

Errata to the First Printing of “Optimizing Compilers for Modern Architectures”

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Errata highlighted in [color](#) are corrections that are not fixed in the second printing, either because they were received too late or were missed for some other reason.

About the Authors

- P. line 11: “currently serves” should read “has served”.
- P. line 12: “and Mentor Graphics.” should read “Apple and Mentor Graphics. Dr. Allen is Founder and CEO of Catalytic, Inc., a startup exploiting advanced compiler technology.”
- P. line 13: “Ann and John Doerr Professor” should read “John and Ann Doerr University Professor”
- P. line 23: “150” should read “200” and “34” should read “36”

Preface

- P. xxv, line 11: before the sentence beginning “We are deeply”, insert the following: Corrections for the second printing were provided by Agustin Arruabarrena, David Bartley, Adam Bordelon, Remko van Beusekom, John Callan, Arun Chauhan, Cristian Coarfa, Anshuman Dasgupta, Yuri Dotsenko, Jason Eckhardt, John Elliott, John Garvin, Jeroen Gordijn, Jacques-Olivier Haenni, [Guohua Jin](#), Mike Johnson, Chris Kuhlman, Anton Lokhmotov, Anirban Mandal, Henry McNair, Alexander Motzkau, David Niedzielski, Tim O’Neill and his students, Jonas Skeppstedt, David Wohlford, Feng Xiaobing and his colleagues at the Chinese Academy of Sciences (who translated the book into Chinese), Edward Yang, Hongbo Yang, Fengmei Zhao, Yuan Zhao, and Lei Zhou.
- P. xxv, line 16: “Vicky” should be “Vicki”.

Chapter 1

- P. 13, line 9: Replace “*” with “+”
- P. 20, lines 15-16: “none of Bernstein’s conditions holds” should read “all of Bernstein’s conditions hold”
- P. 24, line 12: “the array quantity $C(I, J)$ ” should read “the address of the array quantity $C(J, I)$ ”

Chapter 2

- P. 36, line 34: “.NE.” should be “.EQ.”
- P. 40, line 6: “ ik ” should read “ i_k ”
- P. 40, line 18: “The iteration space of S_1 ” should be “The iteration space of S ”
- P. 45, line 27 (line 1 of Definition 2.9): the “ i ” in “iteration i ” should be in boldface, *e.g.* “ **i** ”
- P. 45, line 28 (line 2 of Definition 2.9): “and statement” should be “to statement”

P. 46, Definition 2.10: there is a significant error in this definition, which is corrected on the replacement page provided with new copies of the book and available as a pdf file on the companion web site

P. 46, line 24: “sink than at the source” should be “source than at the sink”

P. 50, line 3: the “0” following “>” should be in boldface

P. 57, line 32: the second reference “A (I+1 , J , K+1)” should read “A (I , J , K+1)”

P. 59, line 1: “(<.<)” should be “(<,<)”; that is, the period should be a comma

P. 67, line 20: “*codegen*({S₂, S₃, S₄}, 2}” should read “*codegen*({S₂, S₃, S₄}, 2, D₂)”

P. 68, line 5: “*codegen*({S₂, S₃ }, 3}” should read “*codegen*({S₂, S₃ }, 3, D₃)”

P. 72, line 6: the “B” at the end of the line should be “C”

Chapter 3

P. 80, Figure 3.1, line 5 from the bottom: “ε” should be “∈”

P. 83, Figure 3.2: The intercept “-c₁/a₁” should read “-c₁/a” and the intercept “-c₂/a₂” should read “-c₂/a”

P. 84, lines 8-11: replace the sentence beginning “The weak SIV test...” with the following: “The weak SIV test can then be formulated as determining whether there exists an integral value m between the loop bounds and integral values i and i' such that a₁i + c₁ = a₂i' + c₂ = m, as shown in Figure 3.3.”

P. 89, line 23: “=” should be “= ...”

P. 89, line 24: “ =” should be “... =”

P. 90, line 14: “second test” should be “second subscript”

P. 91, line 32: “Equation 3.13” should be “Equation 3.12”

P. 94, line 19: “n_b” should be “-n_b”

P. 101, line 5: the second “L_i^x” should read “L_i^y”

P. 102, line 8: “no smaller than” should read “less than or equal to”

P. 102, next-to-last line: “1 - 1” should be “0 - 0”

P. 103, line 21: “A (I : I * 2 - 1)” should read “A (I : I * 2 - 2)”

P. 103, line 29: “1 - 1 = 0” should be “-1 - 0 = -1”

P. 104, line 1: “greater than 3” should be “greater than or equal to 2”

P. 106, Figure 3.7, last line: “**end ComputePositionLessThan**” should read “**end ComputePositionEqual**”

P. 107, Figure 3.8, line 14: “((A” should read “(A”

P. 107, Figure 3.9, line 14: “((A” should read “(A”

P. 109, line 27 (3 from the bottom): replace the entire line with the following (centered):

$$U_{10} = 100; U_{20} = -1; U_{21} = 1; L_{10} = L_{20} = 1; L_{21} = 0$$

P. 113, line 9: “is to the” should be “is the”

P. 113, lines 24-25: “direction vector is (0,1), and the only legal distance vector is (=,<)” should read “distance vector is (1,0), and the only legal direction vector is (<,)”

