

Revised HOPL IV Style Guide

Richard P. Gabriel
Guy L. Steele Jr.
Mark Priestley

February 18, 2020

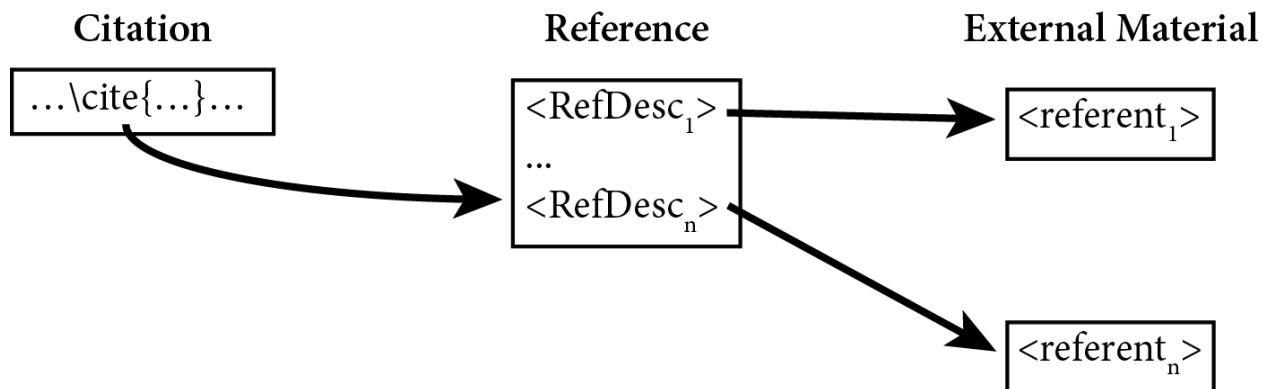
This guide describes the finer points of typesetting, style, and citations for HoPL papers.

The rules about archival and non-archival citations in the first section “Citations and References” must be followed for all final HoPL articles.

1. Citations and References

SIGPLAN and PACMPL have recently been reevaluating the treatment of citations and references, particularly *post-traditional* ones. Because HoPL presents special circumstances for citations and references, this section is long, and there are likely some changes you need to make to your citations and references to be in compliance with these revised best practices.

We use the following model for citations and references. A *citation* is the text in your paper that identifies one entry in the References section or Bibliography. Such an entry (a *reference*) contains descriptions of one or more pieces of referenced external material (if there is more than one description, then one is considered primary, and the others are secondary or ancillary). A primary description typically contains a title, a list of authors, and a publication venue and date; often a secondary description indicates an alternative source for the same material, or indicates related material, and it may consist of an URL plus other information such as a date of retrieval. Every description should make it possible for the reader to identify, locate, and access one specific body of external material. *External material* is information or a physical object that your paper relies on but is not contained in the paper.



In this model, each referent_i listed under “External Material” should be a different manifestation of the same essential material. For example, the primary referent might be a paper that was published in a print journal, another referent might be a digital copy of a PDF file for that paper in that journal’s digital archives, another might be a digital copy of the PDF on the author’s website, and another might be a digital copy of an expanded version of the paper on the author’s website.

Each RefDesc_i (“referent description”) is a description of its corresponding external material—in particular, a description suitable for a reader to understand what it is and how to locate it; in that sense, it is a pointer. For a book, one of the RefDesc_i—usually the first—will contain its title, author, publisher (and perhaps the address of the publisher), date of publication, and ISBN. Each other RefDesc_i is a description of how to identify, locate, and access some other referenced external material and how that material is related to the primary referenced external material. Continuing the example, a RefDesc_i could be an URL to a PDF of that book, a description of a different edition of the book or a translation of the book, or any other way a reader can examine the contents of that book.

External material can be broken into three broad categories (roughly from most archival to least): ***traditional referents***, ***traditional computer-science referents***, and ***post-traditional referents***.

Traditional referents are publications printed on paper¹ and stored in multiple libraries around the world, made before online archives existed; they are print-only publications. Copies on other analog media such as microfilm might also be stored in a library and considered archival.

Traditional computer-science referents are traditional referents along with digital publications that are stored in digital archives.

Post-traditional referents are private material, non-traditional digital material, and ephemeral material.

Post-traditional referents include the following:

- web sites
- email discussions
- blog posts, tweets, social media
- “direct” communication (face-to-face, telephone, online chat) reported by the author, or by another participant to the author
- paintings, sculptures, buildings
- videos, sound recordings, photographs
- source code
- models and diagrams
- logs, printouts, and other material produced by software described in the paper

¹ The most archival material is printed on acid-free paper, typically expected to last 500 to 1000 years.

- datasets
- anything SIGPLAN considers an artifact

Most of the infrastructure and ways we think about citations and references were formulated for traditional and traditional computer science referents: papers, books, and material generally believed suitable for printing on paper and being read as natural-language or mathematical text. Post-traditional material expands the pool of referenceable material. The notion of “archival” changes with post-traditional material in one or more of these three ways:

1. The material may be other than pure natural-language or mathematical text.
2. The material was originally intended to be ephemeral rather than archival (that is, it was created in and for the moment, rather than for the ages).
3. The size of the material may be dramatically larger (perhaps the size of a library rather than a paper or a book).

There is an additional wrinkle to some post-traditional material: although it’s possible to store material in a digital archive, unless there will be a way to decode it later, it cannot be archival in the expected sense. For example, if a Word document created in Microsoft Word for Mac 1.0 in 1985 is stored in an archive, will a scholar be able to open and read that file in 2085 when there is neither an executable Word for Mac 1.0, nor a Macintosh computer or simulator? Similarly for source code: what if there is no executable language compiler or implementation?



A citation is most useful when its referenced external material can be identified, located, accessed, and understood. The following complications can arise:

- the material might not be manifest in physical or digital objects (e.g., some kinds of informal communications; ephemeral material)
- the material might not be stored in archival repositories (therefore, possibly non-permanent)
- the material might not have manifest or conventional indicia for referring to relevant parts or positions within it²
- the material can be proprietary (therefore, not accessible)
- the material might be in a personal collection
- the material might be in the custody of an institution that does not support public or scholarly access
- the material might be very large, such as datasets of a terabyte or more

² For example: audio or video—the author may need to refer to time positions. Another example: some material, such as hypertext or a video game, may not have a linear structure (how do you refer to a particular level/scene within, say, Super Mario World or Myst?).

1.1 References: Identification, Location, Access, Understanding

There are four conditions for a useful reference: **identification**, **location**, **access**, and **understanding**.

For traditional computer-science referents, the description in the reference is, generally, standardized (via BibTeX, for example), and is typically a title, a list of authors, and a publication venue and date. There may be other useful information associated with the venue, ranging from city name to ISBN.

