

THE PUBLIC IS MORE FAMILIAR WITH BAD DESIGN THAN GOOD DESIGN. IT IS, IN EFFECT, CONDITIONED TO PREFER BAD DESIGN, BECAUSE THAT IS WHAT IT LIVES WITH. THE NEW BECOMES THREATENING, THE OLD REASSURING.

PAUL RAND

A DESIGNER KNOWS THAT HE HAS ACHIEVED PERFECTION NOT WHEN THERE IS NOTHING LEFT TO ADD, BUT WHEN THERE IS NOTHING LEFT TO TAKE AWAY.

ANTOINE DE SAINT-EXUPÉRY

...THE DESIGNER OF A NEW SYSTEM MUST NOT ONLY BE THE IMPLEMENTOR AND THE FIRST LARGE-SCALE USER; THE DESIGNER SHOULD ALSO WRITE THE FIRST USER MANUAL...IF I HAD NOT PARTICIPATED FULLY IN ALL THESE ACTIVITIES, LITERALLY HUNDREDS OF IMPROVEMENTS WOULD NEVER HAVE BEEN MADE, BECAUSE I WOULD NEVER HAVE THOUGHT OF THEM OR PERCEIVED WHY THEY WERE IMPORTANT.

DONALD E. KNUTH

FRANC BRGLEZ, JANEZ BREST, BORKO BOŠKOVIĆ

ON TESTING THE FEATURES OF THE TUFTE BOOK TEMPLATE

PUBLISHERS OF THIS BOOK

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*Dedicated to those who appreciate \LaTeX
and the work of Edward R. Tufte and Donald E. Knuth.*

About This Book

THIS BOOK serves (1) to test and (2) to illustrate features of the Tufte book template, using the material from the original template and various inserts from our article drafts. This book has three chapters with two sections in each chapter. The chapter titles are: (1): *About Text Items*, (2): *About Figures*, and (3): *About Tables*. Each chapter has two sections, (1) dealing with items from Tufte's book template, (2) dealing with inserts from our article drafts.

TEMPLATE INCOMPATIBILITIES with our article drafts include (so far):

- Neither the subfigure nor the subcaption packages are compatible with this template; this necessitates that subfigure labels such as (a), (b), etc should become an integral part of the subfigure. In other words, if the subfigure is created in R, the label created in R should extend to (a), or (b), etc.
- The package cite is not compatible, so when we list 5 citations with a single \cite command, it is not possible for these citations to appear in a contracted form such as [1]-[5].
- NO citations can be placed inside either figure or table captions. However, with each of these captions, one *can* place hyperlinks with the \url command, and one *can* refer to other figures and tables with the \ref command. Also, NO \verb commands can be placed inside either figure or table captions!

Still, the workarounds to avoid these incompatibilities are rewarded the with well-designed book layout that this template enables.

AND NOW, filler text with command \lipsum[2]. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

1

About Text Items

TEXT ITEMS IN THIS CHAPTER are divided into three sections:

- (1) about notational conventions and schema of \LaTeX files,
- (2) text items selected from Tufte's book template,
- (3) text items from other sources,
- (4) typesetting examples of algorithms.

FOR DETAILS about how figures and tables are being represented, see Chapters [2](#) and [3](#). For additional examples of algorithms, see Chapter [4](#).

1.1 About Notational Conventions and Schema for \LaTeX files

WHEN COLLABORATING with multiple authors using \LaTeX , conventions about notation and file structures will save a lot of time. The schema in Figure 1.1 already illustrates a number of conventions that are being used in this document. The list below includes not only the items which are in plain sight in Figure 1.1, it also includes items we can observe in subdirectories *Algorithms*, *Figures*, and *Tables* as well as the *.tex files in these subdirectories.

- Consistently avoid file names with *underscore* (`_`).
- For complex algorithms, figures and tables, create a separate file which is prefixed with either `alg-`, `fg-` or `tb-` and move the file into the designated subdirectory. Use the rootname of the file for the label that is used to reference the algorithm, figure, or table. For example, we can thus refer to contents of file `alg-global-search2-normal.tex` as `Algorithm~\ref{alg-global-search2-normal}`. Notably, we embed contents of algorithm not only under `\algorithm`, `\algorithm-wide` environments but also under `\figure`, `\figure*` environments.
- There is always the easy-to-find-file `A00-main.tex`. This file not only invokes `\documentclass{tufte-book}` and the supporting files `*tufte*`, but also all items that are generic to the layout of the book and new command definitions that are content-specific with respect to the book. Finally, this file also invokes the book chapters in a well-defined sequence such as `Ch-About.tex`, `Ch-Figures.tex`, `Ch-Tables.tex`, and `Ch-Algorithms2.tex`. The amount of text in a typical chapter will rarely extend beyond a single page since each chapter is likely to invoke a number of sections that reside in adjacent files and may represent contributions from several collaborating authors. For example, `Ch-About.tex` invokes four files in this order: `Ch-About-Conventions.tex`, `Ch-About-Tufte.tex`, `Ch-About-Other.tex`, `Ch-About-Algorithms.tex`.
- The only *.bib file in the directory `ebook-test`, `bibTemp.bib`, is initially an empty file. Within the file `A00-main.tex`, we use relative paths to define location of the ‘nearby files’ `OPUS.bib` and `OPUS2.bib` under `xLatex`: `\bibliography{\detokenize{../../OPUS}, \detokenize{../../OPUS2}, \detokenize{./bibTemp}}`. Both files, `OPUS.bib` and `OPUS2.bib`, are almost always up-to-date for use by all project participants, so the need for temporary bib items under the file `bibTemp.bib` seldom arises.

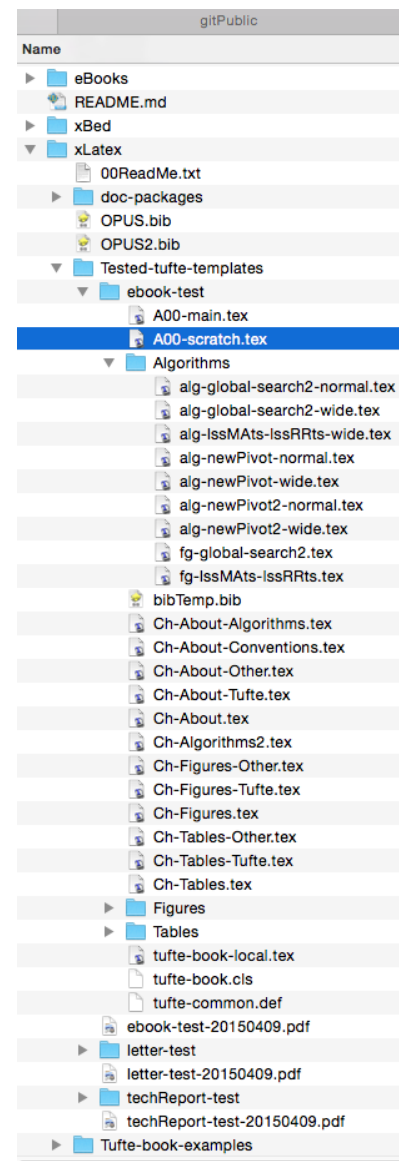


Figure 1.1: Notational conventions and schema for \LaTeX files to support collaboration.

1.2 Text Items Selected from Tufte's Book Template

THE PRIMARY TEXT ITEMS for this section are selections from Tufte Book Template¹ Here, we extracted three sections from the Chapter on *On the Use of the tufte-book Document Class*: From this template, we have extracted three sections

- Page Layout: Headings
- Sidenotes
- References

However, in this document, we treat all of these three sections as subsections.

Page Layout: Headings

TUFTE'S BOOKS include the following heading levels: parts, chapters,² sections, subsections, and paragraphs. Not defined by default are: sub-subsections and subparagraphs.

Heading	Style	Size
Part	roman	24/36×40 pc
Chapter	italic	20/30×40 pc
Section	italic	12/16×26 pc
Subsection	italic	11/15×26 pc
Paragraph	italic	10/14

¹ The Tufte Book Template can be accessed at <https://github.com/Tufte-LaTeX/tufte-latex>.

² Parts and chapters are defined for the `tufte-book` class only.

Table 1.1: Heading styles used in *Beautiful Evidence*.

Paragraph Paragraph headings (as shown here) are introduced by italicized text and separated from the main paragraph by a bit of space.

This style provides A- and B-heads (that is, `\section` and `\subsection`), demonstrated above.

If you need more than two levels of section headings, you'll have to define them yourself at the moment; there are no pre-defined styles for anything below a `\subsection`. As Bringhurst points out in *The Elements of Typographic Style*,³ you should "use as many levels of headings as you need: no more, and no fewer."

The Tufte- \LaTeX classes will emit an error if you try to use `\subsubsection` and smaller headings.

³ Robert Bringhurst. *The Elements of Typography*. Hartley & Marks, 3.1 edition, 2005

IN HIS LATER BOOKS,⁴ Tufte starts each section with a bit of vertical space, a non-indented paragraph, and sets the first few words of the

⁴ Edward R. Tufte. *Beautiful Evidence*. Graphics Press, LLC, first edition, May 2006

sentence in SMALL CAPS. To accomplish this using this style, use the `\newthought` command:

```
\newthought{In his later books}, Tufte starts...
```

Sidenotes

One of the most prominent and distinctive features of this style is the extensive use of sidenotes. There is a wide margin to provide ample room for sidenotes and small figures. Any `\footnotes` will automatically be converted to sidenotes.⁵ If you'd like to place ancillary information in the margin without the sidenote mark (the superscript number), you can use the `\marginnote` command.

The specification of the `\sidenote` command is:

```
\sidenote[⟨number⟩][⟨offset⟩]{Sidenote text.}
```

Both the `⟨number⟩` and `⟨offset⟩` arguments are optional. If you provide a `⟨number⟩` argument, then that number will be used as the sidenote number. It will change of the number of the current sidenote only and will not affect the numbering sequence of subsequent sidenotes.

Sometimes a sidenote may run over the top of other text or graphics in the margin space. If this happens, you can adjust the vertical position of the sidenote by providing a dimension in the `⟨offset⟩` argument. Some examples of valid dimensions are:

```
1.0in    2.54cm    254mm    6\baselineskip
```

If the dimension is positive it will push the sidenote down the page; if the dimension is negative, it will move the sidenote up the page.

While both the `⟨number⟩` and `⟨offset⟩` arguments are optional, they must be provided in order. To adjust the vertical position of the sidenote while leaving the sidenote number alone, use the following syntax:

```
\sidenote[][⟨offset⟩]{Sidenote text.}
```

The empty brackets tell the `\sidenote` command to use the default sidenote number.

If you *only* want to change the sidenote number, however, you may completely omit the `⟨offset⟩` argument:

```
\sidenote[⟨number⟩]{Sidenote text.}
```

The `\marginnote` command has a similar *offset* argument:

```
\marginnote[⟨offset⟩]{Margin note text.}
```

⁵ This is a sidenote that was entered using the `\footnote` command.

This is a margin note. Notice that there isn't a number preceding the note, and there is no number in the main text where this note was written.

References

References are placed alongside their citations as sidenotes, as well. This can be accomplished using the normal `\cite` command.⁶

The complete list of references may also be printed automatically by using the `\bibliography` command. (See the end of this document for an example.) If you do not want to print a bibliography at the end of your document, use the `\nobibliography` command in its place.

