Real World Algorithms: A Beginners Guide
Errata to the Third Printing

Last updated 25 May 2020

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 as 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 8,** lines 8–17 ________ 17 Feb 2020

Therefore, in the worst case, which is if the quotes are in ascending order, line 7 will execute the following number of times:

$$1 + 2 + \cdots + n = \frac{n(n+1)}{2}$$

If the equation is not clear, then you can easily see that this is indeed so if you add the numbers $1, 2, \ldots, n$ twice:

$$\begin{array}{rcccccc} & 1 & + & 2 & + \cdots + & n & \\ + & n & + & n-1 & + \cdots + & 1 & \\ \hline & n+1 & + & n+1 & + \cdots + & n+1 & = n(n+1) \end{array}$$

Because line 6 is the step of the algorithm that will execute most times, $n(n+1)/2$ is the worst case running time of the algorithm.

$\rightsquigarrow$

Therefore, in the worst case, which is if the quotes are in ascending order, lines 6–7 will execute the following number of times (recall that we start from day zero):

$$0 + 1 + 2 + \cdots + (n-1) = \frac{n(n-1)}{2}$$

If the equation is not clear, then you can easily see that this is indeed so if you start with the sum of $1, 2, \ldots, n$ twice:

$$\left.\begin{array}{rcccccc} & 1 & + & 2 & + \cdots + & n \\ + & n & + & n-1 & + \cdots + & 1 \\ \hline & n+1 & + & n+1 & + \cdots + & n+1 \end{array}\right\} \rightarrow 1 + 2 + \cdots + n = \frac{n(n+1)}{2}$$

$$1 + 2 + \cdots + (n-1) = \frac{n(n+1)}{2} - n = \frac{n(n-1)}{2}$$

Because lines 6–7 are the steps of the algorithm that will execute most times, $n(n-1)/2$ is the worst case running time of the algorithm.

▶ **Page 15,** line 3 ________ 17 Feb 2020

a complexity of $O(n(n+1/2))$ $\rightsquigarrow$ a complexity of $O(n(n-1)/2)$

▶ **Page 70,** figure 3.5 ________ 14 Apr 2020

Swap places of F and C in the figure to make the result identical to figure 3.6 (L. Christoforatos)

Page 79, line 9 ________ 07 May 2019

overall logic $\rightsquigarrow$ general logic

► **Page 122**, table 4.10, table rows 5, 6 ———— 11 Jun 2019

292 $\leadsto$ 229 (S. Kypritidis)

► **Page 122**, table 4.10, table row 8 ———— 11 Jun 2019

232 $\leadsto$ 212 (S. Kypritidis)

► **Page 195**, algorithm 8.1, line 9 ———— 06 Apr 2020

for $i \leftarrow 0$ **to** $|V|$ $\leadsto$ **for** $i \leftarrow 0$ **to** $|V| - 1$ (E. Papoutsi)

Page 238, algorithm 10.2, input line 2 ———— 12 Apr 2020

between nodes i and j $\leadsto$ between node i and j

Page 238, algorithm 10.2, output line 2 ———— 12 Apr 2020

between nodes i and j $\leadsto$ between node i and j

Page 241, algorithm 10.3, input line 3 ———— 12 Apr 2020

between nodes i and j $\leadsto$ between node i and j

Page 244, algorithm 10.4, input line 2 ———— 12 Apr 2020

between nodes i and j $\leadsto$ between node i and j

Page 244, algorithm 10.4, output line 2 ———— 12 Apr 2020

between nodes i and j $\leadsto$ between node i and j

► **Page 274**, figure 11.18, caption ———— 19 Jun 2019

Two complement's $\leadsto$ Two's complement

► **Page 274**, figure 11.19, caption ———— 19 Jun 2019

two complement's $\leadsto$ two's complement

► **Page 274**, line 2 ———— 19 Jun 2019

two complement's $\leadsto$ two's complement

► **Page 275**, figure 11.20, caption ———— 19 Jun 2019

two complement's $\leadsto$ two's complement

► **Page 278**, line 6 ———— 03 May 2020

$A[7]$. $\leadsto$ $A[7]$.

► **Page 320**, line −3 ———— 08 Jun 2019

$A[b] < 84$ $\leadsto$ $A[i] < 84$

► **Page 322**, line −8 ———— 17 Feb 2020

$n + (n-1) + \cdots + 1 = n(n-1)/2$ $\leadsto$ $(n-1) + \cdots + 2 + 1 = n(n-1)/2$

► **Page 339**, line 1 ——— 03 May 2020

$$\frac{D_n D_{n-1} \ldots D_1 D_0}{10^x} = 10^x \times D_n D_{n-1} \ldots D_x + x_{x-1} D_{x-2} \ldots D_1 D_0$$

$\leadsto$

$$D_n D_{n-1} \ldots D_1 D_0 = 10^x \times D_n D_{n-1} \ldots D_x + D_{x-1} D_{x-2} \ldots D_1 D_0$$

► **Page 342**, line 4 ——— 17 Feb 2020

$n + (n-1) + \cdots + 1 = n(n-1)/2 \leadsto n + (n-1) + \cdots + 1 = n(n+1)/2$

Page 346, line -6 ——— 07 May 2019

64-bit numbers are similar $\leadsto$ 64-bit numbers work alike

► **Page 381**, line -11 ——— 06 May 2019

$h(m') = -\lg(2/10) = 2.32 \leadsto h(m') = -\lg(2/10) \approx 2.32$

► **Page 425**, algorithm 15.1, line 4 ——— 25 May 2020

$n - m \leadsto n - m + 1$

► **Page 426**, line -7 ——— 25 May 2020

$n - m \leadsto n - m + 1$

► **Page 427**, line 2 ——— 25 May 2020

$n - m \leadsto n - m + 1$

► **Page 427**, line 3 ——— 25 May 2020

$m(n - m) \leadsto m(n - m + 1)$

► **Page 427**, line 4 ——— 25 May 2020

$O(m(n - m)) \leadsto (m(n - m + 1))$

► **Page 427**, line 5 ——— 25 May 2020

$n - m \approx n \leadsto n - m + 1 \approx n$

► **Page 456**, algorithm 16.3, line 5 ——— 18 May 2020

$s_1 \leftarrow s1 \oplus (s_1 \gg 11) \leadsto s_1 \leftarrow s_1 \oplus (s_1 \gg 11)$

► **Page 456**, algorithm 16.3, line 7 ——— 18 May 2020

$S[p] \leftarrow s_0 \oplus s1 \leadsto S[p] \leftarrow s_0 \oplus s_1$

► **Page 478**, line 8 ——— 19 May 2019

we have equality when $c = n \leadsto$ we have equality when $c = n$ and n is a perfect square

► **Page 508**, second column ———————————————— 19 Jun 2019

two complement's representation $\rightsquigarrow$ two's complement representation