A voter v_i has a weight w_j given by a mapping $f: V \rightarrow W$. For a decision to be taken, it needs to meet a *quota* Q . In the example of the EEC, we have $Q = 12$. The setup of V , W , f , and Q is called a *voting game*.

- Page 468, line 3 _____ 21 May 2017
such as $\wedge \rightarrow$ such that
- Page 468, line 4 _____ 21 May 2017
in obtaining losing coalition $\wedge \rightarrow$ in obtaining a losing coalition
- Page 468, line 14 _____ 21 May 2017
ECC $\wedge \rightarrow$ EEC
- Page 468, line -7 _____ 21 May 2017
then then $\wedge \rightarrow$ then the
- Page 468, lines -3 to -1 _____ 30 May 2017
As an example, take four voters $V = \{A, B, C, D\}$ with corresponding weights
 $W = \{4, 2, 1, 3\}$ and quota $Q = 6$. The critical coalitions are (we underline the
critical voters) $\{\underline{A}, \underline{B}\}$, $\{\underline{A}, \underline{D}\}$, $\{\underline{A}, \underline{B}, C\}$, $\{\underline{A}, B, D\}$, $\{\underline{A}, C, \underline{D}\}$, $\{\underline{B}, \underline{C}, \underline{D}\}$.
 $\wedge \rightarrow$
As an example, let us take four voters A, B, C, D with corresponding weights
equal to 4, 2, 1, 3, and quota $Q = 6$. The critical coalitions then are, underlining
the critical voters: $\{\underline{A}, \underline{B}\}$, $\{\underline{A}, \underline{D}\}$, $\{\underline{A}, \underline{B}, C\}$, $\{\underline{A}, B, D\}$, $\{\underline{A}, C, \underline{D}\}$, and $\{\underline{B}, \underline{C}, \underline{D}\}$.
- Page 469, lines 6-7 _____ 30 Jan 2018
Voter D has a greater voting weight than voter D $\wedge \rightarrow$ Voter D has a greater
voting weight than voter B (Yi-Ming Lai)
- Page 472, line -1 _____ 05 Sep 2017
zero $\wedge \rightarrow$ one (N. Batsal)
- Page 473, line 1 _____ 05 Sep 2017
one $\wedge \rightarrow$ zero (N. Batsal)

Page 476, table 16.3 _____ 05 Feb 2017

Table 16.3 was built with data from 2008. To update it for 2016, it should be as follows:

Table 16.3

2016 U.S. electoral college number of electors and Banzhaf measure.

CA	55	0.471	MN	10	0.076	NM	5	0.038
TX	38	0.298	MO	10	0.075	WV	5	0.038
FL	29	0.223	WI	10	0.076	HI	4	0.03
NY	29	0.224	AL	9	0.068	ID	4	0.03
IL	20	0.153	CO	9	0.068	ME	4	0.03
PA	20	0.153	SC	9	0.068	NH	4	0.03
OH	18	0.136	KY	8	0.06	RI	4	0.03
GA	16	0.121	LA	8	0.061	AK	3	0.023
MI	16	0.121	CT	7	0.053	DC	3	0.023
NC	15	0.114	OK	7	0.052	DE	3	0.023
NJ	14	0.106	OR	7	0.053	MT	3	0.023
VA	13	0.098	AR	6	0.045	ND	3	0.023
WA	12	0.091	IA	6	0.045	SD	3	0.023
AZ	11	0.083	KS	6	0.045	VT	3	0.023
IN	11	0.083	MS	6	0.045	WY	3	0.023
MA	11	0.083	NV	6	0.045			
TN	11	0.083	UT	6	0.046			
MD	10	0.076	NE	5	0.038			

Page 476, lines −6 to −5 _____ 05 Feb 2017

In 2015 $\wedge \rightarrow$ In 2016

Page 476, lines −3 to −2 _____ 05 Feb 2017

California's Banzhaf measure is about 20.65 times that of Vermont. $\wedge \rightarrow$ California's Banzhaf measure is about 20.48 times that of Vermont.

► Page 479, line −4 _____ 21 May 2017

primes $\wedge \rightarrow$ composites

► Page 479, lines −4 to −3 _____ 21 May 2017

$n(1/2 + 1/3 + 1/5 \cdots + 1/k) \wedge \rightarrow n(1/2 + 1/3 + 1/5 + \cdots + 1/k)$

► Page 479, line −3 _____ 21 May 2017

$(1/2 + 1/3 + 1/5 \cdots + 1/k) \wedge \rightarrow (1/2 + 1/3 + 1/5 + \cdots + 1/k)$

Page 485, algorithm 16.11 _____ 23 May 2017

Output: (r, q) , such that $n = 2^r q \wedge \rightarrow$ **Output:** (r, q) , such that $n = 2^r q$ with q odd

Page 498, reference 219 _____ 26 Mar 2017

Ian H. Witten, Eibe Frank, and Mark A. Hall. *Data Mining: Practical Machine Learning Tools and Techniques*. Morgan Kaufmann Publishers Inc., San Francisco, CA, 3rd edition, 2011.

$\wedge \rightarrow$

Ian H. Witten, Eibe Frank, Mark A. Hall, and Christopher J. Pal. *Data Mining: Practical Machine Learning Tools and Techniques*. Elsevier, Cambridge, MA, 4th edition, 2016.

► **Page 502**, first column _____ 12 2017

big-Oh ($O(f(n))$) $\wedge \rightarrow$ big O ($O(f(n))$)

big-Omega ($\Omega(f(n))$) $\wedge \rightarrow$ big Omega ($\Omega(f(n))$)

add big Theta ($\Theta(f(n))$), 13

Page 502, first column _____ 09 May 2017

added binary fractional number

► **Page 503**, second column _____ 20 May 2017

European Economic Community (ECC) $\wedge \rightarrow$ European Economic Community (EEC)

Page 504, first column _____ 23 Jul 2017

graph re-weighting $\wedge \rightarrow$ graph reweighting

Page 504, first column _____ 03 Feb 2018

remove length (move to path, length)

► **Page 505**, first column _____ 30 Jan 2018

Lember-Ziv-Welch $\wedge \rightarrow$ Lempel-Ziv-Welch (Yi-Ming Lai)

Page 505, second column _____ 09 May 2017

added mapping, minimal perfect

Page 506, first column _____ 03 Feb 2018

add path, length