To enter multiple citations at one location,⁷ you can provide a list of keys separated by commas and the same optional vertical offset argument: `\cite{offset}{Tufte2006,Tufte1990}`.

`\cite[⟨offset⟩]{bibkey1,bibkey2,...}`

⁶ The first paragraph of this document includes a citation.

⁷ Edward R. Tufte. *Beautiful Evidence*. Graphics Press, LLC, first edition, May 2006; and Edward R. Tufte. *Envisioning Information*. Graphics Press, Cheshire, Connecticut, 1990

1.3 About Text Items from Other Sources

THE PRIMARY TEXT ITEMS for this section are selections from⁸.

The command `\cmt` as listed below, [creates a ‘comment’ sentence like this one.]

```
\newcommand{\cmt}[1]{\textsf{[#1]}}
```

The command `\OMIT` as listed below

```
\newcommand{\OMIT}[1]{}
```

suppresses a block of text listed in the latex source code below (it makes it invisible).

Local paragraph. This boldface headings, terminated with a period, *Local paragraph.* has been created by using the local command `\TOPIC`: see the command below

```
\newcommand{\TOPIC}[1]{\vspace{1.3ex}\par\noindent\textbf{#1.}}
```

NOTE: such heading may be considered ‘too bold’ in the context of Tufte’s ideas in *Beautiful Evidence*.

Tufte’s Paragraph Paragraph headings (as shown here) are introduced by italicized text and separated from the main paragraph by a bit of space. The command is

```
\paragraph{}
```

About the labs problem. The *aperiodic low-autocorrelation binary sequence* (labs) problem has a simple formulation: take a binary sequence of length L , $S = s_1 s_2 \dots s_L$, $s_i \in \{+1, -1\}$, the autocorrelation function $C_k(S) = \sum_{i=1}^{L-k} s_i s_{i+k}$, and minimize the energy function:

$$E(S) = \sum_{k=1}^{L-1} C_k^2(S) \quad (1.1)$$

or alternatively, maximize the *merit factor* F ⁹:

$$F(S) = L^2 / (2E(S)). \quad (1.2)$$

The asymptotic value for the maximum merit factor F , introduced by Golay, has been re-derived using arguments from statistical mechanics¹⁰:

$$\text{as } L \rightarrow \infty, \text{ then } F \rightarrow 12.3248 \quad (1.3)$$

The publication of the asymptotic value in Eq. 1.3 is providing an on-going challenge since no published solutions can yet claim to converge to this value as the length of the sequence increases.

Creating a filler text. The remainder of this paragraph has been created with the command `\lipsum[4]`. Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices.

⁸ Borko Bošković, Franc Brglez, and Janez Brest. Low-Autocorrelation Binary Sequences: On Improved Merit Factors and Runtime Predictions to Achieve Them. <http://arxiv.org/>, also under journal review, 2015

⁹ Marcel J.E. Golay. Sieves for low autocorrelation binary sequences. *IEEE: Transactions on Information Theory*, 23:43–51, 1977; Marcel J.E. Golay. The merit factor of long low autocorrelation binary sequences. *IEEE: Transactions on Information Theory*, 28:543–549, 1982; and Marcel J.E. Golay and Duncan B. Harris. A new search for skewsymmetric binary sequences with optimal merit factors. *Information Theory, IEEE Transactions on*, 36(5):1163–1166, 1990

¹⁰ Jacob Bernasconi. Low autocorrelation binary sequences: statistical mechanics and configuration space analysis. *J. Phys.*, 48:559–567, April 1987

Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

More about the labs problem. Finding the optimum sequence is significantly harder than solving the special cases of the Ising spin-glass problems with limited interaction and periodic boundary conditions, for example¹¹. While effective methods have been presented to solve the special cases¹², up to $L = 400$, the best merit factors that has also been *proven optimal* for the problem as formulated in Eq. 1.2 are presently known for values of $L \leq 60$ only¹³. A web page of labs best merit factors and solutions, up to the sequence length of $L = 304$, has been compiled by Joshua Knauer in 2002. This page is no longer accessible and has now been restored at two mirroring sites¹⁴ next to additional and comprehensive tables of *best-value solutions*. These tables contain not only updates on the best known figures of merit but also on the number of *unique* solutions in *canonic form* and the solutions themselves.

Now, we need more text on this page if we are to make extra space for the citation that should be moved into the margins on the next page. Can or should we have *some citations* not appear in the margin, only at under Bibliography at the very end? Such a feature would not appear logical in the context of Tufte's book template, would it? The message from Tufte's book template seem to be: do not overcrowd with citations on any given page, have sufficient text to justify the introduction (and context) of any new citation ... This criterion can be considered different for books when compared to peer-reviewed article ...

This text has been created with the command `\lipsum[4]`. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis,

¹¹ Martin Pelikan and David E. Goldberg. Hierarchical boa solves ising spin glasses and maxsat. In *Proceedings of the 2003 international conference on Genetic and evolutionary computation: PartII*, GECCO'03, pages 1271–1282, Berlin, Heidelberg, 2003. Springer-Verlag

¹² Martin Pelikan and David E. Goldberg. Hierarchical boa solves ising spin glasses and maxsat. In *Proceedings of the 2003 international conference on Genetic and evolutionary computation: PartII*, GECCO'03, pages 1271–1282, Berlin, Heidelberg, 2003. Springer-Verlag

¹³ Stephan Mertens. Exhaustive search for low-autocorrelation binary sequences. *Journal of Physics A: Mathematical and General*, 29:473–481, 1996. The sequences for $48 < L \leq 60$ have been found with an improved implementation due to Heiko Bauke. All values are available at <http://www-e.uni-magdeburg.de/mertens/research/labs/open.dat>

¹⁴ LABS Problem: 2002 Merit Factor Records posted by Knauer. Now reposted under two mirroring sites: <http://cbl.ncsu.edu/xBed/xProj/B.labs/> and <http://labraj.uni-mb.si/en/B.labs>, 2014

diam. Duis eget orci sit amet orci dignissim rutrum.

Relationships between results reported in¹⁵ and¹⁶, and all subsequent updates under¹⁷ are depicted in four panels in Figure 2.4 (See Chapter 2. The latest experimental results support the trend towards the conjectured asymptotic value of $F = 12.3248$, however as we demonstrate later on in the paper, the computational cost to reach this value may well exceed the currently available resources unless a better solver is discovered.

¹⁵ Marcel J.E. Golay. The merit factor of long low autocorrelation binary sequences. *IEEE: Transactions on Information Theory*, 28:543–549, 1982; and G.F.M. Beenker, T.A.C.M. Claasen, and P.W.C. Hermens. Binary sequences with a maximally flat amplitude spectrum. *Philips J. Res.*, vol. 40:289–304, 1985

¹⁶ Jacob Bernasconi. Low autocorrelation binary sequences: statistical mechanics and configuration space analysis. *J. Phys.*, 48:559–567, April 1987; and Marcel J.E. Golay and Duncan B. Harris. A new search for skewsymmetric binary sequences with optimal merit factors. *Information Theory, IEEE Transactions on*, 36(5):1163–1166, 1990

¹⁷ Franc Brglez, Janez Brest, and Borko Bošković. Home Page of the LABS Problem Performance Experiments and Solutions. Posted under two mirroring sites: <http://cbl.ncsu.edu/xBed/xProj/B.labs/> and <http://labraj.uni-mb.si/en/B.labs>, 2014

1.4 Typesetting Examples of Algorithms

THERE ARE A NUMBER of examples of algorithms in this section. For additional examples of algorithms, see Chapter 4.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Algorithm 1 Procedure newPivot.saw – normal width.

```

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i \mid d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \mid \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:  else ▷ deal with a trapped pivot
11:     $\beta = \beta + 1$ 
12:     $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:     $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:  end if
16:  return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

THE ALGORITHM EXAMPLES are listed in this order:

1. Algorithm 1 is in-line and normal width.
2. Algorithm 2 is in-line and full-width below a full-width Figure 2.3.
3. Algorithm 3 is on a full page and normal width.
4. Algorithm 3 is on a full page and full-width.
5. Algorithm 5 is at the top of the page and full-width.

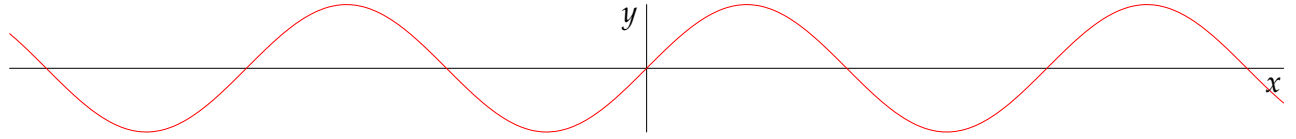


Figure 1.2: This graph shows $y = \sin x$ from about $x = [-10, 10]$. Notice that this figure takes up the full page width.

Algorithm 2 Procedure `newPivot.saw` – using algorithm-wide environment.

```

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i \mid d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega-1}) \mid \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:  else ▷ deal with a trapped pivot
11:     $\beta = \beta + 1$ 
12:     $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:     $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:  end if
16:  return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

NOTABLY, typesetting of the Algorithm 2 results in excessive width, for better rendition of identical algorithm, see Algorithm 1 in the preceding page.

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ON THE NEXT PAGE, Algorithm 3 takes a full page at normal width. However, the version in Algorithm 4 describes the same algorithm, also on a full page, but in a wider, easier-to-read format.

Algorithm 3 A fully instrumented version of solver `lss0rel` – normal width.

```

1: procedure lss0rel( $\sigma_0, \Theta_L^{ub}, t_{lmt}, \omega_{lmt}$ )
2:    $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}(\sigma_0)$   $\triangleright$  initial solution
3:    $\tau \leftarrow 1$   $\triangleright$  initialize cntProbe
4:    $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$   $\triangleright$  initial best solution
5:    $isCens \leftarrow 0$   $\triangleright$  initialize isCensored
6:    $tgReached \leftarrow 0$   $\triangleright$  initialize targetReached
7:    $\beta \leftarrow 0$   $\triangleright$  initialize cntTrapped
8:    $\omega \leftarrow 0$   $\triangleright$  initialize total number of steps
9:   while true do
10:     $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \text{walk.saw}(\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt})$   $\triangleright$  return a completed walk segment
11:     $\omega \leftarrow \omega + \omega_s$   $\triangleright$  update total number of steps
12:    if  $\Theta(\underline{\zeta}^*) \leq \Theta_L^{ub}$  then
13:      if  $\Theta(\underline{\zeta}^*) = \Theta_L^{ub}$  then
14:         $tgReached = 1$   $\triangleright$  upper-bound is reached
15:      else
16:         $tgReached = 2$   $\triangleright$  upper-bound is improved
17:      end if
18:      break
19:    end if
20:    if  $t \geq t_{lmt}$  then
21:       $isCens \leftarrow 1$   $\triangleright$  return solution as “censored”
22:      break
23:    end if
24:     $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}()$   $\triangleright$  initialize a new walk segment
25:     $\tau \leftarrow \tau + 1$   $\triangleright$  update cntProbe
26:     $\omega \leftarrow \omega + 1$   $\triangleright$  update total number of steps
27:  end while
28:   $Table \leftarrow (\sigma_0, \underline{\zeta}^*, \Theta(\underline{\zeta}^*), \omega, \tau, t, isCens, tgReached)$ 
29: end procedure