1.1.1 Access: Archival vs Non-archival Material



Ideally, each citation should be to a reference to *archival material*: documents, evidence, information, or other artifacts that are stored in recognized archives. In general, an archive consists of documents and other material that have been selected for permanent or long-term preservation on grounds of their enduring cultural, historical, or evidentiary value. The following are considered archival:

- ACM, IEEE, and other professional society conference proceedings and journals
- conference proceedings or journals published by major publishers (e.g., Springer, Elsevier) or by University presses (e.g., Duke University, Stanford)
- any material collected in recognized archives such as the following:
 - arXiv (at arXiv.org)
 - Internet Archive (at archive.org)
 - ACM Digital Library (at dl.acm.org)
 - Zenodo (at zenodo.org)
 - archival research and/or copyright libraries such as the US Library of Congress, the British Library, the Bodleian Library, and the National Library of Ireland³
- in general, anything referenced by a DOI
- any material collected in repositories at major universities
- any material collected in recognized standards organization repositories
- “artifacts” (for example, software or datasets) submitted and reviewed by an Artifact Evaluation Committee and then stored in an archive provided by the publication venue

Material located as follows is considered non-archival:

- social media sites
- commercial and non-profit sites
- government-maintained sites
- personal or family sites
- professor, researcher, and student web pages on university servers

³ In general, government-operated web sites should be considered non-archival. These library exceptions are made because they are where almost every book printed in English can be found.

These two lists point out relatively obvious examples of archives and non-archives; you must decide whether a repository you refer to is an archive. When doing so, endeavor to judge whether the repository was created to secure material of enduring cultural, historical, or evidentiary value, as well as whether it seems likely that repository will still exist in fifty years.



Post-traditional referents are generally non-archival. Non-archival material must be handled in one of two ways for citation purposes, listed in decreasing order of preference:

- by moving or copying it to a recognized archive and then referencing that archived material
- by labeling a reference to it “NON-ARCHIVAL” and including a précis⁴ inline in the main text of the paper or in the bibliography that describes the referenced material and how the paper relies on it

The web sites `archive.org` and `zenodo.org` offer services to create an archived copy of a web page, web site, or dataset. Make sure to follow their specified terms and conditions regarding copyrighted material if you upload material to these sites.⁵ If you have moved or copied the material to a recognized archive, the reference should describe how to access both the archived and the original material. For example, Internet Archive (`archive.org`) URLs for archived material provides both; the date of capture is useful information:

<https://web.archive.org/web/20091227023651/http://news.ycombinator.com/item?id=1014080>
(archived 27 Dec. 2009).

The service at `zenodo.org` provides a DOI.

In general, a citation can refer to a bibliographic entry (a reference) that contains several reference descriptions; for example, a reference might refer to a print journal volume and issue number and also contain an URL for a PDF file located on the author’s university web page. In such cases, each reference description that points to non-archival material should be so labeled (using small caps):

Richard Gabriel. 2008. Designed as Designer. In *Proceedings of the 23rd ACM SIGPLAN Conference on Object-Oriented Programming Systems, Languages, and Applications*. <https://doi.org/10.1145/1449764.1449813>
Also at NON-ARCHIVAL <https://dreamsongs.com/Files/DesignedAsDesigner.pdf>
Expanded version: NON-ARCHIVAL <https://dreamsongs.com/Files/DesignedAsDesignerExpanded.pdf>

This entry can be expressed in a standard BiBTeX file, using the `\NA` macro, as follows:

```
@inproceedings{Gabriel2008,  
  author = {Gabriel, Richard},  
  title = {Designed as Designer},  
  booktitle = {Proceedings of the 23rd ACM SIGPLAN Conference on Object-Oriented  
Programming Systems, Languages, and Applications},  
  series = {OOPSLA 2008},
```

⁴ a concise summary of essential points, statements, or facts

⁵ The machinery at `archive.org` includes a web crawler that archives material it legitimately finds. If you believe you do not have the right to upload (and hence archive) something, navigate to `archive.org` to see whether it already has been archived.

```

year = {2008},
issn = {0362-1340},
location = {Nashville, Tennessee, USA},
issue_date = {October 2008},
pages = {617--632},
numpages = {16},
doi = {https://doi.org/10.1145/1449764.1449813},
publisher = {Association for Computing Machinery},
address = {New York, New York, USA},
note = {Also at {\NA} \url{https://dreamsongs.com/Files/DesignedAsDesigner.pdf}}
Expanded version: {\NA}
\url{https://dreamsongs.com/Files/DesignedAsDesignerExpanded.pdf}},
}

```

Alternatively, using the facilities described in Appendix B, Section B3, the note field could be replaced by these new fields:

```

urlprefix = {Also at {\NA}},
url = {https://dreamsongs.com/Files/DesignedAsDesigner.pdf},
secondurlprefix = {Expanded version: {\NA}},
secondurl = {https://dreamsongs.com/Files/DesignedAsDesignerExpanded.pdf},

```

An alternate strategy is to separate references into two groups, with one group (under the heading “REFERENCES”) containing references whose primary referent is archival and the other group (under the heading “NON-ARCHIVAL REFERENCES”) containing references whose primary referent is non-archival. Then only secondary referents of the other kind need be individually labeled. See Appendix B, Section B2, for a description of LaTeX facilities that support such separation of references into two groups.



Précis

Consider the following reference:

Apple. Differential privacy. NON-ARCHIVAL (Accessed 11-11-2017.)
https://images.apple.com/privacy/docs/Differential_Privacy_Overview.pdf.

The material at this location can be described with a précis like this in a paper about differential privacy:

This website describes the differential privacy mechanisms first released by Apple in their operating system macOS 10.12 (Sierra) in 2016. These include Count-Min Sketch [Cormode 2009] and a variant Apple calls, Hadamard Count Mean Sketch [*sic*]. These mechanisms provide a degree of identity privacy to macOS users who opt-in to providing actual-use data. We refer to it in order to demonstrate that at the time of the research reported in our paper, the computing industry was both interested in differential privacy and were using techniques similar to what we examine in the paper.



Such a précis can be handled the following ways:

- inline in the text
- as part of the citation in the references section

Here is how a précis in the middle of a standard references section might look. *Notice that the second reference is labeled “non-archival” and has a précis.*

REFERENCES

Aws Albarghouthi and Justin Hsu. 2018. Synthesizing coupling proofs of differential privacy. PACMPL 2, POPL (2018), 58:1558:30. <https://doi.org/10.1145/3158146>

Apple. Differential privacy. NON-ARCHIVAL (Accessed 11-11-2017.)

https://images.apple.com/privacy/docs/Differential_Privacy_Overview.pdf.

This website describes the differential privacy mechanisms first released by Apple in their operating system macOS 10.12 (Sierra) in 2016. These include Count-Min Sketch [Cormode 2009] and a variant Apple calls Hadamard Count Mean Sketch [*sic*]. These mechanisms provide a degree of identity privacy to macOS users who opt-in to providing actual-use data. We refer to it in order to demonstrate that at the time of the research reported in our paper, the computing industry was both interested in differential privacy and were using techniques similar to what we examine in the paper.

