

ERRORS IN HACKER'S DELIGHT

Second Edition, First Printing

P. 1, 5th line up from bottom: the two formulas $x = y = -2^{31}$ and $x + y = -2^{32}$ should have light-face type (as I show here).

—Mike Collins

P. 12 line 9: “and 0’s elsewhere” should be “and 1’s elsewhere”.

—Soonbaek Yun

P. 37, Delete the last sentence in the second paragraph (“These remarks remain true if there is a “carry in”—that is, if we are computing $x + y + \mathbf{1}$.”).

—Jasper Neumann

P. 45 line 5: Add a few words so that it reads “if y is the maximum negative number and x is not.”

—Lawrence Ryan

P. 47 line 12: “... 11 instructions and six cycles” should be “... 11 instructions and five cycles” (i.e., change “six” to “five”).

—Lawrence Ryan

P. 50, 7th line up from the bottom: This long formula needs more parentheses. It should be:

$$f(x) = (((x \ll (31 - n_1)) \gg 31) \& (a - b)) + (((x \ll (31 - n_2)) \gg 31) \& (c - a)) + b$$

—Lawrence Ryan

P. 62 line 19: “loops forever for $x \geq 2^{31}$ ” should be “... $x > 2^{31}$.”

—Lawrence Ryan

P. 74 line 3: “first two inequalities” should be “first three inequalities”.

—Lawrence Ryan

P. 74 line 19: “valid and it reduces” should be “valid and it may reduce”.

—Lawrence Ryan

P. 75 lines 5 and 8 of the paragraph that starts “Now let us consider”: The expressions $c \mid d$ should both be $b \mid d$.

—Lawrence Ryan

P. 88, add to the end of the first paragraph: “The third executable line must be changed to $x = (x \& 0x0F0F0F0F) + ((x \gg 4) \& 0x0F0F0F0F)$; and the $3F$ in the last line must be changed to $7F$.”

—Lawrence Ryan

P. 88, second line of last paragraph, change “larger population count” to “larger (or same) population count”.

—Lawrence Ryan

P. 97: Line 3 should read “own inverse, $y_i \oplus y_j$ is the parity of bits $i - 1$ through j of x , for $i \geq j$.”

—Michael Pyne

P. 100, line 6: The “)” near the end of the line should be a “}”.

—Lawrence Ryan

P. 101, first line of second paragraph: The “5 + ...” should be “6 + ...”
And third line of fourth paragraph, “... takes 11” should be “... takes 12”.

—Lawrence Ryan

P. 106, last line: The “... - 2³⁰ + 1 ...” should be “... - 2³⁰ - 1 ...” (change + to -).

—Lawrence Ryan

P. 115 line 7: $\log_2(\Lambda) + 1$, should be $\lfloor \log_2(\Lambda) \rfloor + 1$.

—Lawrence Ryan

P. 120, 9th line up from bottom: Needs a “)” between the “4081” and the “>>”. That is, the line should be (note the thin spaces etc.):

```
return table[(y*0x0002040810204081) >> 56];
```

—Jasper Neumann

P. 141 line 2: Replace the period at the end of this sentence with “of 2^n bits for odd n , and the bit reversal of the outer perfect shuffle for even n .”

—Lawrence Ryan

P. 142 line 3: Change “2” to “16”, so that it reads “... size 16×3 bytes.”. Also on this page, in Figure 7-5, change $m = 2$ to $m = 16$.

—Lawrence Ryan

P. 144, 12th line up from bottom: change “no” to “little”, so that it reads “... has little instruction-level parallelism.”

—Jasper Neumann

P. 145 lines 1 and 2: “char A[8]” should be “char* A” and “char B[8]” should be “char* B”.

—Lawrence Ryan

P. 149 line 14: “0..8” should be “8..15”.

—Lawrence Ryan

P. 155 lines 4 and 5: “m1” should be “mv0” and “m4” should be “mv4”.

—Lawrence Ryan

P. 156 last line should be “x = ((x ^ t) & mv) ^ x;”.

—Lawrence Ryan

P. 186, Figure 9-1, 5th line from the end of the program, change “n” to “n-1”. Between the 3rd and 4th lines from the end of the program, insert the line

```
r[n-1] = un[n-1] >> s;
```

The last seven lines should then be:

```
if (r != NULL) {
    for (i = 0; i < n-1; i++)
        r[i] = (un[i] >> s) | (un[i+1] << (16-s));
    r[n-1] = un[n-1] >> s;
}
return 0;
}
```

—HSW

P. 220, first of the three equations in the middle of the page: the “3” should have an exponent of 2, so that it reads “ $2^{15} + 1 = 3^2 \cdot 11 \cdot 331$ ”.