P. 124, lines 24 and 32: “**return depExists;**” should be “**return false;**”

P. 125, line 12: “**return depExists;**” should be “**return false;**”

P. 127, line 6 below Figure 3.16: the leftmost reference “A (I , J+1 , J+K)” should be “A (I , J , J+K)”

P. 134, line 1: The second “L_i^x” should read “L_i^y”

Chapter 4

P. 140, line 7: replace “largest integer greater than” with “largest integer less than or equal to”

P. 141, next-to-last line: “Muchnick[218]” should read “and Muchnick[218]”

P. 144, Figure 4.2, lines 9 and 14: “ ϵ ” should be “ \in ”

P. 145, Figure 4.3, line 2: “in which constants are to be propagated” should be “from which dead code is to be eliminated”

P. 147, line 26: replace “ $worklist \cup \{x\}$ ” with “ $worklist \cup \{y\}$ ”

P. 151, Figure 4.8, lines 6, 10, and 12: “ ϵ ” should be “ \in ”

P. 151, line 6 in Figure 4.8: replace the entire line with the following 2 lines:

```
for each  $b \in N$  do
```

```
    if predecessors( $b$ ) =  $\emptyset$  then dominators( $b$ ) :=  $\{b\}$ ; else dominators( $b$ ) :=  $N$ ;
```

(Note that the correction above merges two distinct corrections, including both the change of “ ϵ ” to “ \in ” from the previous correction and the change of the initialization)

P. 156, line 13: align “ $A(K)$ ” with “ K ” in the line above

P. 157, line 19: indent “...” to align with “IC” in the line above

P. 159, lines 5-6: replace these lines with:

```
// Returns true if substitution eliminates all uses of the defined variable in the loop
```

```
// otherwise, returns false indicating that IV substitution should be tried
```

P. 159, line 10: replace “*false*” with “*true*”

P. 159, lines 11-17: delete these lines

P. 159, line 19 and line 32: replace “*all_uses_gone*” with “*all_nonloop_uses_gone*”

P. 159, line 34-36: replace these lines with the following sequence of lines:

```
if all_loop_uses_gone and all_nonloop_uses_gone then begin
```

```
    delete( $S$ );
```

```
    return true;
```

```
end
```

```
else if all_loop_uses_gone then begin
```

```
    move  $S$  outside loop;
```

```
    return true;
```

```
else return false; // cannot be fully substituted, but try IV-sub
```

P. 164, line 15 (line 4 in Figure 4.16): after this line, insert the line:

```
for each do loop  $D$  nested at the top level within  $L$  do  $IVDrive(D)$ ;
```

(Note that the above line should have a blank line above and below it.)

P. 164, line 19: “*FS_not_done*” should read “*all_uses_removed*”.

P. 164, line 20: “*FS_not_done*” should read “**not** *all_uses_removed*”.

P. 164, lines 21-22 (lines 10-11 in Figure 4.16): delete these lines, leaving a single blank line before the line “default:”