Gilles Barthe, Marco Gaboardi, Benjamin Grégoire, Justin Hsu, and Pierre-Yves Strub. 2016. A program logic for union bounds. In The 43rd International Colloquium on Automata, Languages and Programming . Rome, Italy. <https://doi.org/10.4230/LIPIcs.ICALP.2016.107>

The Apple reference entry can be expressed in a standard BiBTeX file as follows:

```
@misc{Apple2017,  
  author = {Apple},  
  year = {2017},  
  title = {Differential privacy. {\NA} (Accessed 11-11-2017.)},  
  url = {https://images.apple.com/privacy/docs/Differential_Privacy_Overview.pdf},  
  note = {\ \noindent This website describes the differential privacy mechanisms  
first released by Apple in their operating system macOS 10.12 (Sierra) in 2016. These  
include Count-Min Sketch [Cormode 2009] and a variant Apple calls Hadamard Count Mean  
Sketch [\emph{sic}]. These mechanisms provide a degree of identity privacy to macOS  
users who opt-in to providing actual-use data. We refer to it in order to demonstrate  
that at the time of the research reported in our paper, the computing industry was both  
interested in differential privacy and were using techniques similar to what we examine  
in the paper.}  
}
```

You also could define a command like this and use it in the note entry:

```
\newcommand{\precis}[1]{\ \noindent#1}
```

Alternatively, using the facilities described in Appendix B, Sections B2 and B5, the citation can be something like `\citeNA{Apple2017}`, and the reference will appear in a separate section of the bibliography (eliminating the need to mark each such entry as non-archival), the `urldate`

field provides the access date, and the note field can be replaced by a use of a new field, synopsis:

```
@misc{Apple2017,  
  author = {Apple},  
  year = {2017},  
  title = {Differential privacy},  
  url = {https://images.apple.com/privacy/docs/Differential\_Privacy\_Overview.pdf},  
  urldate = {2017-11-11},  
  synopsis = {This website describes the differential privacy mechanisms first  
released by Apple in their operating system macOS 10.12 (Sierra) in 2016. These include  
Count-Min Sketch [Cormode 2009] and a variant Apple calls Hadamard Count Mean Sketch  
[\emph{sic}]. These mechanisms provide a degree of identity privacy to macOS users who  
opt-in to providing actual-use data. We refer to it in order to demonstrate that at the  
time of the research reported in our paper, the computing industry was both interested  
in differential privacy and were using techniques similar to what we examine in the  
paper.}  
}
```

Fair Use

Instead of (or in addition to) a précis, direct quotes of fair-use size can be used to describe or represent the referenced material. You still need to provide a citation and associated reference to identify and locate the material, but you can thereby avoid writing a précis or synopsis.

Appendix A, *Fair-Use Example for Citations*, shows how to apply fair use to the Apple citation example.

For very short material, a précis or fair-use treatment might not require copying the material to an archival repository.

1.1.2 Identification & Location: Thorough and Helpful References / Citations

A good reference should properly identify the outside source and provide readers with a route to it. Consider von Neumann's "First Draft of a Report on the EDVAC." A good identification in a reference is as follows:

John von Neumann, First Draft of a Report on the EDVAC, IEEE Annals of the History of Computing, Vol. 15, No. 4, pp. 27–75, 1993. ISSN 1934-1547. <http://doi.org/10.1109/85.238389>

This is good because it provides a way to locate and access the publication in the early part of the 21st century. However, it does not reasonably identify the paper in its historical context. For that, a good identification in a reference is as follows:

John von Neumann, "First Draft of a Report on the EDVAC," Contract No. W-670-ORD-4926 between the US Army Ordnance Department and the University of Pennsylvania, Moore School of Electrical Engineering, University of Pennsylvania, June 30, 1945.

This puts the paper in its historic context, but it does not provide a (reasonable) way to access the paper.

Additionally, a historian might be interested in the scanned copy of the original report in the Smithsonian Libraries; this scanned copy is also available from archive.org:

<https://archive.org/details/firstdraftofrepo00vonn>

Therefore, a thorough reference might include all that information:

John von Neumann, First Draft of a Report on the EDVAC, Contract No. W-670-ORD-4926 between the US Army Ordnance Department and the University of Pennsylvania, Moore School of Electrical Engineering, University of Pennsylvania, June 30, 1945. A transcription is available in the IEEE Annals of the History of Computing, Vol. 15, No. 4, pp. 27–75, 1993. ISSN 1934-1547. <http://doi.org/10.1109/85.238389>. Also, <https://archive.org/details/firstdraftofrepo00vonn>.

This entry can be expressed in a standard BiBTeX file as follows:

```
@misc{VonNeumann1945,
  Author = {John von Neumann},
  Day = {30},
  Month = Jun,
  year = {1945},
  Title = {First Draft of a Report on the EDVAC},
  note = {Contract No. W-670-ORD-4926 between the US Army Ordnance Department and the
  University of Pennsylvania, Moore School of Electrical Engineering, University of
  Pennsylvania, June 30, 1945. A transcription is available in the IEEE Annals of the
  History of Computing, Vol. 15, No. 4, pp. 27--75, 1993. ISSN 1934-1547.
  \url{http://doi.org/10.1109/85.238389}. Also,
  \url{https://archive.org/details/firstdraftofrepo00vonn}.}
}
```

It's a good practice to cite the actual copy of the source material being used along with the original. Here is an example:

Darwin, Charles, "On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life," (1st ed.), London: John Murray, 1859. Copy used: "The Origin of Species," Modern Library; reprint, 2009.

This entry can be cited using `\cite{Darwin1859a}` and expressed in a standard BiBTeX file as follows:

```
@book{Darwin1859a,
  title={On the Origin of Species by Means of Natural Selection, or the Preservation of
  Favoured Races in the Struggle for Life},
  author={Charles Darwin},
  year={1859},
  publisher={John Murray},
  address = {London},
  edition = {first},
  note = {Copy used: ``The Origin of Species,' ' Modern Library; reprint, 2009},
}
```

Or this entry can be cited using `\cite{Darwin1859a,Darwin1859b}` and expressed in a standard BiBTeX file as follows:

```
@book{Darwin1859a,
  title={On the Origin of Species by Means of Natural Selection, or the Preservation of
  Favoured Races in the Struggle for Life},
  author={Charles Darwin},
```

```

year={1859},
publisher={John Murray},
address = {London},
edition = {first},
}

@book{Darwin1859b,
title={On the Origin of Species},
author={Charles Darwin},
year={2009},
publisher={Modern Library},
address = {New York, New York},
note = {Copy used},
}

```

In this case the citation will appear as follows: “[Darwin 1859, 2009]”; note that clarity in the references is best served by using contiguous keys such as Darwin1859a and Darwin1859b.

Similarly, in a paper written in English, citing a paper originally published in German is best accompanied by a reference to an English translation that is archived and accessible:

Albert Einstein, “Zur Elektrodynamik bewegter Körper,” *Annalen der Physik* 17, pp. 891–921, Berlin, June 30 1905. Also, English translation, “On the Electrodynamics of Moving Bodies,” <https://einsteinpapers.press.princeton.edu/vol2-trans/154>.