—Jasper Neumann

P. 224 line 7, the number 715,827,833 should be 715,827,883.

—Colin Bartlett

P. 228, penultimate line, change “of three” to “of two”.

—Paolo Bonzini

P. 240, Figure 10-4: Replace lines 2 and 3 of this program with the following two lines:

```
nc = ((nmax + 1) // d) * d - 1
nbits = len(bin(nmax)) - 2
```

—Colin Bartlett

P. 329, first line below Figure 14-7, “see exercise 1” should be “see exercise 2”.

—Lawrence Ryan

P. 233, Figure 10-2: This program has a bug in that it gives an incorrect result for $d = 0x80000001$ (only). To fix it, change line 6 (“`int p;`”) to

```
int p, gt = 0;
```

Insert after line 17 (“`p = p + 1;`”), the line

```
if (q1 >= 0x80000000) gt = 1; // Means q1 > delta.
```

preceded by six spaces. Change the 6th line from the bottom (“ `} while (p < 64 &&”) to`

```
 } while (gt == 0 &&
```

—Colin Bartlett

P. 342, middle, in the assignment to p_0 , change the “ \wedge ” symbol to “ $\&$ ” (so that it is similar to the following line).

—Paolo Bonzini

P. 407, Answer no. 2, line 9: Change x to n , so that it reads “... depends upon whether or not $n = 0$, ...”.

—Lawrence Ryan

P. 411, answer to question 11, 2nd line: $c(n)$ should be c_n .

—Lawrence Ryan

P. 416, line 6: Change “it is an odd multiple of 2.” to “it is a multiple of 10 and an odd multiple of 2.”

Same page, line 9: This line should be:

```
“if (r > 5 || (r == 5 && (y & 2) != 0))”
```

Same page, line 14 should be:

```
“if (r == 0 && (y & 2) != 0)”
```

—Lawrence Ryan

P. 417, line 11, “`nlz(c & d)`” should be “`nlz(b & d)`”.

Same page, line 19: “The maximum value is $c \mid d$ ” should be “... $b \mid d$ ”.

—Lawrence Ryan

P. 477, entry for [Reiser], append the following:

An earlier source of this technique, described in considerable detail, is Crocker, Steve. "A Note on Padding." In *Network Working Group Request for Comments (RFC) #70*, 15 October 1970, UCLA. Available on the web.

—Neil Viberg

P. 489: Replace the last two index entries for M with the single entry:

MUX (multiplex) operation, 42, 56, 131, 163, 406

—Jasper Neumann

P. 494, last line: "Zero means 2^n " should be "Zero means 2^{**n} ".

Actually, an exponent would be preferable here. This would require changing " 2^n " to 2^n in the index entry, and changing " 2^{**n} " to 2^n in the section heading on page 22, and in the TOC entry on page vii.

Non-substantive errors (typographical etc.)

P. 5, Table 1-2, line beginning "addis": Change the expression "`I || 0x0000`" to "`I << 16`". (Retain the parentheses.)

—Jasper Neumann

P. 17, Table 2-1: Would be nice if the second and third columns were separated by a heavier vertical line than is used elsewhere in this table.

—Jasper Neumann

P. 41, lines 9-12: The text to the left of the "/" should be lined up on the same horizontal line as the text beginning with "/".

—Jasper Neumann

P. 43 line 19, 65 line 5, and 430 line 8: Change "GPR" to "register".

—Jasper Neumann

P. 47, graphic near top of page: Would be preferable if only the B and D blocks had a gray background, and if the A, C, and E blocks had a white background.

—Jasper Neumann

P. 73 last line before Section 4-3: Delete the word "either", so that it reads "... that is, if u or v is **true**."

—Jasper Neumann

P. 113, last paragraph: "The sum of the rows are" should be "The sums ...".

—Lawrence Ryan

P. 137, line 4: Delete “the,” so that it reads “... including one *multiply* ...”

—Jasper Neumann

P. 148, first line of Figure 7-8: Needs a space after `>>`. That is, “`>>j`” should be “`>> j`”.

P. 264, Figure 10-23 line 4: Add the text “`// (Signed shift) .`” so that the “`//`” lines up with that on the previous lines.

—Jasper Neumann

P. 387 formula at line 6: The limits a and b are too close to the integral sign.

—Norman Koch

P. 391 lines 19 and 22, and p. 393 line 4: The large decimal numbers should have commas, that is: 6,700,417 and 274,177 and 67,280,421,310,721 and 203,005 and 203,000.

—Jasper Neumann

P. 409, line 9: “instuictions” should be “instructions”.

—Lawrence Ryan