P. 169, line 25: “1,000” should be “1000”

Chapter 5

P. 172, line 33: replace “ $I = 1, L$ ” with “ $J = 1, M$ ”

P. 172, line 35: replace “ $K = 1, N$ ” with “ $K = 1, L$ ”

P. 182, Figure 5.2, line 24: the entire line, which contains “**end**” should be deleted

P. 186, line 7: replace “ S_2 ” with “ S_3 ”

- P. 187, line 11 and line 19: replace “ $A(I+1)$ ” with “ $A(I-1)$ ”
- P. 187, Figure 5.7: the bottom dependence, labeled “ δ_1^{-1} ”, should be labeled “ δ_1 ”
- P. 191, line 21: replace “loop-independent antidependences prior to the covering definition” with “forward loop-carried and loop-independent antidependences”
- P. 192, line 1: replace “Loop-independent antidependences” with “Forward antidependences”
- P. 192, lines 3-4: replace “Since the references no longer occur on the same iteration, the loop-independent” with “Since the use now refers to a location that is different from the one assigned on any current or future iteration, the”
- P. 192, lines 21-22: Replace “Edge D_1 is a forward loop-independent antidependence, which disappears” with “Edges D_1 and D_3 are forward antidependences, which disappear”
- P. 193, Figure 5.9: Add another edge (arc) from vertex S_1 to vertex S_2 , with the labels “ D_3 ” and “ δ_1^{-1} ”
- P. 194, line 14 and line 21 below Figure 5.10: replace the second occurrence of “ $A(I+j)$ ” with “ $A(I+j+1)$ ”
- P. 196, Figure 5.10: add a loop-independent true dependence from S_1 to S_4 and a loop-independent output dependence from S_1 to S_3 . To do this, you need to add an arc from S_1 to S_4 and label it with “ δ_∞ ”. Second, you need to add an arc from S_1 to S_3 and label it with “ δ_∞^0 ”.
- P. 202, line 9: replace “ $A\$1(I+1)$ ” with “ $A\$2(I+1)$ ”
- P. 202, line 11: replace “ $A\$2(I)$ ” with “ $A\$1(I)$ ”
- P. 210, line 21: “ $A(I+21:I+40)$ ” should be “ $A(I+20:I+39)$ ”
- P. 213, line 23: the “and” should read “and, depending on the topological sort, it might”
- P. 225, line 6: replace the last word “mark” with “**begin**”
- P. 225, line 7: replace the entire line with the following three lines:
- ```
mark all loops at level $k, k+1, \dots, p-1$ as vector for all statements in S_i ;
mark_gen(S_i, p, D_i);
end
```

## Chapter 6

- P. 247, line 1: “ $N+1$ ” should be “ $N$ ”
- P. 247, line 3: “.LE.” should read “.LT.”
- P. 247, line 17: “ $A(j)=B(j)+C$ ” should read “ $A(j)=B(j)+C(j)$ ”
- P. 262, line 29: replace “the result  $n$ ” with “the result  $x$ ”
- P. 262, line 30: replace “out of  $x$  be out of  $n$ ” with “out of  $n$  be out of  $x$ ”
- P. 264, line 3: “ $E$  is the number of vertices” should be “ $E$  is the number of edges”
- P. 266, line 9: “ $V$  is the number of edges” should be “ $V$  is the number of vertices”
- P. 279, line 2: “only “=”” should be “only non-“=””
- P. 297, line 35 (third from bottom): “outer loop on  $J$ ” should be “outer loop on  $K$ ”
- P. 302, line 4: “WAIT( $EV(I-1)$ )” should read “WAIT( $EV(I-1)$ )”
- P. 302, line 25: replace “an array” with “a two-dimensional array”
- P. 302, line 27 (contains a “DOACROSS”): insert the line “POST( $EV(1,1)$ )” before this line
- P. 302, line 28: delete this line

- P. 302, line 30: replace “EV(J-1)” with “EV(I-1, J-1)”
- P. 302, line 33: replace “EV(J)” with “EV(I, J)”
- P. 303, line 3 (after the figure, contains “DOACROSS”): insert “POST(EV(1, 1))” before this line
- P. 303, line 4: delete this line
- P. 303, line 8: replace “EV(K)” with “EV(I-1, K)”
- P. 303, line 9 (after the figure): “MAX” should read “MIN”
- P. 303, line 13: replace “EV(K+1)” with “EV(I, K+1)”

## Chapter 7

- P. 323, eighth line from last: replace “DO 100 I” with “DO I”
- P. 324, line 10: replace “DO 100 I” with “DO I”
- P. 324, line 16: The line should have a continuation character “&” at the end
- P. 324, line 24: replace “DO 100 I” with “DO I”
- P. 347, line 25: “irangel = L” should be “irangel = (1, L)”
- P. 348, line 24: remove the entire line containing “DO jtemp”
- P. 348, line 25: reduce the indentation on the line “A(I, 0:M) = 0” to align with the line above it.
- P. 354, Figure 7.10: the “{2}” next to node 5 should be removed
- P. 365, line 10: replace “EV(I)” with “EV<sub>n</sub>(I)”
- P. 365, line 21: replace “.EQ. 1” with “.EQ. .TRUE.”

