

Real World Algorithms: A Beginners Guide

Errata to the Third Printing

Last updated 03 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 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 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 $1, 2, \dots, n$ twice:

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

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.

↙↘

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 $1, 2, \dots, n$ twice:

$$\left. \begin{array}{ccccccc} 1 & + & 2 & + & \cdots & + & n \\ + & n & + & n-1 & + & \cdots & + & 1 \\ \hline n+1 & + & n+1 & + & \cdots & + & n+1 \end{array} \right\} \begin{array}{l} \nearrow 1 + 2 + \cdots + n = \frac{n(n+1)}{2} \\ \searrow 1 + 2 + \cdots + (n-1) = \frac{n(n+1)}{2} - n = \frac{n(n-1)}{2} \end{array}$$

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 $O(n(n+1/2))$ ↙↘ 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 ↙↘ general logic

- Page 122, table 4.10, table rows 5, 6 _____ 11 Jun 2019
 $292 \wedge 229$ (S. Kyritidis)
- Page 122, table 4.10, table row 8 _____ 11 Jun 2019
 $232 \wedge 212$ (S. Kyritidis)
- Page 195, algorithm 8.1, line 9 _____ 06 Apr 2020
for $i \leftarrow 0$ **to** $|V| \wedge$ **for** $i \leftarrow 0$ **to** $|V| - 1$ (E. Papoutsis)
Page 238, algorithm 10.2, input line 2 _____ 12 Apr 2020
between nodes i and $j \wedge$ between node i and j
Page 238, algorithm 10.2, output line 2 _____ 12 Apr 2020
between nodes i and $j \wedge$ between node i and j
Page 241, algorithm 10.3, input line 3 _____ 12 Apr 2020
between nodes i and $j \wedge$ between node i and j
Page 244, algorithm 10.4, input line 2 _____ 12 Apr 2020
between nodes i and $j \wedge$ between node i and j
Page 244, algorithm 10.4, output line 2 _____ 12 Apr 2020
between nodes i and $j \wedge$ between node i and j
- Page 274, figure 11.18, caption _____ 19 Jun 2019
Two complement's \wedge Two's complement
- Page 274, figure 11.19, caption _____ 19 Jun 2019
two complement's \wedge two's complement
- Page 274, line 2 _____ 19 Jun 2019
two complement's \wedge two's complement
- Page 275, figure 11.20, caption _____ 19 Jun 2019
two complement's \wedge two's complement
- Page 278, line 6 _____ 03 May 2020
 $A[7] \cdot \wedge A[7]$.
- Page 320, line -3 _____ 08 Jun 2019
 $A[b] < 84 \wedge A[i] < 84$
- Page 322, line -8 _____ 17 Feb 2020
 $n + (n - 1) + \dots + 1 = n(n - 1)/2 \wedge (n - 1) + \dots + 2 + 1 = n(n - 1)/2$

- Page 339, line 1 _____ 03 May 2020

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

$\wedge \vee \rightarrow$

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

- Page 342, line 4 _____ 17 Feb 2020

$$n + (n-1) + \dots + 1 = n(n-1)/2 \wedge \vee \rightarrow n + (n-1) + \dots + 1 = n(n+1)/2$$

- Page 346, line -6 _____ 07 May 2019

64-bit numbers are similar $\wedge \vee \rightarrow$ 64-bit numbers work alike

- Page 381, line -11 _____ 06 May 2019

$$h(m') = -\lg(2/10) = 2.32 \wedge \vee \rightarrow h(m') = -\lg(2/10) \approx 2.32$$

- Page 478, line 8 _____ 19 May 2019

we have equality when $c = n$ $\wedge \vee \rightarrow$ we have equality when $c = n$ and n is a perfect square

- Page 508, second column _____ 19 Jun 2019

two complement's representation $\wedge \vee \rightarrow$ two's complement representation