```

```

1: procedure walk.saw( $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt}$ ) : procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:   if  $\Theta(\underline{\zeta}_0) \leq \Theta(\underline{\zeta}^*)$  then
3:      $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$   $\triangleright$  new best solution
4:   end if
5:    $\omega_s \leftarrow 0$   $\triangleright$  walk segment length
6:    $Walk_0 \leftarrow \{\underline{\zeta}_0\}$   $\triangleright$  new walk segment
7:   while  $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$  and  $\omega_s < \omega_{lmt}$  do
8:     if  $t \geq t_{lmt}$  then  $\triangleright$  timeout
9:       break
10:    end if
11:     $\omega_s = \omega_s + 1$   $\triangleright$  a new step!
12:     $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow$ 
13:     $\leftarrow \text{newPivot.saw}(\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1})$ 
14:    if  $\Theta(\underline{\zeta}_{\omega_s}) \leq \Theta(\underline{\zeta}^*)$  then
15:       $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
16:    end if
17:  end while
18:  return  $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*)$ 
19: end procedure

```

```

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{ \underline{\zeta}_{\omega_s-1}^i | d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p \}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{ \mathcal{N}(\underline{\zeta}_{\omega_s-1}) | \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1} \}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + | \mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) |$   $\triangleright$  update cntProbe
10:   else  $\triangleright$  deal with a trapped pivot
11:      $\beta = \beta + 1$ 
12:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$   $\triangleright$  re-initialize
13:      $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:      $\tau \leftarrow \tau + 1$   $\triangleright$  update cntProbe
15:   end if
16:   return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

Algorithm 4 A fully instrumented version of solver `lss0rel` – using algorithm-wide environment.

```

1: procedure lss0rel( $\sigma_0, \Theta_L^{ub}, t_{lmt}, \omega_{lmt}$ )
2:    $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}(\sigma_0)$  ▷ initial solution
3:    $\tau \leftarrow 1$  ▷ initialize cntProbe
4:    $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$  ▷ initial best solution
5:    $isCens \leftarrow 0$  ▷ initialize isCensored
6:    $tgReached \leftarrow 0$  ▷ initialize targetReached
7:    $\beta \leftarrow 0$  ▷ initialize cntTrapped
8:    $\omega \leftarrow 0$  ▷ initialize total number of steps
9:   while true do
10:     $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \text{walk.saw}(\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt})$  ▷ return a completed walk segment
11:     $\omega \leftarrow \omega + \omega_s$  ▷ update total number of steps
12:    if  $\Theta(\underline{\zeta}^*) \leq \Theta_L^{ub}$  then
13:      if  $\Theta(\underline{\zeta}^*) = \Theta_L^{ub}$  then
14:         $tgReached = 1$  ▷ upper-bound is reached
15:      else
16:         $tgReached = 2$  ▷ upper-bound is improved
17:      end if
18:      break
19:    end if
20:    if  $t \geq t_{lmt}$  then
21:       $isCens \leftarrow 1$  ▷ return solution as “censored”
22:      break
23:    end if
24:     $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}()$  ▷ initialize a new walk segment
25:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
26:     $\omega \leftarrow \omega + 1$  ▷ update total number of steps
27:  end while
28:   $Table \leftarrow (\sigma_0, \underline{\zeta}^*, \Theta(\underline{\zeta}^*), \omega, \tau, t, isCens, tgReached)$ 
29: end procedure

1: procedure walk.saw( $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt}$ )
2:   if  $\Theta(\underline{\zeta}_0) \leq \Theta(\underline{\zeta}^*)$  then
3:      $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$  ▷ new best solution
4:   end if
5:    $\omega_s \leftarrow 0$  ▷ walk segment length
6:    $Walk_0 \leftarrow \{\underline{\zeta}_0\}$  ▷ new walk segment
7:   while  $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$  and  $\omega_s < \omega_{lmt}$  do
8:     if  $t \geq t_{lmt}$  then ▷ timeout
9:       break
10:    end if
11:     $\omega_s = \omega_s + 1$  ▷ a new step!
12:     $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow$ 
13:       $\leftarrow \text{newPivot.saw}(\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1})$ 
14:    if  $\Theta(\underline{\zeta}_{\omega_s}) \leq \Theta(\underline{\zeta}^*)$  then
15:       $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
16:    end if
17:  end while
18:  return  $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*)$ 
19: end procedure

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i \mid d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \mid \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:   else ▷ deal with a trapped pivot
11:      $\beta = \beta + 1$ 
12:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:      $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:      $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:   end if
16:   return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

Algorithm 5 lssMAts and lssRRts algorithms – using algorithm-wide environment.

	setting	value
1: procedure lssMAts(Θ_L^{ub}, t_{lmt})	population size:	100
2: for $i \leftarrow 1$ to $popsiz$ do	mutation probability:	$2/(L+1)$
3: $pop_i \leftarrow \text{RandomBinarySequence}(L)$	crossover probability:	0.9
4: Evaluate(pop_i)	tournament selection size:	2
5: end for	crossover:	uniform
6: $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$	tabu search walk length:	a random choice from the range $[\frac{L}{2}, \frac{3L}{2}]$
7: while $t < t_{lmt}$ and $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$ do		
8: for $i = 1$ to $offsize$ do		
9: if recombination is performed (p_X) then		
10: $parent_1 \leftarrow \text{Select}(pop)$		
11: $parent_2 \leftarrow \text{Select}(pop)$		
12: $offspring_i \leftarrow \text{Recombine}(parent_1, parent_2)$		
13: else		
14: $offspring_i \leftarrow \text{Select}(pop)$		
15: end if		
16: if mutation is performed (p_m) then		
17: $offspring_i \leftarrow \text{Mutate}(offspring_i)$		
18: end if		
19: $offspring_i \leftarrow \text{TabuSearch}(offspring_i)$		
20: Evaluate($offspring_i$)		
21: end for		
22: $pop \leftarrow \text{Replace}(pop, offspring)$		
23: $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$		
24: end while		
25: end procedure		
	1: procedure lssRRts(Θ_L^{ub}, t_{lmt})	
	2: $pop_1 \leftarrow \text{RandomBinarySequence}(L)$	
	3: Evaluate(pop_1)	
	4: $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$	
	5: while $t < t_{lmt}$ and $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$ do	
	6: $pop_1 \leftarrow \text{RandomBinarySequence}(L)$	
	7: $pop_1 \leftarrow \text{TabuSearch}(pop_1)$	
	8: Evaluate(pop_1)	
	9: $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$	
	10: end while	
	11: end procedure	

ON THIS PAGE, Algorithm 5 is placed at the top of the page with the [!t] option. Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

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HERE IS a simple in-line Algorithm description we can include, with some restrictions, in a margin note as well.

Algorithm 6 Pseudo code for lssRRts – in-line version

```

1: procedure lssRRts( $\Theta_L^{ub}, t_{lmt}$ )
2:    $pop_1 \leftarrow \text{RandomBinarySequence}(L)$ 
3:   Evaluate( $pop_1$ )
4:    $\Theta(\underline{c}^*) \leftarrow \text{ValueBest}(\text{pop})$ 
5:   while  $t < t_{lmt}$  and  $\Theta(\underline{c}^*) > \Theta_L^{ub}$  do
6:      $pop_1 \leftarrow \text{RandomBinarySequence}(L)$ 
7:      $pop_1 \leftarrow \text{TabuSearch}(pop_1)$ 
8:     Evaluate( $pop_1$ )
9:      $\Theta(\underline{c}^*) \leftarrow \text{ValueBest}(\text{pop})$ 
10:  end while
11: end procedure

```

HERE IS A MARGIN NOTE for a pseudo-code that describes a simple procedure. NOTE: we cannot use the `\algorithm` and `\caption` environment under `\marginnote`.