## Chapter 8

- P. 388, line 1: replace “tB = B(0)” with “tB1 = B(0); tB2 = B(1)”
- P. 389, line 13: "killed by a stare" should be "killed by a store".
- P. 391, line 31: replace “B(I); A(I)” with “B(J); A(J)”
- P. 395, line 28: replace “an instance of the” with “a”
- P. 395, line 29: replace the entire line with: “packing problem known as the knapsack problem. In its most general form, bin-packing is NP-”
- P. 395, line 30: replace “bin-packing” with “knapsack”
- P. 396, last line: “five phases” should be “four phases”
- P. 405, line 27: replace “A(0)” with “A(0, J)”
- P. 405, line 28: replace “A(1)” with “A(0, J+1)”
- P. 405, line 32: replace “s1” with “s0”
- P. 405, line 33: replace “A(I+1, J) = s0” with “A(I, J+1) = s1”
- P. 419, line 15: append the sentence “This code would be further improved if we had considered input dependences in the loop nest; we leave it as an exercise to rework the example to take input dependences into account.”
- P. 419, line 33-34: In order for the dependences in the matrix to line up with the order that they are mentioned in the lead-in sentence above, the rows should be interchanged. In other words, the matrix should look like

$$\begin{array}{ccc} < & = & = \\ & = & < & = \end{array}$$

With the brackets still present.

- P. 424, line 22: “result A(I, J)” should be “result A(J, I)”
- P. 424, line 25: “loop index I” should be “loop index J”

- P. 424, line 35: “DO I = 1, M” is spurious and should be removed
- P. 427, line 3: the “ENDDO” should be aligned with the “DO” in line 1
- P. 428, line 17: “front of the first” should be “front of the second”
- P. 428, line 18: “end of the second” should be “end of the first”
- P. 429, lines 10, 16 and 27: “1,000” should be “1000”
- P. 431, line 10: “1,000” should be “1000”
- P. 431, line 17: replace “X(I+1) \* D” with “X(I+2) \* D”
- P. 431, line 29: replace this line with “A(2) = tA1”
- P. 431, last line: replace “X(1,000) = tA0 \* E” with “X(1000) = tA0 \* E”
- P. 433, Figure 8.22, line 18: “else begin” should read:  
“else if L[lastindex] < H[thisindex] then begin”
- P. 433, Figure 8.22, after line 22: insert “else; // empty loop, do nothing”
- P. 435, lines 19, 22 and 25: “1,000” should be “1000”
- P. 436, lines 1, 4, 7 and 8: “1,000” should be “1000”
- P. 437, next-to-last line: replace the line with: “3. Each set either contains no bad vertex or consists of a single bad vertex, that is,”
- P. 437, last line: replace “ $V_i \cap B = V_i$ ” with “ $V_i \cap B = \emptyset$ ”
- P. 450, lines 20 and 21: “1,000” should be “1000”
- P. 451, line 11: “1,000” should be “1000”
- P. 452, lines 3, 8, 19, 29 and 42: “1,000” should be “1000”
- P. 452, line 24 and line 34: “A(0, J+1)” should be “A(1, J+1)”
- P. 458, line 33: after the first occurrence of “variables” insert “that are *partially initialized* on entry to *b*, that is, variables”
- P. 458, lines 34-35: replace “have been initialized on some path to” with “are partially initialized at”
- P. 458, fourth line from end: replace both instances of “available” with “initialized”
- P. 459, Equation 8.5: replace the second occurrence of “*pinit(b)*” with “*pinit(c)*”
- P. 461, Figure 8.38: swap the markings on the two axes; *i.e.*, the vertical axis should be labeled “*T*” and start at “2” and the horizontal axis should be labeled “*J*” and start at “1”
- P. 462, line 1: replace the line with “A(I+2, J) = A(I+2, I+2) + A(J, J)”
- P. 463, line 11: replace “N1” with “N3”
- P. 463, line 30: replace “N1” with “N3”
- P. 464, lines 18 and 33: replace “W(-N2-1)” with “W(-N2)”
- P. 468: Add Exercise 8.6: “Rework the example from Section 8.5.1 to improve performance by taking input dependence into account. Hint: this can save one additional load per iteration.”

## Chapter 9

- P. 471, line 15: “B(J)” should be “B(jj)”
- P. 472, line 35: delete the word “temporal” before the word “reuse”
- P. 474, line 2: “temporal reuse” should be “spatial reuse”
- P. 474, line 26: “M/b” should be “N/b”
- P. 474, line 27: “N” should be “M”
- P. 475, line 32: “P := L” should be “P := N”
- P. 476, line 7: “B(I, J)” should be “B(K, J)”
- P. 478, line 5: “B” should be “D”

- P. 483, line 36: “A(ii, k)” should be “A(ii, kk)”  
 P. 484, line 3 below the table: “K-loop” should read “kk-loop”  
 P. 488, line 19-23: replace these lines with the following five lines:

```

DO I = 0, N - 1
 DO J = 0, N - 1
S1 A(J+1, I+1) = AINIT(J+1, I+1)
 ENDDO
ENDDO