This entry can be expressed in a standard BiBTeX file as follows:

```

@article{Einstein1905,
title={Zur Elektrodynamik bewegter K{"o}rper},
author={Albert Einstein},
year={1905},
address = {Berlin},
journal = {Annalen der Physik},
issue_date = {June 30, 1905},
volume = {17},
month = {June},
day = {30},
year = {1905},
pages = {891--921},
numpages = {21},
note = {Also, English translation, ``On the Electrodynamics of Moving Bodies,''}
\url{https://einsteinpapers.press.princeton.edu/vol2-trans/154}},
}

```

When quoting from cited material, it is helpful to point out the pages, sections, or paragraph numbers containing the quote (use the square-bracketed optional argument to the LaTeX `\cite` macro). For example,

```

... the young cuckoo, soon after birth, has the instinct, the strength, and a
properly shaped back for ejecting its foster-brothers, which then perish from
cold and hunger. \cite[p.~329, Modern Library Edition]{Darwin}

```

which produces the following:

```

...the young cuckoo, soon after birth, has the instinct, the strength, and a properly shaped back
for ejecting its foster-brothers, which then perish from cold and hunger. [Darwin 1859, p. 329,
Modern Library Edition]

```

1.1.3 Location and Access: Give Readers the Best Chance

The most important thing about a citation and its reference is to give a reader the best shot at successfully locating and obtaining access to the cited external material. For future readers, this implies that archival material is best. But sometimes non-archival, open material has an advantage because it is not behind a firewall or paywall. Therefore, *sometimes* it is appropriate to provide multiple references for the same material, for example:

- a journal version and a tech report
- a journal version and a copy on `arxiv.org`
- a conference paper and a copy on the author’s web page

Sometimes it even makes sense to combine multiple references into a single, more complex bibliographic reference. For example, it is a very common ACM practice for a paper to appear in a conference proceedings that is also considered an issue of a periodical, such as SIGPLAN Notices. The standard ACM BibTeX style file allows you to use fields `journal`, `volume`, and `number` in an `@inproceedings` entry. The extended style file for HOPL also supports a `journaldate` field (to handle the case where the date on the journal issue differs from the date of the conference); see Appendix B, Section B7.

Nevertheless, the alternatives should be clearly labeled regarding their status relative to the “official,” primary reference. For example, a reference to an author’s website might be to an early draft, to an expanded version, or to a preprint.

1.1.4 Location and Access: Personal Communications

Email, text messages, and personal communications require additional considerations.

An important consideration is which circumstances warrant the use of ordinarily private material. In a scientific paper, such material generally cannot be relied on in a technical sense. However, in a history paper (HoPL, in our case), an essay (Onward!, for example), or in any context-setting part of a scientific paper, such material can be helpful to readers and scholars.

For historical papers where the purpose is to create archival sources for future historians—that is, where gathering oral histories is an essential part of the process—the primary concern is to make sure that the source of the communication is clear and that the people involved are aware of and approve the material gathered.

Some apparently personal communications are archived because they are part of a public or community conversation, and might be handled as ordinary archival material. In (rare) cases, personal email can be archived by permission of all relevant parties.

Email and other private communications most likely must be handled as non-archival using a *précis* in which the gist of the exchange and its relevance are stated. It must be made clear, though, whether the reported communication is purely a recollection by the author of the paper

or the other party has reviewed it. Label each personal and oral communication as “Reviewed and Confirmed” or “Unconfirmed.”

In some cases an oral statement can be supported by other archival material. The following is an example:

John McCarthy told the author (Joe Fabeets) in 1976 in McCarthy’s office at the Stanford AI Lab that Lisp can be essentially defined in half a page of Lisp code. This statement was later substantiated by referring to the “Lisp 1.5 Programmer’s Manual.” [McCarthy 1962, p. 13]

...

REFERENCES

...

McCarthy, John; Abrahams, Paul; Edwards, Daniel; Hart, Timothy; and Levin, Michael. 1962. *Lisp 1.5 Programmer’s Manual*. MIT Press (Cambridge, Massachusetts, USA).

Some (especially historical) venues might be able to provide sealed archives so that scholars in the future can review otherwise private communications.

1.2 Citations: Typesetting and Other Advice

Typesetting a Citation: PACMPL uses author-year citations—the supplied, official template specifies this by declaring `\citetstyle{acmauthoryear}`.

A citation is a parenthetical remark; the sentence must read properly even if the parenthetical material is omitted. The text produced by `\cite` is not English and should not be treated as such. For example, the following LaTeX line (using author-year citations):

```
The ultimate source is \cite{texbook}. % not recommended!
```

produces the following sentence in the final output:

The ultimate source is [Knuth 1983].

This might look like a sentence, but it is not. Try reading it aloud—how did you pronounce “[Knuth 1983]”? Moreover, the citation is parenthetical, so you should be able to leave it out while reading. A better sentence would be the following:

```
The ultimate source is \textit{The {\TeX}book} \cite{texbook}.
```

which produces

The ultimate source is *The T_EXbook* [Knuth 1983].

or alternatively

```
The ultimate source is \textit{The {\TeX}book} by Donald Knuth \citetext{\citeyear{texbook}}.
```

which produces

The ultimate source is *The T_EXbook* by Donald Knuth [1983].

The PACMPL Author Guidelines permit author-year citations to be used as noun phrases by using `\citet` from the `natbib` package, which provides the author’s last name outside the brackets and then the year in brackets. The `natbib` package provides access to a variety of bibliographic styles, and the command `\citet` produces text. We do not recommend that practice; instead you should retain control over your text. For example, suppose that the reference key `church-1932` refers to the paper “A Set of Postulates for the Foundation of Logic” by Alonzo Church, and the sentence you want to write is as follows:

"The lambda calculus was originally conceived by Church [1932]."

You can retain control over the precise text “Church” while giving `natbib` the responsibility for typesetting the year (`\citeyear`) and the correct kind of surrounding brackets (`\citetext`), as follows:

The lambda calculus was originally conceived by Church `\citetext{\citeyear{church-1932}}`.

However, whether you use the above technique or you use `\citet`, you must be sure you know the material being referenced, including that the key or keys refer to the correct BiBTeX entries. Moreover, in some cases the full citation produced by `\cite` will work best in your sentence.

Other problems of wording in citations can also be solved by using `\citetext` and `\citeyear`. Suppose you are introducing work by Goldstine and von Neumann for the first time in your paper; you might like to mention their first names. You can write the following:

Herman Goldstine and John von Neumann `\citetext{\citeyear{goldstine-and-von-neumann-paper}}`

which produces the following:

“Herman Goldstine and John von Neumann [1947]”

Using the simple command `\cite` can lead to wording you don’t like. For example, the following source:

The lambda calculus was originally conceived by Church `\cite{Church-1932}`.

leads to the following text, with the word “Church” repeated:

"The lambda calculus was originally conceived by Church [Church 1932]."

Don’t be afraid to revise the sentence to make it more natural, perhaps by including additional useful information:

“During 1928–1929, Alonzo Church began to develop the lambda calculus [Church 1932].”