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```

1: procedure lssRRts( $\Theta_L^{ub}, t_{lmt}$ )
2:    $pop_1 \leftarrow \text{RandBinSeq}(L)$ 
3:   Evaluate( $pop_1$ )
4:    $\Theta(\underline{c}^*) \leftarrow \text{ValueBest}(\text{pop})$ 
5:   while
6:      $t < t_{lmt}$  and  $\Theta(\underline{c}^*) > \Theta_L^{ub}$ 
7:   do
8:      $pop_1 \leftarrow \text{RandBinSeq}(L)$ 
9:      $pop_1 \leftarrow \text{TabuSearch}(pop_1)$ 
10:    Evaluate( $pop_1$ )
11:     $\Theta(\underline{c}^*) \leftarrow \text{ValueBest}(\text{pop})$ 
12:  end while
13: end procedure

```

2

About Figures

FIGURES IN THIS CHAPTER are divided into two sections: (1) figures from Tufte, (2) figures from other sources.

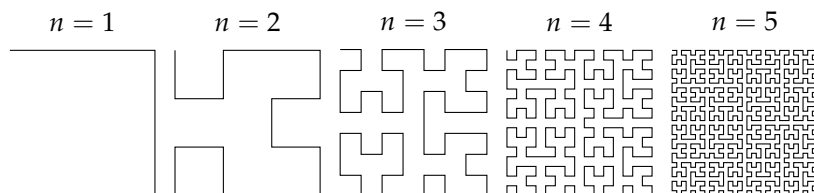
FOR DETAILS about how various text items are being represented, see Chapter 1.

2.1 Figures from Tufte

ABOUT THE FIGURES from Tufte:

- a margin figure, fg-tufte-margin-helix, Figure 2.1,
- a normal-width figure, fg-tufte-normal-hilbertcurves, Figure 2.2, and
- a full-width figure, fg-tufte-wide-sine, Figure 2.3.

.



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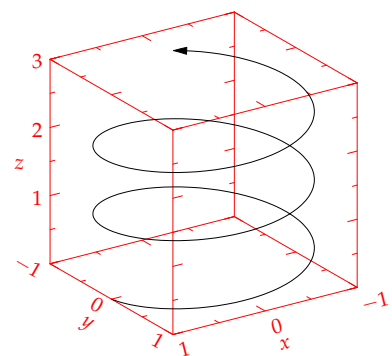


Figure 2.1: This is a margin figure. The helix is defined by $x = \cos(2\pi z)$, $y = \sin(2\pi z)$, and $z = [0, 2.7]$. The figure was drawn using Asymptote (<http://asymptote.sf.net/>).

Figure 2.2: Hilbert curves of various degrees n . Notice that this figure only takes up the main textblock width.

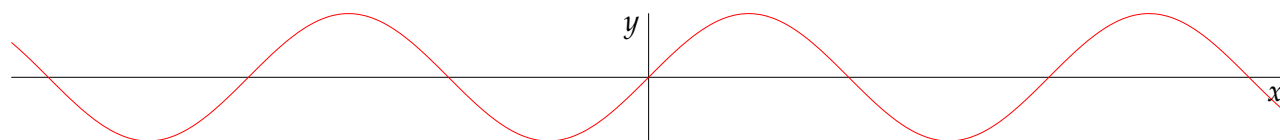


Figure 2.3: This graph shows $y = \sin x$ from about $x = [-10, 10]$. Notice that this figure takes up the full page width.

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2.2 Figures from Other Sources

THE FILE `fg-R-labs-wide-4-figures.tex` renders Figure 2.4, used in¹. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

¹ Borko Bošković, Franc Brglez, and Janez Brest. Low-Autocorrelation Binary Sequences: On Improved Merit Factors and Runtime Predictions to Achieve Them. <http://arxiv.org/>, also under journal review, 2015

THE FILE `fg-R-labs-wide-6-figures.tex` renders Figure 2.5. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

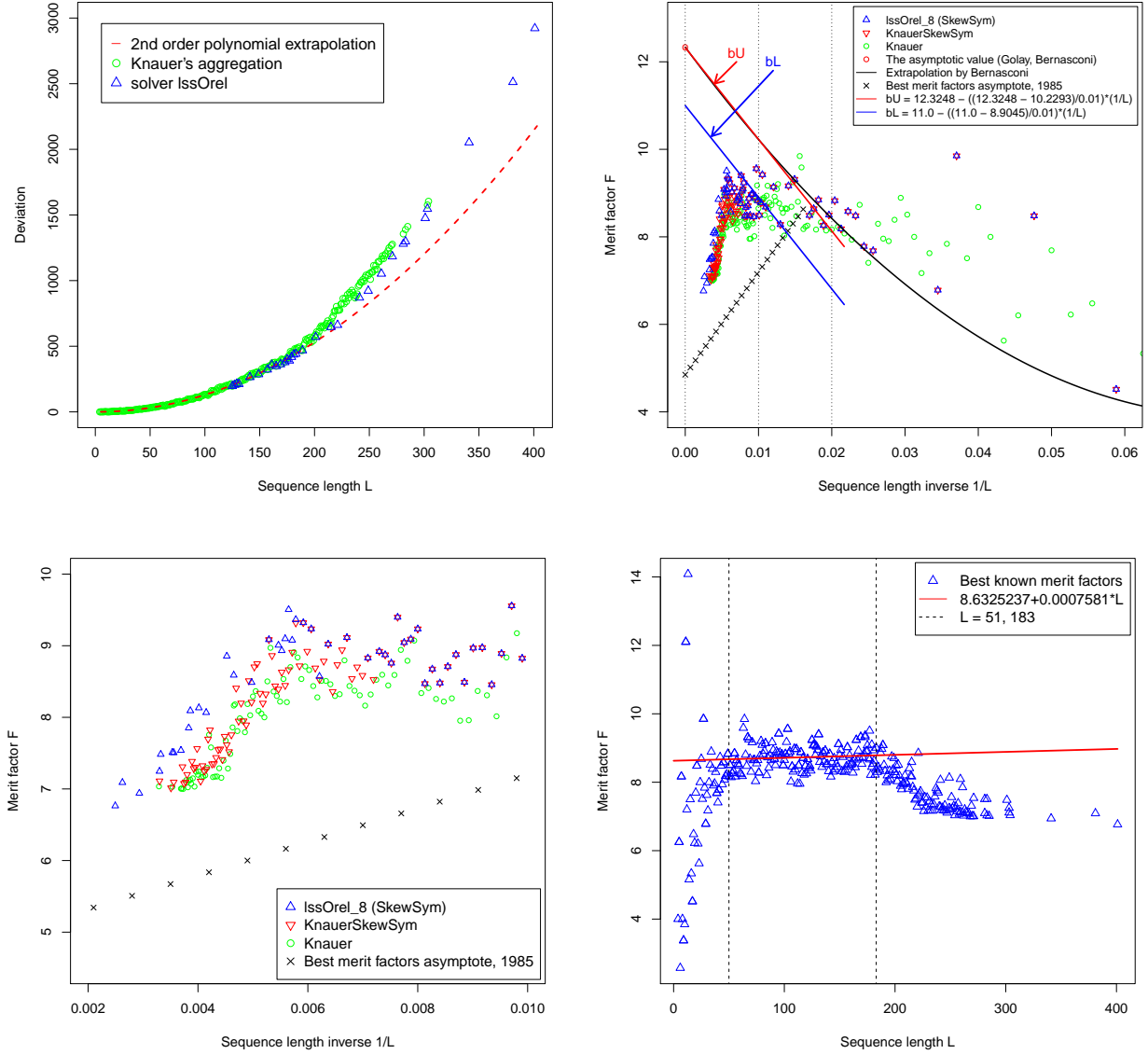


Figure 2.4: From the file fg-R-labs-wide-4-figures.tex borrowed from Lib-OPUS2-labs-2015-arxiv-Boskovic. **NOTE: both 'verb' and 'cite' commands seem disabled under 'figure environment'!** (a) it may not be possible to create (a) in this file with \LaTeX ... may need to create it in R; (b) it may not be possible to create (b) in this file with \LaTeX ... may need to create it in R; (c) it may not be possible to create (c) in this file with \LaTeX ... may need to create it in R; (d) it may not be possible to create (d) in this file with \LaTeX ... may need to create it in R.

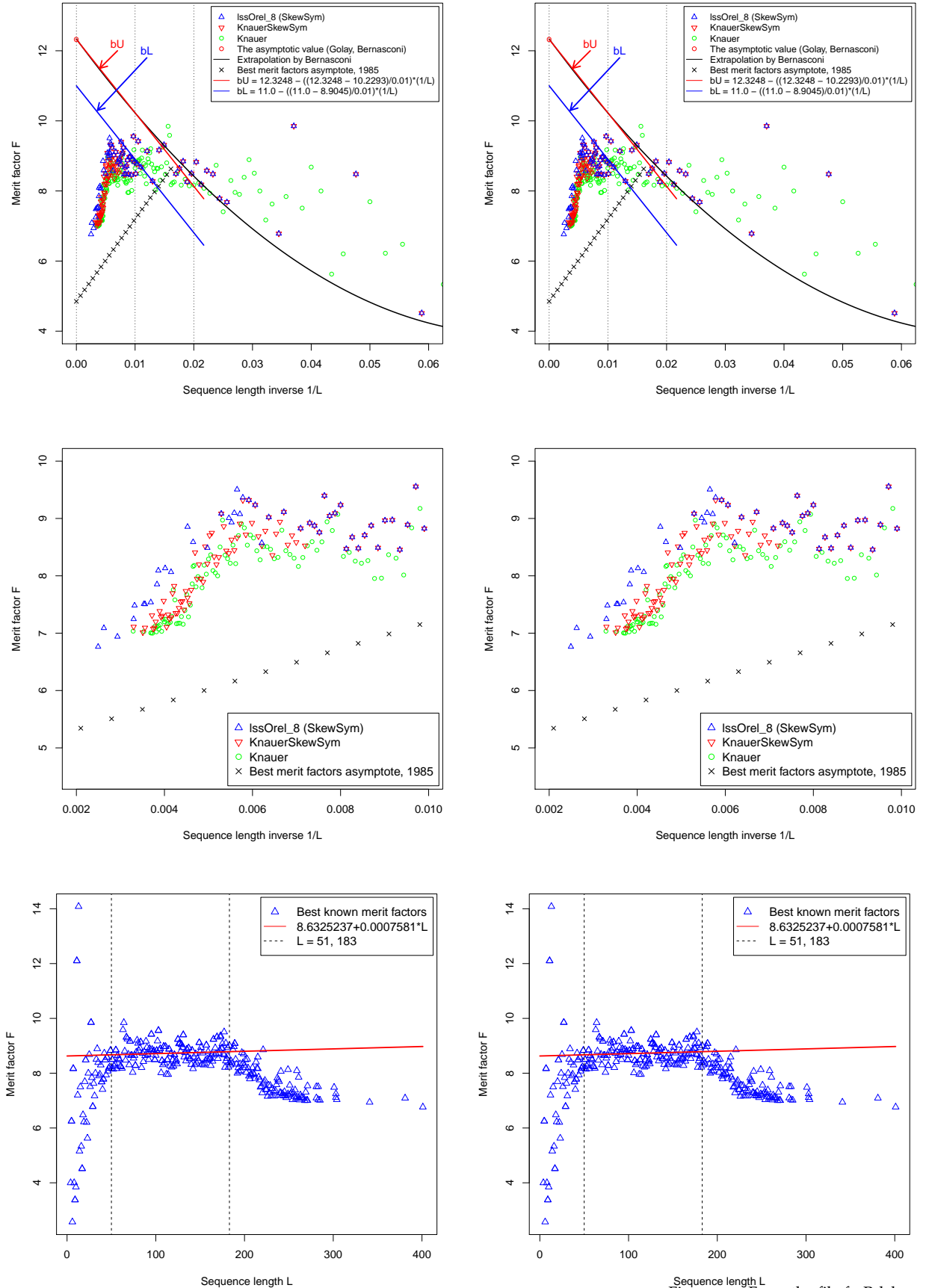


Figure 2.5: From the file fg-R-labs-wide-6-figures.tex borrowed from Lib-OPUS2-labs-2015-arxiv-Boskovic.

THE FILE `fg-R-labs-normal-3-figures.tex` renders Figure 2.6.

NOTE AGAIN: both ‘verb’ and ‘cite’ commands seem disabled under ‘figure environment’! Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

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² Franc Brglez, Yang Ho, and Johnny Nguyen. *On Combinatorial Optimization and Rapid Prototyping of Stochastic Solvers*. Search for eBooks under <https://github.com/fbrglez/gitPublic/> ... For edited chapters from the book, search under <http://arxiv.org/>, 2015