```

- P. 488, line 30-42: replace the entire range of lines with the following 13 lines:

```

DO I = 0, 1
 DO J = 0, N - 1
 A(J+1, I+1) = AINIT(J+1, I+1)
 ENDDO
ENDDO
DO I = 2, N - 1
 A(1, I+1) = AINIT(1, I+1)
 A(2, I+1) = AINIT(2, I+1)
 DO J = 2, N - 1
S1 A(J+1, I+1) = AINIT(J+1, I+1)
S2 A(J, I) = (A(J+1, I+1) + A(J-1, I-1)) * 0.5
 ENDDO
ENDDO

```

- P. 489, line 8: “earlier in this chapter” should be “in Chapter 8”  
 P. 491, line 22: replace “same example” with “example from Section 8.2.2”  
 P. 491, line 34: “A(ii, I) + A(ii, J)” should be “A(ii, ii) + A(J, J)”  
 P. 492, line 4: “DO J = 1, I + K - 1” should be “DO J = I, I + K - 1”  
 P. 492, line 6: “A(ii, I) + A(ii, J)” should be “A(ii, ii) + A(J, J)”  
 P. 500, line 33: “temporal locality” should be “spatial locality”  
 P. 502, line 37: “A(I, J) = A(I, J) + A(I-1, J)” should be  
     “A(ii, J) = A(ii, J) + A(ii-1, J)”  
 P. 506, line 11: “DO I = 5, 32” should be “DO I = 5, 32, 4”  
 P. 510: delete Exercise 9.5 (it is the same as Exercise 9.2)

## Chapter 10

- P. 518, Figure 10.2, line 9: replace the line with:

*“predecessors[n<sub>2</sub>] := predecessors[n<sub>2</sub>] ∪ {n<sub>1</sub>};”*

- P. 525, line 31: change: “sf r2, b(r1)” to: “sf fr2, b(r1)”  
 P. 526, Figure 10.7, line 4: change: “fadd fr2” to: “addf fr2”  
 P. 527, line 28: “addf fr3, fr2, fr1” should be deleted  
 P. 529, line 9: “do” should read “do begin”  
 P. 538, line 37: “make it possible” should be “makes it possible”  
 P. 539, Figure 10.11: the operation in node 7 should be “vadd”  
 P. 540, Figure 10.12: the operation in node 7 should be “vadd”  
 P. 547, line 2: “comercially” should be “commercially”

## Chapter 11

- P. 551, line 25 (line 1 of Definition 11.2): “ $(s,x)$ ” should be “ $(p,x)$ ”
- P. 551, line 26 (line 2 of Definition 11.2): “to  $s$ ” should be “to  $p$ ”
- P. 559, line 14: “or  $\neg \text{APUSE}(p) \subseteq \text{USE}(p)$ ” should be “or  $\neg \text{APUSE}(p) \subseteq \neg \text{USE}(p)$ ”
- P. 561, Equation 11.3: delete the first “{“
- P. 563, Equation 11.5: the text “ $s=(p,q)$ ” should be positioned under the larger union symbol to the right, rather than the smaller one to the left
- P. 567, line 11: “control flow graph” should be “call graph”
- P. 569, Figure 11.4, line 1: “*findMod*( $N,E,n,\text{IMOD+},\text{LOCAL}$ )” should be “*findMod*( $N,E, \text{DMOD},\text{ALIAS},\text{MOD}$ )”
- P. 575, Equation 11.7: “ $\text{cost}(J_s^x)$ ” should be : “ $\text{cost}(J_s^x)$ ”, *i.e.*, delete the final “!”
- P. 576, Figure 11.9, line 11: indent the “CALL” to align with “W” on the previous line
- P. 577, line 28: replace “if  $C \in \text{MOD}(\gamma)$ ” with “if  $B \in \text{MOD}(\gamma)$ ”
- P. 577, line 29: replace “ $\text{R}_{\text{SOLVE}}^C J_\gamma^T((N))$ ” with “ $\text{R}_{\text{SOLVE}}^C (J_\gamma^T(N))$ ”
- P. 577, line 30: replace “else *undefined-const*” with “else B”
- P. 595, line 5: “value of A” should be “value of IS”

## Chapter 12

- P. 605, line 2: “has been has been” should be “has been”
- P. 623, line 22: “a [ 2 : 3 }” should be “a [ 2 : 3 ]”
- P. 649, line 9: “wires” should be “latches”