Producing appropriately informative, accurate, and beautiful citations and citation text requires careful—or at least relentless—thought.

Typesetting Multiple Citations: In most situations, it is preferable to combine multiple related citations at a single point in the text within one set of brackets. The `\cite` command handles the most common situations by accepting multiple BibTeX keys separated by commas. Thus

```
\cite{WirthAlgorithms,PascalManual,KnuthVolume1}
```

will produce

```
[Wirth 1976; Jensen and Wirth 1974; Knuth 1968]
```

This is preferable to using three separate commands

```
\cite{WirthAlgorithms} \cite{PascalManual} \cite{KnuthVolume1}
```

which would produce

```
[Wirth 1976] [Jensen and Wirth 1974] [Knuth 1968]
```

Once again, the more general command `\citetext` can be used to handle more complex situations, such as the case of multiple citations when one or more of them needs a square-bracketed optional argument: instead of this:

```
\cite[page 353]{WirthAlgorithms} \cite[page 116]{PascalManual} % not so good
```

which produces the following:

```
[Wirth 1976, page 353] [Jensen and Wirth 1974, page 116]
```

you can write, say,

```
\citetext{\citealp{WirthAlgorithms}, page 353; \citealp{PascalManual}, page 116}
```

which produces the following text:

```
[Wirth 1976, page 353; Jensen and Wirth 1974, page 116]
```

DOI: If it's possible to associate a DOI with a primary reference, include it as a DOI field in the BibTeX entry for the reference. If a secondary reference has a DOI, use it in the appropriate `url` entry (see Appendix B4).

2. Other Material

Section Order: Please follow the sample file, `sample-acmsmall.tex` (`sample-acmsmall.pdf`), for the order of material except for Appendices and References: **all Appendices should come before the References section.**

If the References section is more than 2 pages long **and** either the References section starts more than 2/3 down the page or the paper is at least 50 pages long, put a `\clearpage` before the References section. Use the same rule for each appendix.

Footnotes: Except for dashes, place footnotes *after* punctuation:

```
<word>.\footnote{...}
```

(But use footnotes sparingly.)

Ranges: Use en-dashes: 9--13. There should be no spaces before or after the en-dash.

Dashes: Use em-dashes to set off parenthetical remarks, to set off appositives that contain commas, to bring focus to a list, or to mark sharp turns of thought. Like en-dashes, em-dashes are not surrounded by spaces:

```
Lisp---the world's finest programming language---is the only one I use.
```

Dieresis / Diaeresis (naïve, coöperate, reëngineer): Use of dieresis to indicate that a vowel should be sounded as a separate syllable is permitted. (It was used in *MIT Technology Review* under Jason Pontin, and is still used in *New Yorker* magazine and the writings of Richard P. Gabriel.)

Directional Words (toward, towards, backward, backwards): Use the form of such words that does not end in “s”. That is, use “toward” instead of “towards” and “backward” instead of “backwards.” This is the preferred American form; British forms are the opposite.

Ellipses: These should be used primarily in quotations. Let’s suppose this is the original material that will be quoted:

The evolution of Lisp has been guided more by institutional rivalry, one-upmanship, and the glee born of technical cleverness than by sober assessments of technical requirements. Lisp—the world’s greatest programming language—is the only one I use and the only one I need.

Use `\textellipsis` for the ellipsis character (...) unless in math mode.

Use no spaces on either side when the elided material is in the middle of a sentence:

Gabriel wrote, ``Lisp\textellipsis{}is the only language I use and the only one I need.''

When the elided material is at the very end of a sentence (*before the period*), but the sentence as quoted is grammatically complete, put the period before the ellipsis, like this:

Gabriel wrote, ``Lisp---the world's greatest programming language---is the only language I use.\textellipsis''

To be clear, the above is also how you would typeset the ellipsis when there is elided material immediately *after* the period.

When there is elided material before a period, but the sentence as quoted is deliberately grammatically incomplete, use only ellipsis with no period, like this:

Many people recall the self-serving passage Gabriel wrote that begins ``The evolution of Lisp has been\textellipsis'' But how many can recite the rest of it?

That is, there will be three dots, not four.

For other punctuation either before or after elided material, place the ellipsis where the elided material would be.

When material at the beginning of a quoted sentence is omitted, typeset it like this (a block quote in this case with an extra ellipsis to replace an em-dash):

```
\begin{quotation}
The evolution of Lisp has been guided more by institutional rivalry, one-upmanship, and
the glee born of technical cleverness than by sober assessments of technical
requirements\textellipsis. The world's greatest programming language{\textellipsis}is
the only one I use and the only one I need.
\end{quotation}
```

Notice that the sentence whose beginning has been elided is capitalized (“The world’s greatest...”). This is because the ellipsis immediately before (underlined) swallows that elided beginning (even though there is a period in between).

When ellipses occur in the original, there are two cases: when no ellipses are added by you and when some are. When no ellipses are added by you, typeset as the text appears and add a note explaining what you did. Suppose the text you are quoting is as follows:

Mark, sitting in the sun, wondered about periods, commas...and decided it was all too hard.

To quote all of this, you would typeset as follows (using a block quote for clarity):

```
\begin{quotation}
Mark, sitting in the sun, wondered about periods, commas\textellipsis{}and
decided it was all too hard.
\end{quotation}
```

(Ellipsis in original.)

When you are eliding some material in a quote that contains ellipses, place your ellipses within square brackets with spaces on either side of them unless there is punctuation there. Add your explanation of what you did. For example, as follows:

```
\begin{quotation}
Mark [\textellipsis] wondered about periods, commas\textellipsis{}and decided
it was all too hard.
\end{quotation}
```

(Bracketed ellipsis added.)

In this example, the commas are part of the material elided.

When there are several quotes with their own ellipses, you can place a blanket explanation in a note, preface, or elsewhere. For example, as follows:

```
Ellipses that appear in the original text that is quoted are set as they
appear. Ellipses added by the author are set off in square brackets.
```

Punctuation and quotes: Use American style: punctuation inside quotes unless the punctuation is ? or ! and is part of the larger sentence, or if it is ; or .:

```
`I like APL.'
`You say you like APL?''
I like ``deemie bobbbers.'' % Not logical, but conventional6
I like ``deemie bobbbers''; so does my friend.
You say you like ``deemie bobbbers''?
I said, ``Who likes deemie bobbbers?''
```

However, this rule may be violated if absolutely necessary to avoid ambiguity.

```
The command is called ``parse.number''.
```

In many cases one can rewrite a sentence to avoid both ambiguity and violation of the rule.

```
The command ``parse.number'' takes three arguments.
The command is called ``parse.number''; it takes three arguments.
```

⁶ This comment reflects the situation that some regard British-style punctuation involving quotation marks as more logical than the more standard and conventional American style, which we recommend for HoPL.

Explain names in direct quotes if necessary: For example, if you are quoting an email referring to a person by first name or last name only, put the full name and any required identifying information in square brackets after the first occurrence:

```
\begin{quotation}
```

Dear Donald:

I think John [John McCarthy, of MIT and Stanford] invented Lisp, not you.

```
\end{quotation}
```

Latin abbreviations: Except for the special case of “[*sic*]”, do not italicize Latin abbreviations.