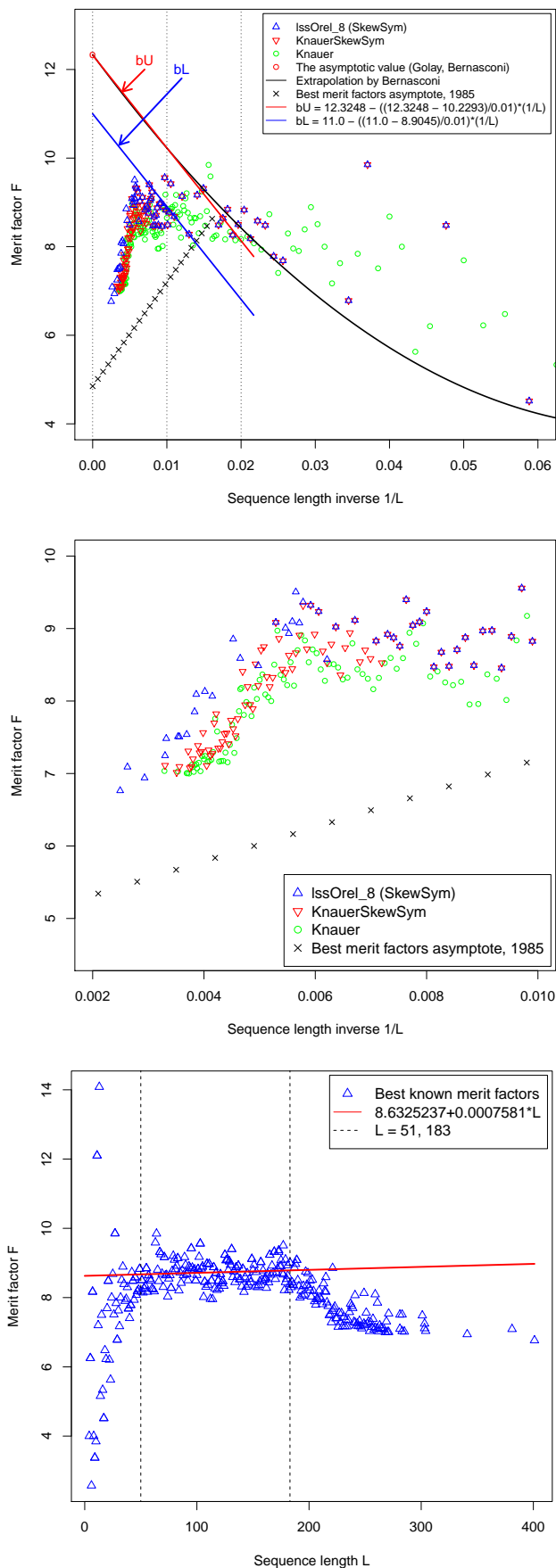


Figure 2.6: From the file fg-R-labs-normal-3-figures.tex borrowed from Lib-0PUS2-labs-2015-arxiv-Boskovic. **NOTE: both ‘verb’ and ‘cite’ commands seem disabled under ‘figure environment’!** Also, 3 vertical plots in portrait from R create more white space than the 4 plots from R in wide format, see Figure 2.4. Then, (a) it may not be possible to create (a) in this file with \LaTeX ... may need to create it in R; (b) it may not be possible to create (b) in this file with \LaTeX ... may need to create it in R; (c) it may not be possible to create (c) in this file with \LaTeX ... may need to create it in R.

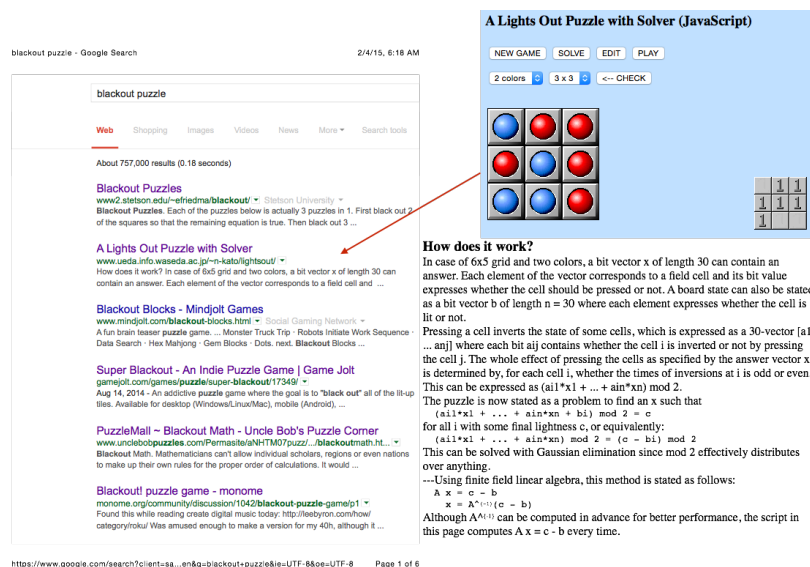
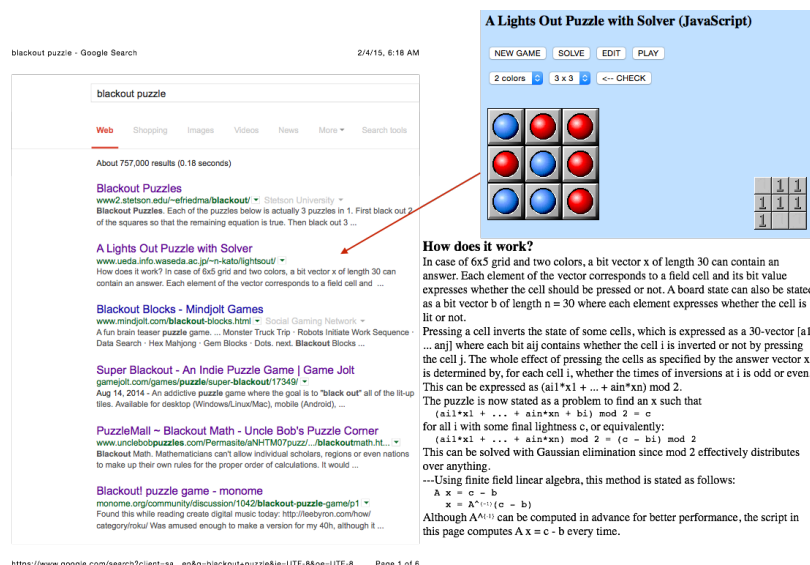
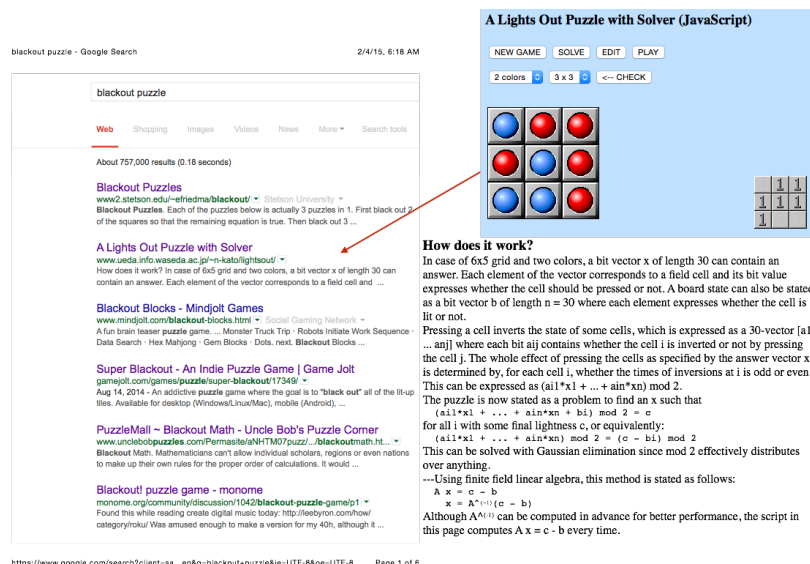


Figure 2.7: From the file fg-key-blackp-portrait-3-figures.tex *borrowed from* Lib-0PU52-ebook-CSC499-Sp15-2015-Brglez. **NOTE: both 'verb' and 'cite' commands seem disabled under 'figure environment'!** Also, the portrait of 3 plots from Keynote are larger than the 3 plots from R in portrait format, see Figure ?? . Then, (a) it may not be possible to create (a) in this file with \LaTeX ... may need to create it in Keynote; (b) it may not be possible to create (b) in this file with \LaTeX ... may need to create it in Keynote; (c) it may not be possible to create (c) in this file with \LaTeX ... may need to create it in Keynote.

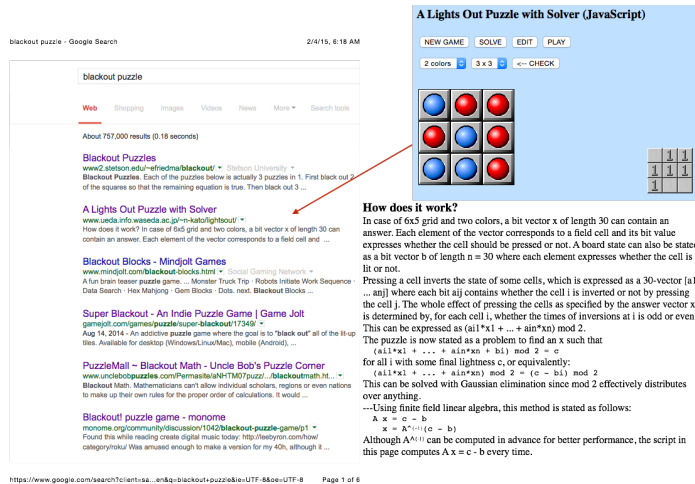


Figure 2.8: From the file fg-key-blackp-normal-2-figures.tex *borrowed from* Lib-0PUS2-ebook-CSC499-Sp15-2015-Brglez. **NOTE:** both ‘verb’ and ‘cite’ commands seem disabled under ‘figure environment’!

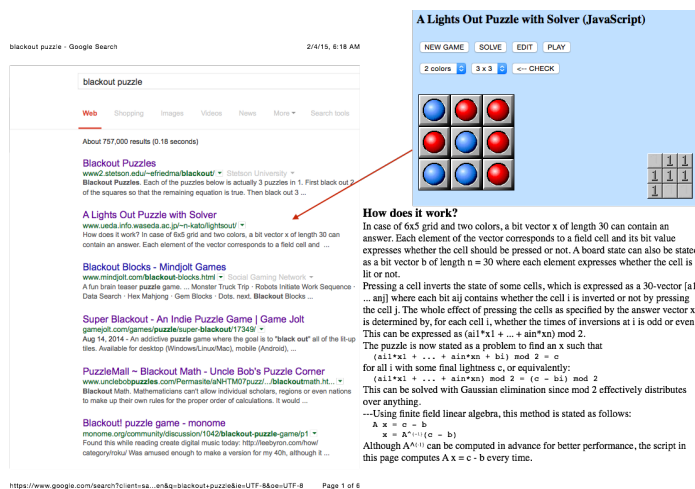


Figure 2.9: From the file fg-key-blackp-normal-2-figures.tex *borrowed from* Lib-0PUS2-ebook-CSC499-Sp15-2015-Brglez. **NOTE:** both ‘verb’ and ‘cite’ commands seem disabled under ‘figure environment’!

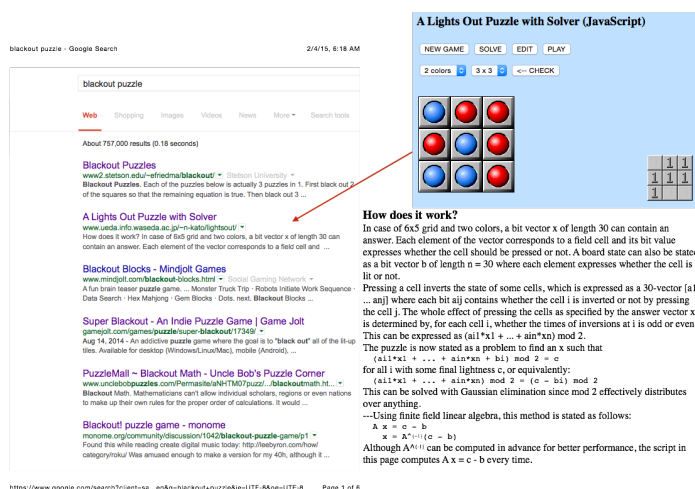
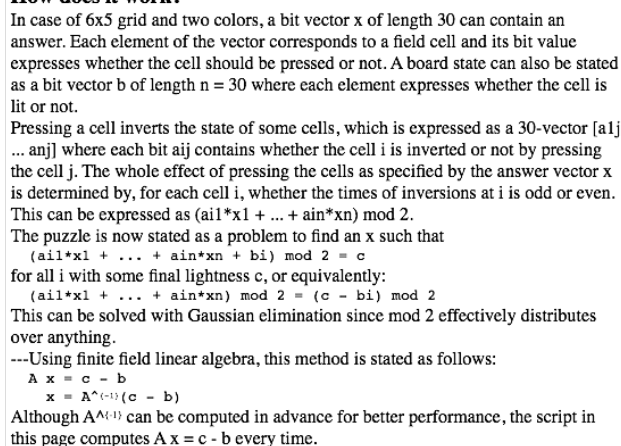


Figure 2.10: From the file fg-key-blackp-normal-2-figures.tex *borrowed from* Lib-0PUS2-ebook-CSC499-Sp15-2015-Brglez. **NOTE:** both ‘verb’ and ‘cite’ commands seem disabled under ‘figure environment’!

[illegible]

blackout puzzle - Google Search

2/4/15, 6:18 AM

blackout puzzle

About 757,000 results (0.18 seconds)

Blackout Puzzles
www2.stetson.edu/~efriedma/blackout/ - Stetson University -
 Blackout Puzzles. Each of the puzzles below is actually 3 puzzles in 1. First black out 2 of the squares so that the remaining equation is true. Then black out 3 ...

A Lights Out Puzzle with Solver
www.ueda.info.waseda.ac.jp/~n-kato/lightsout/ -
 How does it work? In case of 6x5 grid and two colors, a bit vector x of length 30 can contain an answer. Each element of the vector corresponds to a field cell and its bit value expresses whether the cell should be pressed or not. A board state can also be stated as a bit vector b of length n = 30 where each element expresses whether the cell is lit or not.