## Chapter 13

- P. 656, line 23: “A(I)” should be “A(i)”
- P. 656, next-to-last line: “no problems” should be “problems”
- P. 659, line 34: replace “T is assigned to the right-hand side of S” with “the right-hand side of S is assigned to T”
- P. 660, line 27: replace “A(i+1)” with “A(i-1)”
- P. 661, line 13: replace “DO i = 257, 2” with “DO i = 257, 2, -1”
- P. 662, line 20: replace “A(257)” with “A(258)”
- P. 662, line 21: replace “A(i)” with “A(257)”
- P. 665, lines 9: “a carried dependence” should be “an antidependence”
- P. 665, lines 9-10: “an antidependence” should be “a carried dependence”
- P. 665, line 22: “X(1;M)” should be “X(1:M)”
- P. 667, line 18: replace “i2 = i1, 4, 2” with “i2 = i1, 6, 2”
- P. 667, lines 25-30: replace the entire set of lines with the following 8 lines:

```
DO i1 = 3, 4
 T1 = A(i1-2)
 DO i2 = i1, 6, 2
 T2 = (T1 + A(i2+2))/2.0
 T1 = A(i2)
 A(i2) = T2
 ENDDO
ENDDO
```



P. 668, lines 1-2: replace these lines with the following 2 lines:

```
A(5:104) = A(1:100) + A(3:102) + &
A(7:106) + A(9:108)
```

P. 668, line 4: insert “after loop splitting” before “regardless”

P. 669, line 2: “do” should read “do begin”

P. 670, line 13: “DO j = 1, 100, 1” should be “DO j = 1, 100”

P. 670, line 14: “DO i = 1, 100, 64” should be “DO i = 1, 100”

P. 672, line 10: replace “A(0:N-1,N)” with “A(0:N-1,N+1)”

P. 672, line 23, P. 673, line 4, and P. 673, line 19 : replace the line “T<sub>0</sub>(1) = A(2,0)” with the following three lines:

```
DO i = 1, N
T0(i) = A(i+1,0)
ENDDO
```