The Latin term “*sic*” means “thus.” It is conventionally used to indicate that something incorrectly written is intentionally being left as it was in the original. When used for this purpose it is italicized and always surrounded by brackets to indicate that it was not part of the original. Place “[*sic*]” right after the error. Do not add an exclamation point, however tempting that might be; the correct place to express any attitude toward the error, snarky or otherwise, is in the main text (or a footnote), not in the quotation.

Use a comma after “i.e.” or “e.g.”—and consider saying “that is” or “for example” instead. The *Chicago Manual of Style* remarks: “The English equivalents are preferable in formal prose, though sometimes the compactness of these two-character abbreviations makes them desirable.”

Do not use a comma after “cf.” Do not put a period between the ‘c’ and the ‘f’. Use “cf.” to contrast; to compare like things, use “see” or “see also.”

Gendered pronouns: Try to word sentences so as not to require third person pronouns, but if you cannot, it is permissible to use the gender-neutral alternatives “they” and “their.” Saying “he or she,” alternating between “he” and “she,” or using “she” (to make a point) are not recommended.

Start sentences in English: Avoid starting a sentence with a symbol, a numeral, or something that needs to be set in a different typeface, such as a computer-language identifier or keyword. Instead of this sentence, “do_while is used to iterate...,” write something like “The control construct do_while is used to iterate...”

Avoid fragments: Fragments can occur in conjunction with the use of colons. For example, the following is a fragment:

The important things to note in this example:

- <point1>
- <point2>

Write the following instead:

The important things to note in this example are as follows:

- <point1>
- <point2>

Label inconsistent examples: When describing different behavior of similar code in different versions of a programming language, label the code figures to indicate the different versions.

```
" xyz ". prop = 42; // Set the value of property prop to 42 for all strings
alert (" xyz ". prop ); // displays : 42
alert (" abc ". prop ); // displays : 42
```

JavaScript 1.0

```
" xyz ". prop = 42; // Set the value of a String wrapper property to 42
alert (" xyz ". prop ); // Implicitly creates another wrapper , displays : undefined
var abc = new String ("abc "); // Explicitly create a wrapper object
alert ( abc +" xyz "); // Implicitly converts wrapper to string , displays : abcxyz
abc . prop = 42; // create a property
alert ( abc . prop ); // display : 42
```

JavaScript 1.1

Use full sentences when introducing numbered and bulleted lists: “His postmortem thoughts also include the following: 1.”

Sentences and fragments in lists: The set of list items should be all sentences or all fragments, not a mixture. If they are sentences, use periods at the end of each; if not, then use no punctuation at the ends.

“Only”: Place the word “only” where it belongs, even though idiomatic English accepts poor placement. This is an example of an idiomatic use of “only”—it is a bad sentence:

Ecma International currently only capitalizes the “E” in “Ecma,” but at various times in the past they have used all capital letters.

That first clause can lead a reader astray because it could have been followed by a very different ending—one that illustrates what the “only” above actually modifies:

Ecma International currently only capitalizes the “E” in “Ecma,” but at various times in the past they have used italics and boldface along with capitalization, like this: *Ecma* or **Ecma**.

The intended meaning of the original sentence is better expressed as follows:

Ecma International currently capitalizes only the “E” in “Ecma,” but at various times in the past they have used all capital letters.

“Mostly,” “Just,” “Solely”: The advice for “only” applies also to “mostly,” “just,” and “solely.”

Hyphenating “-ly” adverbs: We ordinarily hyphenate compound modifiers for clarity: a “large-animal veterinarian” might be different from a “large animal veterinarian.” However, the simple rule for hyphenation with an adverb ending in *-ly*, as stated in *The Chicago Manual of Style*, is as follows:

Compounds formed by an adverb ending in *ly* plus an adjective or participle (such as *largely irrelevant* or *smartly dressed*) are not hyphenated either before or after a noun, since ambiguity is virtually impossible. (The *ly* ending with adverbs signals to the reader that the next word will be another modifier, not a noun.)

Thus the phrase “large scale massively parallel run time library” should be hyphenated as “large-scale massively parallel run-time library” because the noun “library” is preceded by three two-word compound modifiers, of which the first and third need a hyphen but the second does not because of the special rule about *-ly* adverbs.

Spelling and Punctuation in Quoted Text: Quoted texts may spell words differently and use different punctuation from current (2020) practice—for example, language names like “FORTRAN,” which was changed to “Fortran,” and “e-mail,” which is now spelled “email.” In quotes, retain the spelling of the original text, and likewise retain the original punctuation. Use square brackets to indicate revisions that would make the original intent clear.

Lisp / Fortran: The proper spelling of “LISP” is “Lisp.” The proper spelling of “FORTRAN” is “Fortran.” Use these spellings unless you are quoting text that spells them differently—in those cases, retain the original text’s spelling.

Oxford Comma: The Oxford comma is the comma that comes after the penultimate item in a list of three or more items, before “and” or “or.”

Please bring me three French hens, two turtle doves, and a partridge in a pear tree.

The Oxford comma is the one that comes right after “doves.” Not using it opens you up to interesting, usually accidental, interpretations, like this one:

I love my parents, Lady Gaga and Humpty Dumpty.

(Commas are used in English both to separate items in a list and to separate appositive phrases, and it is not clear in this example which function the comma is intended to serve.)

When a sentence uses nested constructions, the Oxford comma often helps to prevent ambiguity and confusion. Compare the following:

I like roast beef and provolone, ham and swiss and peanut butter and jelly.

I like roast beef and provolone, ham and swiss, and peanut butter and jelly.

You may have roast beef and provolone, ham and swiss or peanut butter and jelly.

You may have roast beef and provolone, ham and swiss, or peanut butter and jelly.

You have three choices to make: wheat or rye, ham or turkey and mustard or catsup.

You have three choices to make: wheat or rye, ham or turkey, and mustard or catsup.

In each pair of sentences, the presence of an Oxford comma makes the second one noticeably easier to read.

If a sentence gets too complicated and the Oxford comma cannot do the job, it may be prudent to use semicolons (including an "Oxford semicolon"):

I like roast beef and provolone; ham and swiss; bacon, lettuce, and tomato; and peanut butter and jelly.

We strongly recommend the use of the Oxford comma for HoPL, because technical material, especially in computer science, frequently mentions long lists of items that may be related conjunctively ("and") or disjunctively ("or"), where the items themselves may be complicated phrases rather than words. In our experience, consistent use of the Oxford comma reduces ambiguity and confusion in such technical material.