 Pressing a cell inverts the state of some cells, which is expressed as a 30-vector [a_{1j} ... a_{nj}] where each bit a_{ij} contains whether the cell i is inverted or not by pressing the cell j. The whole effect of pressing the cells as specified by the answer vector x is determined by, for each cell i, whether the times of inversions at i is odd or even. This can be expressed as (a_{i1}*x₁ + ... + a_{in}*x_n) mod 2. The puzzle is now stated as a problem to find an x such that (a_{i1}*x₁ + ... + a_{in}*x_n + b_i) mod 2 = c for all i with some final lightness c, or equivalently: (a_{i1}*x₁ + ... + a_{in}*x_n) mod 2 = (c - b_i) mod 2
 This can be solved with Gaussian elimination since mod 2 effectively distributes over anything.
 ---Using finite field linear algebra, this method is stated as follows:
 $Ax = c - b$
 $x = A^{(-1)}(c - b)$
 Although $A^{(-1)}$ can be computed in advance for better performance, the script in this page computes $Ax = c - b$ every time.

Blackout Blocks - Mindjolt Games
www.mindjolt.com/blackout-blocks.html - Social Gaming Network -
 A fun brain teaser puzzle game. ... Monster Truck Trip · Robots Initiate Work Sequence · Data Search · Hex Mahjong · Gem Blocks · Dots. next. Blackout Blocks ...

Super Blackout - An Indie Puzzle Game | Game Jolt
gamejolt.com/games/puzzle/super-blackout/17349/ -
 Aug 14, 2014 - An additive puzzle game where the goal is to "black out" all of the lit-up tiles. Available for desktop (Windows/Linux/Mac), mobile (Android), ...

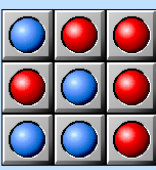

PuzzleMail ~ Blackout Math - Uncle Bob's Puzzle Corner
www.unclebobpuzzles.com/Permasite/aNHTM07puzzl.../blackoutmath.html -
 Blackout Math. Mathematicians can't allow individual scholars, regions or even nations to make up their own rules for the proper order of calculations. It would ...

Blackout! puzzle game - monome
monome.org/community/discussion/1042/blackout-puzzle-game/p1 -
 Found this while reading create digital music today: <http://leebyron.com/how/category/roku/> Was amused enough to make a version for my 40th, although it ...

A Lights Out Puzzle with Solver (JavaScript)

NEW GAME SOLVE EDIT PLAY

2 colors 3 x 3 <-- CHECK

How does it work?
 In case of 6x5 grid and two colors, a bit vector x of length 30 can contain an answer. Each element of the vector corresponds to a field cell and its bit value expresses whether the cell should be pressed or not. A board state can also be stated as a bit vector b of length n = 30 where each element expresses whether the cell is lit or not.
 Pressing a cell inverts the state of some cells, which is expressed as a 30-vector [a_{1j} ... a_{nj}] where each bit a_{ij} contains whether the cell i is inverted or not by pressing the cell j. The whole effect of pressing the cells as specified by the answer vector x is determined by, for each cell i, whether the times of inversions at i is odd or even. This can be expressed as (a_{i1}*x₁ + ... + a_{in}*x_n) mod 2. The puzzle is now stated as a problem to find an x such that (a_{i1}*x₁ + ... + a_{in}*x_n + b_i) mod 2 = c for all i with some final lightness c, or equivalently: (a_{i1}*x₁ + ... + a_{in}*x_n) mod 2 = (c - b_i) mod 2
 This can be solved with Gaussian elimination since mod 2 effectively distributes over anything.
 ---Using finite field linear algebra, this method is stated as follows:
 $Ax = c - b$
 $x = A^{(-1)}(c - b)$
 Although $A^{(-1)}$ can be computed in advance for better performance, the script in this page computes $Ax = c - b$ every time.

https://www.google.com/search?client=sa...&q=blackout+puzzle&ie=UTF-8&oe=UTF-8 Page 1 of 6