P. 672, next-to-last line: “A(i,j)” should be “A(i,N)”

P. 673, line 14 and line 29: “A(i,j)” should be “A(i,N)”

P. 674, line 8: “DO 100 j = 2, 100” should be “DO j = 2, 100”

P. 675, line 13: “DO i = 1, 128” should be “DO i = 1, 127”

P. 675, line 19: “A(1:128,i)” should be “A(1:128,128)”

P. 675, line 25: “DO i = 1, 128” should be “DO i = 1, 127”

P. 675, line 34: “A(j,i)” should be “A(j,128)”

P. 676, line 5: “DO i = 1, 128” should be “DO i = 1, 127”

P. 676, line 13: “A(j,i)” should be “A(j,128)”

P. 676, line 18: “DO i = 1, 128” should be “DO i = 1, 127”

P. 676, line 24: “A(j,i)” should be “A(j,128)”

P. 676, line 31: “DO i = 1, 128” should be “DO i = 1, 127”

P. 676, line 37: “A(j,i)” should be “A(j,128)”

P. 679, line 27: “end;” should read “end”

P. 679, line 3 below Figure 13.6: “Scalarize” should be “CompleteScalarize”

P. 681, line 12: “Scalarize” should be “CompleteScalarize”

P. 682, Figure 13.7: the leftmost dependence label “δ<sub>j</sub>” should be “δ<sub>i</sub>”

P. 683, line 4: “(tA+” should be “(tA0+”

P. 683, line 5: “tA0 = A(i-1,J)” should be “tA0 = A(i,J)”

P. 684, line 12: replace both instances of “K+1:N” with “K:N+1”

P. 684, line 13: replace “N-K” with “N-K+2”

P. 684, line 14: replace “K+1:N” with “K:N+1”

P. 684, next-to-last line: “M(j,K)” should be “M(K,j)”

P. 686, lines 25-26: swap the order of these lines, placing “tMiK = M(i,K)” inside the loop on “i”

## Chapter 14

P. 691, line 21: “!HPF” should read “!HPF\$”

P. 691, line 26: “!HPF” should read “!HPF\$”

P. 691, line 28: “!HPF” should read “!HPF\$”

P. 692, line 8: “!HPF” should read “!HPF\$”

- P. 692, line 17: “!HPF” should read “!HPF\$”
- P. 693, line 11: “ $A(I+1, J) + A(I+1, J)$ ” should be “ $A(I-1, J) + A(I+1, J)$ ”
- P. 695, Figure 14.1: the leftmost dependence edge, currently from  $S_2$  to  $S_1$ , should be reversed so that the source is  $S_1$  and the sink is  $S_2$  (leaving its label unchanged)
- P. 696, line 15: “ $A(L:L+99)$ , is” should be “ $A(L:L+99)$  is” (delete the comma)
- P. 696, line 25: “ $A(1, 100)$ ” should be “ $A(1:100)$ ”
- P. 696, line 28: “PID /= 100” should be “PID /= 99”
- P. 697, line 36: “ $A(1, 100)$ ” should be “ $A(1:100)$ ”
- P. 697, line 39: “PID /= 100” should be “PID /= 99”
- P. 700, line 9: “ $A(10000)$ ” should be “ $A(10000), B(10000)$ ”
- P. 700, line 10: “ $A(\text{BLOCK})$ ” should be “ $A(\text{BLOCK}), B(\text{BLOCK})$ ”
- P. 705, line 6 and line 13: “1:N” should be “[1:N]”
- P. 706, line 1: “Equation 14.18” should be “Equation 14.20”
- P. 706, line 4: “and the set” should be “and, following Equation 14.21, the set”
- P. 706, line 5: “is to begin is” should be “begins is”
- P. 708, line 7 and line 32: delete “ .AND. PID /= 0”
- P. 709, line 7 and line 28: delete “ .AND. PID /= 0”
- P. 709, line 20: delete “, B(10000)”
- P. 709, line 21: delete “, B(BLOCK)”
- P. 710, line 16: “REAL A(10000, 100)” should be  
“REAL A(10000, 100), B(10000, 100)”
- P. 710, last line: “lo + 1” should be “2”
- P. 711, line 20: “ $A(i, J) = B(i-1, J) + C$ ” should be  
“ $A(1, J) = B(0, J) + C$ ”
- P. 711, line 24: “lo + 1” should be “2”
- P. 712, line 3 and line 29: “lo + 1” should be “2”
- P. 712, line 14: “from local to” should read “between local and”
- P. 712, line 23: “ $B(100, J) = B_g(100, J)$ ” should be  
“ $B_g(100, J) = B(100, J)$ ”
- P. 713, line 10 and line 24: “REAL A(10000, 100)” should be  
“REAL A(10000, 100), B(10000, 100)”
- P. 713, line 28: “ $A(I+1, J+1) = A(I, J) + B(I, J)$ ” should be  
“ $A(I+1, J) = A(I, J) + B(I, J)$ ”
- P. 714, line 5: replace “ $B(0, J) + C$ ” with “ $A(0, J) + B(0, J)$ ”
- P. 714, line 7 and line 34: “lo + 1” should be “2”
- P. 714, line 8: replace “ $B(i-1, J) + C$ ” with “ $A(i-1, J) + B(i-1, J)$ ”
- P. 714, line 11: “SEND(PID+1, B(100, J))” should be  
“SEND(PID+1, B(100, J), 1)”
- P. 714, line 12: “SEND(PID+1, A(100, J))” should be  
“SEND(PID+1, A(100, J+1), 1)”
- P. 714, line 30: replace “ $B(0, J) + C$ ” with “ $A(0, J) + B(0, J)$ ”
- P. 714, line 35: replace “ $B(i-1, J) + C$ ” with “ $A(i-1, J) + B(i-1, J)$ ”
- P. 715, line 2: replace “ $A(10000, 100)$ ” with “ $A(10000, 1000)$ ”
- P. 715, line 18: “RECV(PID-1, B(0, J), 1)” should be  
“RECV(PID-1, A(0, J), 1)”
- P. 715, line 21: “lo + 1” should be “2”