Acknowledging Shepherds: Following the precedent set by previous HOPL conferences, there should be explicit recognition of the shepherd(s) for each paper. Because papers will appear separately in the ACM DL rather than in a bound volume, the names of shepherds should appear on the first page of each paper, below the names of the authors, indented and in smaller type. To do this, please download the LaTeX style file "acmshepherd.sty" from the "Author Resources" page:

<https://hopl4.sigplan.org/track/hopl-4-papers#AUTHOR-RESOURCES-FOR-PREPARING-FINAL-COPY>

and put it in the same place as "acmart.cls". In your LaTeX source file, put this line:

```
\usepackage{acmshepherd}
```

with the other "\usepackage" commands, and put something like this:

```
\shepherd{Yannis Smaragdakis, University of Athens}
```

immediately after the \author commands.

Trademarks: There is no legal requirement to place ® or ™ after trademarks; avoid using them. (See the *Chicago Manual of Style*, seventeenth edition (2017), §8.153.)

3. Issues of Fair Use

Unfortunately, the only way to get a definitive answer on whether a particular use is a fair use is to have it resolved in federal court. Judges use four factors to resolve fair use disputes:

- the purpose and character of the use
- the nature of the copyrighted work
- the amount and substantiality of the portion taken
- the effect of the use upon the potential market

After carefully reading the *Chicago Manual of Style*, reading the Stanford Copyright & Fair Use pages, and reading the “Code of Best Practices in Fair Use for the Visual Arts,” prepared by the College Art Association, we believe that every fair-use situation in the submitted and accepted HoPL papers is almost certainly fair use. This applies to quoted text, excerpted manuals, email conversations, photographs, magazine and book covers, and other visual and audio material. We based our judgment on three factors. First, HoPL is an ACM conference, and ACM is an educational nonprofit, which means that there is no commercial motivation behind the use. Second, the material is used to support an analysis of the history of the topics discussed, which renders the use as transformative (and case law supports this). Third, the amount of material used is small, and in the case of magazine covers, the reproduced quality is closer to thumbnails than to high-resolution, color-corrected reproductions.

Moreover, the advice we read in several of these sources is that when one believes the case for fair use is strong—as we do here—seeking permission is likely unnecessary. (See, for example, the *Chicago Manual of Style*, seventeenth edition (2017), §4.93.)

In all cases, fair-use material must be properly cited.

Appendix A: Fair Use Example for Citations

Here is how the material in the Apple reference could be handled in the main text using a fair use approach.

Differential privacy (DP) [Dwork and Roth 2014] has emerged as a rigorous probabilistic definition of privacy, where the goal is to guard the personal information of an individual in a dataset. In a nutshell, DP is enforced by adding random noise to the output of a program,... A number of systems have been proposed by the research community for enforcing differential privacy [Johnson et al. 2018; McSherry 2009; Proserpio et al. 2014; Roy et al. 2010], and major corporations, like Google [Erlingsson et al. 2014], Apple [Apple 2017], and Uber [Johnson et al. 2018], have started incorporating differential privacy to protect sensitive customer information in their data-analysis.

In their public statement on Differential Privacy, Apple states their interest and dedication to preserving the privacy of their users while still being able to gathering useful usage information:

Apple has adopted and further developed a technique known in the academic world as local differential privacy to do something really exciting: gain insight into what many Apple users are doing, while helping to preserve the privacy of individual users. It is a technique that enables Apple to learn about the user community without learning about individuals in the community. Differential privacy transforms the information shared with Apple before it ever leaves the user's device such that Apple can never reproduce the true data. [Apple 2017]

Apple uses Count-Min Sketch [Cormode 2009] and also a variant that Apple calls *Hadamard Count Mean Sketch* [sic]:

In our use of the Count Mean Sketch [sic] technique for differential privacy, the original information being processed for sharing with Apple is encoded using a series of mathematical functions known as hash functions, making it easy to represent data of varying sizes in a matrix of fixed size.

The data is encoded using variations of a SHA-256 hash followed by a privatization step and then written into the sketch matrix with its values initialized to zero. The noise injection step works as follows: After encoding the input as a vector using a hash function, each coordinate of the vector is then flipped (written as an incorrect value) with a probability of $1/(1 + e^{\epsilon/2})$, where ϵ is the privacy parameter. This assures that analysis of the collected data cannot distinguish actual values from flipped values, helping to assure the privacy of the shared information....

The Hadamard Count Mean-based [sic] Sketch technique uses a noise injection method similar to the one used in the Count Mean Sketch [sic] technique, but with an important difference: It applies a type of mathematical operation called a Hadamard basis transformation to the hashed encoding before performing the privatization step. Additionally, it samples only 1 bit at random to send instead of the entire row as in the Count Mean Sketch [sic] technique. This reduces communication cost to 1 bit at the expense of some accuracy. [Apple 2017]

Appendix B: Additional BibTeX Facilities for HOPL

The BibTeX style file `ACM-HOPL-Reference-Format.bst` is an extended version of the style file `ACM-Reference-Format.bst` that provides additional facilities. We will refer to the style with these extra facilities as “the extended style”.

B1. Dates and Date Ranges

The standard way to indicate the publication date of a document is to fill in the year field, perhaps also the month field, and possibly even the day field. These also work in the extended style, but may be replaced or supplemented by a single date field, which is capable of indicating both date and time (useful, for example, when citing an email message, blog post, or tweet) and also of expressing time ranges. The values acceptable for the date field generally conform to ISO 8601 format: a single date/time value has the form “`yyyy-mm-ddT $hh:mm:ss$ \pm tt:uu`” where `yyyy` is a four-digit year, the first `mm` is a two-digit month number, `dd` is a two-digit day number, `hh` is a two-digit hour, the second `mm` is a two-digit minute, `ss` is a two-digit second, and `\pm tt:uu` is a time zone offset where ‘ \pm ’ may be either ‘+’ or ‘-’. A capital letter ‘T’ separates the date from the time. Fields may be dropped from the right-hand end as long as immediately preceding separators are also dropped, and one may also drop `ss` but keep the time zone. In addition, if there is no time zone, the date field may contain 14 consecutive digits with no punctuation. Therefore all of these are valid values for the date field:

```
date = {2007}
date = {2007-05}
date = {2007-05-19}
date = {2007-05-19T14:30}
date = {2007-05-19T14:30-08}
date = {2007-05-19T14:30-08:00}
date = {2007-05-19T14:30:22}
date = {2007-05-19T14:30:22-08}
date = {2007-05-19T14:30:22-08:00}
date = {20070519143022}
```

Consistent with ISO 8601, one may also use ‘Z’ as a time zone designator to indicate UTC:

```
date = {2007-05-19T14:30Z}
date = {2007-05-19T14:30:22Z}
```

Consistent with ISO 8601, the special “month numbers” 21, 22, 23, and 24 actually designate the seasons Spring, Summer, Autumn, and Winter, respectively.

```
date = {2007-23}
```

An extension to ISO 8601 is that the usual BibTeX month abbreviations `jan`, `feb`, `mar`, and so on can be used within the date field in this way:


```
date = {2007} # may
date = {2007} # may # {19}
date = {2007} # may # {19T14:30}
```

When using month abbreviations in this way, the day part is allowed to be just a single digit:

```
date = {2007} # may # {5}
date = {2007} # may # {5T14:30}
date = {2007} # may # {5} # {T14:30}
```

The extended style also allows the use of spring, summer, autumn, or winter in place of a month name:

```
date = {2007} # autumn
```

This use of # provides flexibility to allow the abbreviations to be replaced by other strings. However, if you use a numeric form such as 2007-05-19, the extended style will translate the month number into ACM's standard string for that month or season.