```
% B.blackp.exhA 3,3 6526
valueBest=0
bestAry(2) = 000000110:0
seedInit=6526...coordInit=000110001
%

% array unset mAdd INITIALIZE
% array set mAdd [B.blackp.patterns 3,3]
% parray mAdd
mAdd(1,1,0) = 1
mAdd(1,1,1) = 1
mAdd(1,1,2) = 0
mAdd(1,1,3) = 1
mAdd(1,1,4) = 0
mAdd(1,1,5) = 0
mAdd(1,1,6) = 0
mAdd(1,1,7) = 0
mAdd(1,1,8) = 0
mAdd(1,2,0) = 1
mAdd(1,2,1) = 1
mAdd(1,2,2) = 1
mAdd(1,2,3) = 0
...
...

% B.blackp.f 000000111 000110001
3

% B.coord.neighborhood 000000111
coordPivot
000000111
coordNeighbors
100000111
010000111
001000111
000100111
000010111
000000111
000000011
000000101
000000110

% B.blackp.f 100000111 000110001
6
% B.blackp.f 010000111 000110001
7
% B.blackp.f 001000111 000110001
4
% B.blackp.f 000100111 000110001
7
% B.blackp.f 000010111 000110001
4
% B.blackp.f 000000111 000110001
3
% B.blackp.f 000000011 000110001
4
% B.blackp.f 000000101 000110001
3
% B.blackp.f 000000110 000110001
0
```

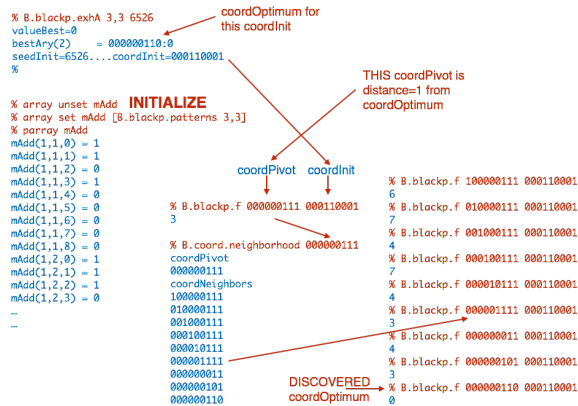
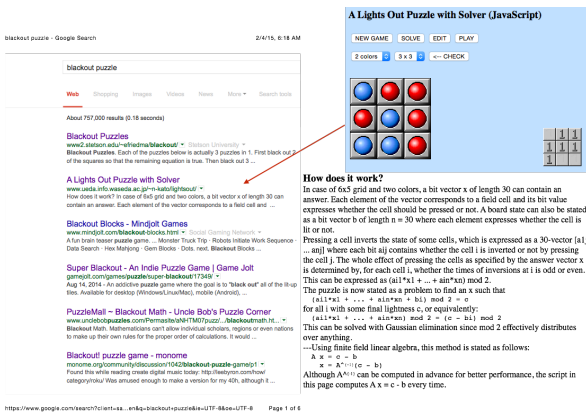
coordOptimum for this coordInit

THIS coordPivot is distance=1 from coordOptimum

coordPivot coordInit

DISCOVERED coordOptimum

Figure 2.12: From the file fg-key-blackp-wide-2-figures.tex borrowed from Lib-OPUS2-ebook-CSC499-Sp15-2015-Brglez.



THE FILE `fg-key-blackp-wide-4-figures.tex`, renders Figure 2.13.

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Figure 2.13: From the file fg-key-blackp-wide-4-figures.tex *borrowed from* Lib-0PUS2-ebook-CSC499-Sp15-2015-Brolez.

3

About Tables

TABLES IN THIS CHAPTER are divided into two sections: (1) tables from Tufte, (2) tables from other sources.

FOR DETAILS about how various text items are being represented, see Chapter 1.

3.1 *Tables from Tufte*

ABOUT THE TABLES from Tufte: Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

- a normal-width table, `tb-tufte-normal-headings`, Table 3.1,
- a normal-width table, `tb-tufte-normal-fontSizes`, Table 3.2,
- a normal-width table, `tb-tufte-normal-environmentStyles`, Table 3.3,
- a normal-width table, `tb-tufte-normal-environmentStyles`, Table 3.4, and
- a wide table, `tb-tufte-wide-extraColumn`, Table 3.5.

Heading	Style	Size
Part	roman	24/36×40 pc
Chapter	italic	20/30×40 pc
Section	italic	12/16×26 pc
Subsection	italic	11/15×26 pc
Paragraph	italic	10/14

Table 3.1: Heading styles used in *Beautiful Evidence*.

L ^A T _E X size	Font size	Leading	Used for
\tiny	5	6	sidenote numbers
\scriptsize	7	8	–
\footnotesize	8	10	sidenotes, captions
\small	9	12	quote, quotation, and verse environments
\normalsize	10	14	body text
\large	11	15	B-heads
\Large	12	16	A-heads, TOC entries, author, date
\LARGE	14	18	handout title
\huge	20	30	chapter heads
\Huge	24	36	part titles

Table 3.2: A list of L^AT_EX font sizes as defined by the Tufte-L^AT_EX document classes.

Environment	Font size	Notes
Body text	10/14×26 pc	
Block quote	9/12×24 pc	Block indent (left and right) by 1 pc
Sidenotes	8/10×12 pc	Sidenote number is set inline, followed by word space
Captions	8/10×12 pc	

Table 3.3: Environment styles used in *Beautiful Evidence*.

Margin	Length
Paper width	8½ inches
Paper height	11 inches
Textblock width	6½ inches
Textblock/sidenote gutter	¾ inches
Sidenote width	2 inches

Table 3.4: Here are the dimensions of the various margins used in the Tufte-handout class.

Environment	Font size	Notes	Extra column
Body text	10/14×26 pc		Whatever we need etc, etc, etc, etc ...
Block quote	9/12×24 pc	Block indent (left and right) by 1 pc	
Sidenotes	8/10×12 pc	Sidenote number is set inline, followed by word space	
Captions	8/10×12 pc		Another item here ...

Table 3.5: Environment styles modifications used in *Beautiful Evidence*....

3.2 Tables from Other Sources

ABOUT THE TABLES from other sources: Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

- a wide table, `tb-tufte-wide-extraColumn`, Table 3.5 from¹, and
- a sideways table, `tb-cover-sideways-results`, Table 3.7.

NOTE: to get the table number printed here, we had to move the label AFTER the caption!!!.

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¹ Franc Brglez and Janez Brest and Borko Bošković. *xBed: An Open Environment for Design of and Experiments with Combinatorial Solvers*. Search for eBooks under <https://github.com/fbrglez/gitPublic/> ... For edited chapters from the book, search under <http://arxiv.org/>, 2015; and Borko Bošković, Franc Brglez, and Janez Brest. Low-Autocorrelation Binary Sequences: On Improved Merit Factors and Runtime Predictions to Achieve Them. <http://arxiv.org/>, also under journal review, 2015

symbol	short name	brief description	symbol	short name	brief description
L	coordDim	instance size	t	runtime	CPU runtime
L'	coordDim'	instance size under skew-symmetry $(L+1)/2$	t_{lmt}	runtimeLmt	solver timeout value
σ_0	seedInit	initial seed integer	τ	cntProbe	# of function probes
$\underline{\zeta}_0$	coordInit	initial coordinate	ρ	cntRestart	# of walk restarts
$\Theta(\underline{\zeta}_0)$	valueInit	initial value	β	cntTrapped	# of trapped solutions
$\underline{\zeta}_j$	coordPivot	pivot coordinate	$\underline{\zeta}^*$	coordBest	best coordinate
$\Theta(\underline{\zeta}_j)$	valuePivot	pivot value	$\Theta(\underline{\zeta}^*)$	valueBest	best value
$\underline{\zeta}_j^i$	coordNeighb	pivot neighbor coord.	Θ_L^{ub}	valueTarget	best upper bound
$\mathcal{N}(\underline{\zeta}_j)$	coordNeighbSet	full neighborhood set of pivot coordinate	isCensored		solution status: 1 if $t \geq t_{lmt}$; 0 otherwise
$\mathcal{N}_{saw}(\underline{\zeta}_j)$	sawNeighbSet	SAW neighborhood set	targetReached		solution status: 0 if $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$, 1 if $\Theta(\underline{\zeta}^*) = \Theta_L^{ub}$, 2 if $\Theta(\underline{\zeta}^*) < \Theta_L^{ub}$
ω_c	walkSegmCoef	walk segment coefficient	N	sampleSize	# of instances and initial seeds in the experiment
$\omega_{lmt} = \omega_c \times L'$	walkSegmLmt	walk segm. length limit	$\mathcal{H}(sid, \Theta_L^{ub})$	hitRatio	# of uncensored solutions under targetReached = 1 divided by sampleSize N
$Walk_\omega = \{\underline{\zeta}_0, \dots, \underline{\zeta}_\omega\}$	walkList	walk list after ω steps	$\mathcal{S}(sid, \Theta_L^{ub}, p)$	asymptotic solvability	predicted waiting time to satisfy $\mathcal{H}(\dots) = 1$ with solver sid , probability p

For 1abs problems with an odd value of L , $L' = (L+1)/2$ represents a *de facto* instance size under skew-symmetry.

For 1abs problems, $\Theta(\underline{\zeta}^*)$ represents the *minimum energy value* returned by the solver.

Table 3.6: Summary of notation: symbols, names, and descriptions.

Table 3-7: A statistical summary of experimental results. For each instance, sample size ≤ 100 as shown column *sszcf* (as the first number).

instance	cols	rows	vBK	vBest	card	sszcf	SAW method = wandertU				runtime runLmt	speed	SAW method = meanderU				runtime runLmt				
							walkL	hitR	mean	std			walkL	hitR	mean	std					
unale/LogSynthU cite																					
max1024.cnfU	1264	1090	245*	NA	NA	57/57	0.00	1.28e+7	1.62e+10	1.62e+10	1.70e+7	4.50e+6	3600.0	NA	NA	NA	NA	NA			
max1024.pi.cnfU	1278	1087	259*	NA	NA	56/56	0.00	1.26e+7	1.62e+10	1.62e+10	4.43e+7	4.50e+6	3600.0	NA	NA	NA	NA	NA			
ex5.cnfU	2428	831	37*	37	86	100/14	0.86	2.47e+6	5.47e+9	6.01e+9	4.07e+9	3.70e+6	3600.0	NA	NA	NA	NA	NA			
ex5.pi.cnfU	2459	873	65*	65	84	100/16	0.84	2.28e+6	4.51e+9	5.61e+9	4.01e+9	3.73e+6	3600.0	NA	NA	NA	NA	NA			
prom2.cnfU	2611	1924	278*	278	50	100/0	1.00	2.48e+5	5.12e+8	6.48e+8	4.19e+8	5.90e+6	587.6	NA	NA	NA	NA	NA			
prom2.pi.cnfU	2617	1988	287*	287	58	100/0	1.00	2.62e+5	6.09e+8	6.86e+8	3.75e+8	5.91e+6	486.9	NA	NA	NA	NA	NA			
bench1.pi.cnfU	4676	398	121*	NA	NA	48/48	0.00	3.58e+6	1.67e+10	1.67e+10	6.58e+7	4.65e+6	3600.0	NA	NA	NA	NA	NA			
exam.pi.cnfU	4676	509	63*	NA	NA	NA	NA	NA	NA	NA	NA	NA	172800.0	NA	NA	NA	NA	NA			
test4.pi.cnfU	6139	1437	101	101	39	100/39	0.61	1.04e+6	6.10e+9	6.42e+9	3.40e+9	3.00e+6	3600.0	NA	NA	NA	NA	NA			
binate/LogSynthB cite																					
clip.b.cnf	349	707	15*	15	199	100/0	1.00	1.28e+4	3.08e+6	4.46e+6	4.97e+6	1.91e+6	18.7	100/0	1.00	1.64e+3	2.20e+5	2.89e+5	3.02e+5	2.07e+6	1.5
sa02.b.cnf	372	772	25*	25	100	43/43	0.00	1.78e+6	6.65e+8	6.61e+8	1.42e+7	1.10e+6	600.0	100/0	1.00	2.61e+5	2.99e+7	4.87e+7	4.76e+7	1.21e+6	277.6
f5tm.b.cnf	406	520	NA	18	199	100/0	1.00	4.05e+3	1.21e+6	1.64e+6	1.30e+6	2.17e+6	3.6	100/0	1.00	9.26e+2	1.36e+5	1.88e+5	1.81e+5	1.89e+6	1.2
5xpi.b.cnf	464	845	12*	12	146	100/9	0.91	8.47e+4	3.44e+7	3.93e+7	2.92e+7	1.70e+6	60.0	100/0	1.00	1.32e+3	2.02e+5	3.08e+5	3.08e+5	2.17e+6	0.7
count.b.cnf	466	694	24*	24	199	100/0	1.00	1.12e+4	3.81e+6	5.22e+6	4.38e+6	1.90e+6	13.3	100/0	1.00	5.90e+2	9.32e+4	1.38e+5	1.29e+5	2.03e+6	0.4
e64.b.cnf	607	1022	48	47	124	70/46	0.34	1.24e+6	9.22e+8	7.56e+8	2.95e+8	1.08e+6	900.0	100/0	1.00	6.91e+3	1.61e+6	2.10e+6	1.84e+6	1.92e+6	6.2
alu4.cnf	807	1823	50*	50	128	100/72	0.28	7.64e+4	7.38e+7	6.16e+7	2.27e+7	1.26e+6	60.0	100/0	1.00	1.20e+4	3.90e+6	4.85e+6	3.78e+6	1.28e+6	19.9
rot.b.cnf	1451	2932	115*	115	22	3/3	0.00	NA	NA	NA	NA	NA	1800.0	56/34	0.39	1.65e+6	1.47e+9	1.20e+9	4.68e+8	8.60e+5	1800.0
binate/uf cite																					
uf250-001.cnf	250	1065	108	108	1	47/47	0.00	8.06e+6	1.97e+9	1.98e+9	4.65e+7	1.10e+6	1800.0	50/46	0.08	2.13e+7	2.82e+9	2.67e+9	5.63e+8	1.57e+6	1800.0
uf250-019.cnf	250	1065	96	96	18	53/44	0.17	1.00e+7	2.90e+9	2.47e+9	1.04e+9	1.71e+6	1800.0	52/0	1.00	1.32e+6	9.14e+7	1.65e+8	2.61e+8	1.43e+6	1373.1
uf250-027.cnf	250	1065	104	105	NA	46/46	0.00	1.26e+7	3.11e+9	3.11e+9	7.28e+7	1.72e+6	1800.0	31/31	0.00	1.60e+7	2.01e+9	2.01e+9	4.37e+7	1.11e+6	1800.0
uf250-034.cnf	250	1065	115	115	3	48/46	0.04	1.20e+7	3.08e+9	2.96e+9	6.24e+8	1.74e+6	1800.0	47/45	0.04	2.12e+7	2.78e+9	2.66e+9	5.60e+8	1.55e+6	1800.0
uf250-087.cnf	250	1065	110	110	6	46/46	0.00	1.28e+7	3.15e+9	3.14e+9	8.04e+7	1.74e+6	1800.0	55/47	0.15	1.38e+7	2.01e+9	1.73e+9	6.75e+8	1.13e+6	1800.0
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i-54-f2-09.cnf	54	224	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-54-f2-10.cnf	54	224	9	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-54-f2-15.cnf	54	224	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-118-f2-33.cnf	118	548	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-163-f2-91.cnf	163	777	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-271-f2-303.cnf	271	1333	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-328-f2-707.cnf	328	1640	1655	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA
i-403-f2-1111.cnf	403	2029	2021	NA	NA	NA	NA	NA	NA	NA	NA	NA	3600.0	NA	NA	NA	NA	NA	NA	NA	NA

4

More About Algorithms

ALGORITHMS IN THIS CHAPTER have been created for further testing of this template. Currently, we expect algorithms placed into different chapters to have a running counter that spans all chapters – unlike Figures and Tables that have a two part counter: `byChapter.byInCapterCounter`.

QUESTION IS: can the template be tweaked to generate algorithm counter in the same style as we have for Figures and Tables.

IN ADDITION: we also illustrate two algorithms that are embedded into the figures environment.

THE EXAMPLE OF ALGORITHM 7 is normal width on a half-page. The example of Algorithm 8 is full width on a half-page.

THE EXAMPLE OF FIGURE 4.1 is in two columns on a half-page. The example of Figure 4.2 is in two columns on a full-page. The figure environment can clearly be used to reference the any algorithm within the figure environment.

SOME MORE TEXT FOLLOWS. Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Algorithm 7 Procedure newPivot2.saw – normal width.