- P. 715, line 24: “hi==100” should be “PID /= lastP”
- P. 715, line 24: “SEND(PID+1,A(100,J+1))” should be  
“SEND(PID+1,A(100,J),1)”
- P. 716, line 7: “lo + 1” should be “2”
- P. 716, line 8: “A(i,J+1) = A(i-1,J) + C” should be:  
“A(i,j+1) = A(i-1,j) + C”
- P. 716, line 11: “hi==100” should be “PID /= lastP”
- P. 716, next-to-last line: “A(i) = B(i-1) + C” should be “A(1) = B(0) + C”
- P. 717, line 1 and line 15: “lo + 1” should be “2”
- P. 717, line 6: “communication” should be “computation”
- P. 717, line 20: “A(i) = B(i-1) + C” should be “A(1) = B(0) + C”
- P. 718, line 19: this line, which reads “D(1) = A”, should be deleted
- P. 719, line 24: “lo + 1” should be “2”
- P. 721, after line 10: insert “UB = min(J+K-1,M)”
- P. 721, lines 12-13: replace the lines with:  
RECV(PID-1,A(0,J:UB),UB-J+1)  
DO j = J, UB
- P. 721, line 14: should be “A(1,j) = A(0,j) + C”
- P. 721, line 17: replace the line with:  
DO j = J, UB
- P. 721, line 18: “lo + 1” should be “2”
- P. 721, line 19: should be “A(i,j) = A(i-1,j) + C”
- P. 721, line 23: replace the line with:  
SEND(PID+1,A(100,J:UB),UB-J+1)
- P. 722, line 7: “CEIL(N/100)” should be “CEIL(N/100) - 1”
- P. 722, line 8: “MOD(N,100)” should be “MOD(N-1,100) + 1”
- P. 722, line 27 and line 28: insert “!HPF\$ ” at the beginning of the line
- P. 724, lines 7-11 (below figure 14.5) should be replaced by the following 5 lines:  
sR = MOD(myR+kP,4); sC = MOD(myC+kP,4)  
rR = MOD(myR-kP,4); rC = MOD(myC-kP,4)  
IF (sR /= myR) SEND ((sR,myC),B(kloc,1:n),n)  
IF (sC /= myC) SEND ((myR,sC),A(1:n,kloc),n)  
IF (rR /= myR) THEN
- P. 724, line 13: replace “(myR,rP)” with “(rR,myC)”
- P. 724, line 17: replace “kP /= 0” with “rC /= myC”
- P. 724, line 19: replace “(myC,rP)” with “(myR,rC)”
- P. 725, lines 8-12 should be replaced by the following five lines:  
sR = MOD(myR+kP,4); sC = MOD(myC+kP,4)  
rR = MOD(myR-kP,4); rC = MOD(myC-kP,4)  
IF (sR /= myR) SEND ((sR,myC),B(1:n,1:n),n\*n)  
IF (sC /= myC) SEND ((myR,sC),A(1:n,1:n),n\*n)  
IF (rR /= myR) THEN
- P. 725, line 14: should be “RECV ((rR,myC),B(n+1:n+n,1:n),n\*n)”
- P. 725, line 18: replace “sP” with “rC ”
- P. 725, line 20: should be “RECV (myR,rC),A(1:n,n+1:n+n),n\*n)”

- P. 726, line 18: “ $(N+1)/10$ ” should be “ $(N+1)/100$ ”
- P. 726, line 19: “ $\text{MOD}(N, 10)$ ” should be “ $\text{MOD}(N, 100)$ ”
- P. 726, lines 20 and 29: delete these lines and align the code they bracket to the left
- P. 726, line 28: “ $B(100)$ ” should be “ $B(100, J+1)$ ”
- P. 726, lines 36-37: should be:
- ```

jlastP = CEIL((M+1)/100) - 1
IF (myC==jlastP) jhi = MOD(M,100) + 1

```
- P. 727, line 2-3: should be:
- ```

ilastP = CEIL((N+1)/100) - 1
IF (myR==ilastP) ihi = MOD(N,100) + 1

```
- P. 727, line 5: delete this line and adjust the alignment of the following 4 lines to the left
- P. 727, line 11: delete this line and adjust the alignment of the following 4 lines to the left
- P. 727, line 31: replace “ $(myR+1, myC)$ ” with “ $(myR, myC+1)$ ”
- P. 727, line 40: “ $(M+1)/10$ ” should be “ $(M+1)/100$ ”
- P. 727, line 41: “ $\text{MOD}(M, 10)$ ” should be “ $\text{MOD}(M, 100)$ ”
- P. 728, line 3: “ $(N+1)/10$ ” should be “ $(N+1)/100$ ”
- P. 728, line 4: “ $\text{MOD}(N, 10)$ ” should be “ $\text{MOD}(N, 100)$ ”
- P. 728, line 11: replace “ $(myR+1, myC)$ ” with “ $(myR, myC+1)$ ”
- P. 728, line 20 and 27: delete these lines and align the code they bracket to the left
- P. 728, lines 28 and 35: delete these lines and align the code they bracket to the left
- P. 729, line 22: “`INHERIT X, Y;`” should be “`INHERIT X, Y`”
- P. 733, Exercise 14.4, line 9: “1, N” should be “2, N”
- P. 734, Exercise 14.5, line 10: “1, N, K” should be “2, N, K”
- P. 734, Exercise 14.5, line 12: replace “ $II + K - 1$ ” with  
“ $\min(II + K - 1, N)$ ”

## Appendix

- P. 739, line 6: “greater than zero” should be “less than zero”

## References

- P. 744-745: references [17] and [24] are essentially duplicates; reference [24] contains the correct citation
- P. 763, reference [284]: “*Conference Record of the 19th Annual ACM Symposium on Principles of Programming Languages*” should read “*Proceedings of the ACM SIGPLAN '91 Conference on Programming Language Design and Implementation*”

## Index

- P. 782, line 26: “resources” should be “recurrences”