```

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i | d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega_s-1}) | \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:  else ▷ deal with a trapped pivot
11:     $\beta = \beta + 1$ 
12:     $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:     $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:  end if
16:  return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

Algorithm 8 Procedure newPivot2.saw – using algorithm-wide environment.

```

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i | d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega_s-1}) | \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:  else ▷ deal with a trapped pivot
11:     $\beta = \beta + 1$ 
12:     $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:     $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:  end if
16:  return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

```

1: procedure lssMats( $\Theta_L^{ub}, t_{lmt}$ )
2:   for  $i \leftarrow 1$  to  $popsize$  do
3:      $pop_i \leftarrow \text{RandomBinarySequence}(L)$ 
4:      $\text{Evaluate}(pop_i)$ 
5:   end for
6:    $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$ 
7:   while  $t < t_{lmt}$  and  $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$  do
8:     for  $i = 1$  to  $offsize$  do
9:       if recombination is performed ( $p_X$ ) then
10:         $parent_1 \leftarrow \text{Select}(pop)$ 
11:         $parent_2 \leftarrow \text{Select}(pop)$ 
12:         $offspring_i \leftarrow \text{Recombine}(parent_1, parent_2)$ 
13:      else
14:         $offspring_i \leftarrow \text{Select}(pop)$ 
15:      end if
16:      if mutation is performed ( $p_m$ ) then
17:         $offspring_i \leftarrow \text{Mutate}(offspring_i)$ 
18:      end if
19:       $offspring_i \leftarrow \text{TabuSearch}(offspring_i)$ 
20:       $\text{Evaluate}(offspring_i)$ 
21:    end for
22:     $pop \leftarrow \text{Replace}(pop, offspring)$ 
23:     $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$ 
24:  end while
25: end procedure

```

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The procedure lssMats on the left is an instrumented versions of the labs solver named as MA_{TS} in cite *Lib-OPUS-labs-2009-ASC-Gallardo-memetic*. Settings of all parameters, used also in our experiments, are described in cite *Lib-OPUS-labs-2009-ASC-Gallardo-memetic*. See a concise reprise below.

setting	value
population size:	100
mutation probability:	$2/(L+1)$
crossover probability:	0.9
tournament selection size:	2
crossover:	uniform
tabu search walk length:	a random choice from the range $[\frac{L}{2}, \frac{3L}{2}]$

```

1: procedure lssRRts( $\Theta_L^{ub}, t_{lmt}$ )
2:    $pop_1 \leftarrow \text{RandomBinarySequence}(L)$ 
3:    $\text{Evaluate}(pop_1)$ 
4:    $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$ 
5:   while  $t < t_{lmt}$  and  $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$  do
6:      $pop_1 \leftarrow \text{RandomBinarySequence}(L)$ 
7:      $pop_1 \leftarrow \text{TabuSearch}(pop_1)$ 
8:      $\text{Evaluate}(pop_1)$ 
9:      $\Theta(\underline{\zeta}^*) \leftarrow \text{ValueBest}(pop)$ 
10:  end while
11: end procedure

```

Figure 4.1: We illustrate two instrumented versions of the labs solver named as MA_{TS} in cite *Lib-OPUS-labs-2009-ASC-Gallardo-memetic* under the caption “Pseudo code of the memetic algorithm”.

```

1: procedure lss0rel( $\sigma_0, \Theta_L^{ub}, t_{lmt}, \omega_{lmt}$ )
2:    $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}(\sigma_0)$  ▷ initial solution
3:    $\tau \leftarrow 1$  ▷ initialize cntProbe
4:    $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$  ▷ initial best solution
5:    $isCens \leftarrow 0$  ▷ initialize isCensored
6:    $tgReached \leftarrow 0$  ▷ initialize targetReached
7:    $\beta \leftarrow 0$  ▷ initialize cntTrapped
8:    $\omega \leftarrow 0$  ▷ initialize total number of steps
9:   while true do
10:     $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \text{walk.saw}(\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt})$  ▷ return a completed walk segment
11:     $\omega \leftarrow \omega + \omega_s$  ▷ update total number of steps
12:    if  $\Theta(\underline{\zeta}^*) \leq \Theta_L^{ub}$  then
13:      if  $\Theta(\underline{\zeta}^*) = \Theta_L^{ub}$  then
14:         $tgReached = 1$  ▷ upper-bound is reached
15:      else
16:         $tgReached = 2$  ▷ upper-bound is improved
17:      end if
18:      break
19:    end if
20:    if  $t \geq t_{lmt}$  then
21:       $isCens \leftarrow 1$  ▷ return solution as “censored”
22:      break
23:    end if
24:     $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0) \leftarrow \text{coordInit}()$  ▷ initialize a new walk segment
25:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
26:     $\omega \leftarrow \omega + 1$  ▷ update total number of steps
27:  end while
28:   $Table \leftarrow (\sigma_0, \underline{\zeta}^*, \Theta(\underline{\zeta}^*), \omega, \tau, t, isCens, tgReached)$ 
29: end procedure

1: procedure walk.saw( $\underline{\zeta}_0 : \Theta(\underline{\zeta}_0), t_{lmt}, \omega_{lmt}$ )
2:   if  $\Theta(\underline{\zeta}_0) \leq \Theta(\underline{\zeta}^*)$  then
3:      $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_0 : \Theta(\underline{\zeta}_0)$  ▷ new best solution
4:   end if
5:    $\omega_s \leftarrow 0$  ▷ walk segment length
6:    $Walk_0 \leftarrow \{\underline{\zeta}_0\}$  ▷ new walk segment
7:   while  $\Theta(\underline{\zeta}^*) > \Theta_L^{ub}$  and  $\omega_s < \omega_{lmt}$  do
8:     if  $t \geq t_{lmt}$  then ▷ timeout
9:       break
10:    end if
11:     $\omega_s = \omega_s + 1$  ▷ a new step!
12:     $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow$ 
13:       $\leftarrow \text{newPivot.saw}(\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1})$ 
14:    if  $\Theta(\underline{\zeta}_{\omega_s}) \leq \Theta(\underline{\zeta}^*)$  then
15:       $\underline{\zeta}^* : \Theta(\underline{\zeta}^*) \leftarrow \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
16:    end if
17:  end while
18:  return  $\omega_s : \underline{\zeta}^* : \Theta(\underline{\zeta}^*)$ 
19: end procedure

1: procedure newPivot.saw( $\underline{\zeta}_{\omega_s-1}, Walk_{\omega_s-1}$ )
2:    $\mathbb{Z} \leftarrow i = 1, 2, \dots, L$ 
3:    $\mathbb{Z}_p \leftarrow \text{permute}(\mathbb{Z})$ 
4:    $\mathcal{N}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\underline{\zeta}_{\omega_s-1}^i | d(\underline{\zeta}_{\omega_s-1}, \underline{\zeta}_{\omega_s-1}^i) = 1, i \in \mathbb{Z}_p\}$ 
5:    $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \leftarrow \{\mathcal{N}(\underline{\zeta}_{\omega_s-1}) | \underline{\zeta}_{\omega_s-1}^i \notin Walk_{\omega_s-1}\}$ 
6:   if  $\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}) \neq \emptyset$  then
7:      $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{bestNeighbor}(\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1}))$ 
8:      $Walk_{\omega_s} \leftarrow Walk_{\omega_s-1} \cup \{\underline{\zeta}_{\omega_s}\}$ 
9:      $\tau \leftarrow \tau + |\mathcal{N}_{saw}(\underline{\zeta}_{\omega_s-1})|$  ▷ update cntProbe
10:  else ▷ deal with a trapped pivot
11:     $\beta = \beta + 1$ 
12:     $\underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s}) \leftarrow \text{coordInit}()$  ▷ re-initialize
13:     $Walk_{\omega_s} \leftarrow \{\underline{\zeta}_{\omega_s}\}$ 
14:     $\tau \leftarrow \tau + 1$  ▷ update cntProbe
15:  end if
16:  return  $Walk_{\omega_s} : \underline{\zeta}_{\omega_s} : \Theta(\underline{\zeta}_{\omega_s})$ 
17: end procedure

```

Figure 4.2: A fully instrumented version of solver lss0rel and two supporting procedures.

Bibliography

- [1] Robert Bringhurst. *The Elements of Typography*. Hartley & Marks, 3.1 edition, 2005.
- [2] Edward R. Tufte. *Beautiful Evidence*. Graphics Press, LLC, first edition, May 2006.
- [3] Edward R. Tufte. *Envisioning Information*. Graphics Press, Cheshire, Connecticut, 1990.
- [4] Borko Bošković, Franc Brglez, and Janez Brest. Low-Autocorrelation Binary Sequences: On Improved Merit Factors and Runtime Predictions to Achieve Them. <http://arxiv.org/>, also under journal review, 2015.
- [5] Marcel J.E. Golay. Sieves for low autocorrelation binary sequences. *IEEE: Transactions on Information Theory*, 23:43–51, 1977.
- [6] Marcel J.E. Golay. The merit factor of long low autocorrelation binary sequences. *IEEE: Transactions on Information Theory*, 28:543–549, 1982.
- [7] Marcel J.E. Golay and Duncan B. Harris. A new search for skewsymmetric binary sequences with optimal merit factors. *Information Theory, IEEE Transactions on*, 36(5):1163–1166, 1990.
- [8] Jacob Bernasconi. Low autocorrelation binary sequences: statistical mechanics and configuration space analysis. *J. Phys.*, 48:559–567, April 1987.
- [9] Martin Pelikan and David E. Goldberg. Hierarchical boa solves ising spin glasses and maxsat. In *Proceedings of the 2003 international conference on Genetic and evolutionary computation: PartII*, GECCO'03, pages 1271–1282, Berlin, Heidelberg, 2003. Springer-Verlag.
- [10] Stephan Mertens. Exhaustive search for low-autocorrelation binary sequences. *Journal of Physics A: Mathematical and General*, 29:473–481, 1996. The sequences for $48 < L \leq 60$ have been

found with an improved implementation due to Heiko Bauke. All values are available at <http://www-e.uni-magdeburg.de/mertens/research/labs/open.dat>.

- [11] LABS Problem: 2002 Merit Factor Records posted by Knauer. Now re-posted under two mirroring sites: <http://cbl.ncsu.edu/xBed/xProj/B.labs/> and <http://labraj.uni-mb.si/en/B.labs>, 2014.
- [12] G.F.M. Beenker, T.A.C.M. Claasen, and P.W.C. Hermens. Binary sequences with a maximally flat amplitude spectrum. *Philips J. Res.*, vol. 40:289–304, 1985.
- [13] Franc Brglez, Janez Brest, and Borko Bošković. Home Page of the LABS Problem Performance Experiments and Solutions. Posted under two mirroring sites: <http://cbl.ncsu.edu/xBed/xProj/B.labs/> and <http://labraj.uni-mb.si/en/B.labs>, 2014.
- [14] Franc Brglez, Yang Ho, and Johnny Nguyen. *On Combinatorial Optimization and Rapid Prototyping of Stochastic Solvers*. Search for eBooks under <https://github.com/fbrglez/gitPublic/> ... For edited chapters from the book, search under <http://arxiv.org/>, 2015.
- [15] Franc Brglez and Janez Brest and Borko Bošković. *xBed: An Open Environment for Design of and Experiments with Combinatorial Solvers*. Search for eBooks under <https://github.com/fbrglez/gitPublic/> ... For edited chapters from the book, search under <http://arxiv.org/>, 2015.

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