A date range consists of two dates separated by a slash '/':

```
date = {2007/2011}
date = {2007-05/2007-10}
date = {2007-05/2011-10}
date = {2007-05-19/2011-04-23}
date = {2007-05-19T14:30/2007-05-19T17:00}
date = {2007-05-19T14:30/2007-05-19T17:00+02}
```

For example, a journal issue dated “January–February 2013” might have this for its date field:

```
date = {2013} # jan # {/} # {2013} # feb
```

The extended style makes an effort to typeset date-range information in an appropriate style.

B2. Citing Non-archival Material

The natbib citation commands `\cite`, `\citep`, and `\citet` may be augmented with a parallel set of commands `\citeNA`, `\citepNA`, and `\citetNA`, which can be used for citing non-archival material. *This feature can be used with or without the extended style provided by the BibTeX style file ACM-Reference-Format.bst; it is an independent choice.*

If you choose to do this, then LaTeX will generate *two* .aux files, one called *yourfilename*.aux and one that is always called nonarchival.aux. It is then necessary to run BibTeX twice, once on each of these files:

```
bibtex yourfilename
bibtex nonarchival
```

thereby producing two .bbl files, called *yourfilename*.bbl and nonarchival.bbl. It is also necessary to have two `\bibliography` commands in your LaTeX source file:

```
\bibliography{yourfilename}
\bibliographyNA{yourfilename}
```

All this will result in a References section followed by a separate Non-archival References section. Citations to a non-archival reference will include “NA” to indicate that the reader should look for the cited reference in the Non-archival References.

Don’t forget to make sure the following two lines appear before “`\begin{document}`”:

```
\bibliographystyle{ACM-HOPL-Reference-Format}
\bibliographystyleNA{ACM-HOPL-Reference-Format}
```

Authors who use the `\citetext` command should be aware that the extended style also provides the commands `\citealpNA`, `\citealtNA`, `\citeauthorNA`, `\citefullauthorNA`, and `\citeyearNA`, which are analogues of `\citealp`, `\citealt`, `\citeauthor`, `\citefullauthor`, and `\citeyear`, respectively.

To use these “NA” citation macros, it is necessary to include this in your LaTeX source file:

```
\usepackage{acmNArefs}
```

(This facility makes use of the standard LaTeX package `multibib`.)

If you choose not to have a separate Non-archival References section—and therefore do not include `\usepackage{acmNArefs}` in your LaTeX source file—make certain you **do** include `\usepackage{acmshepherd}`, which defines some macros you will need for non-archival material even if you are not using `acmNArefs.sty`.

B3. Saying Where Non-archival Material Has Been Archived

The fields `archivedrepository`, `archivedurl`, `archivedurladdon`, and `archiveddate` may be used to document where to find an online archival copy of non-archival material. The important one is `archivedurl`, an URL; `archivedrepository` is the name of the repository, `archivedaddon` is an optional note (not often needed) that is appended to the URL, and `archiveddate` is the date it was archived (see section B1 above for permitted date formats).

```
archivedrepository = {Internet Archive},
archivedurl =
{https://web.archive.org/web/20190702231359/https://www.ibm.com/ibm/history/exhibits/1130/1130\_intro.html},
archivedurladdon = {very cool},
archiveddate = {2019-07-02T23:13:59},
```

URLs provided by the Internet Archive at archive.org have a special format that includes the URL of the archived web page and also contains a timestamp for the archived copy. To avoid printing the entire URL twice, the extended style treats this situation as a special case. Simply **provide** both an `url` field and an `archivedurl` field, and **omit** the `archivedrepository` and `archiveddate` fields. If the URL embedded in the `archivedurl` matches the `url` (and for this purpose the difference between “http” and “https” is ignored), as in this example:

```
url="http://dreamsongs.com/WorseIsBetter.html",
archivedurl="https://web.archive.org/web/20200209181438/http://dreamsongs.com/WorseIsBetter.html",
```

instead of producing text like this as part of the reference:

```
http://dreamsongs.com/WorseIsBetter.html
Archived at https://web.archive.org/web/20200209181438/http://dreamsongs.com/WorseIsBetter.html
```

the extended style produces this abbreviated form:

```
http://dreamsongs.com/WorseIsBetter.html (also at Internet Archive 9 Feb. 2020 18:14:38).
```

where the text “[Internet Archive 9 Feb. 2020 18:14:38](https://web.archive.org/web/20200209181438/http://dreamsongs.com/WorseIsBetter.html)” is a hyperlink to the archival copy. One may still use the `urlprefix`, `urldate`, and/or `urladdon` fields and still get an abbreviated form; for example, using the following fields in a BibTeX entry:

```
url="http://dreamsongs.com/WorseIsBetter.html",
urldate="2020-02-11",
urladdon="preprint",
archivedurl="https://web.archive.org/web/20200209181438/http://dreamsongs.com/WorseIsBetter.html",
```

the extended style produces this abbreviated form:

```
http://dreamsongs.com/WorseIsBetter.html (preprint; retrieved 11 Feb. 2020; also at Internet Archive 9 Feb. 2020 18:14:38).
```

B4. Adding Other URL Information to a BibTeX Entry

The `url` field is now accompanied by three optional fields `urlprefix` (text that precedes the formatted URL), `urladdon` (text that follows the URL; parentheses are automatically provided), and `urldate` (the date on which the URL was accessed; see section B1 above for permitted date formats).

```
urlprefix = {See also cartoon at},
url = {https://xkcd.com/224},
urladdon = {`Lisp' },
urldate = {2020} # jan # {27},
```

If the DOI entry is non-empty, then the URL is not printed **unless** at least one of the `urlprefix`, `urladdon`, and `urldate` fields is non-empty, in which case the URL is printed after all.

In case one URL is not enough, there are similar fields for having a second and third URL:

```
secondurlprefix, secondurl, secondurladdon, secondurldate
thirdurlprefix, thirdurl, thirdurladdon, thirdurldate
```

And there are two specialized sets of fields intended to handle the common cases of mentioning “as a courtesy” slides or a video (or both) associated with a paper or talk:

```
slidesurl, slidesurladdon, slidesurldate
videourl, videourladdon, videourldate
```

(For slides and video, an appropriate prefix is automatically supplied.) On the other hand, if material in the slides or video is referred to in the text, then the slides or video should be cited separately, using separate BibTeX entries.

The following are the rules for printing DOI, `url`, `secondurl`, `thirdurl`, `slidesurl`, `videourl`, and `archivedurl` items in a BibTeX entry:

If both an `url` and a DOI are provided, and the `urlprefix`, `urladdon`, and `urldate` are all empty, print only the DOI; otherwise print both DOI and `url`.

If any `urladdon` (such as `secondurladdon` or `thirdurladdon`) is a single alphanumeric character,

then instead of being enclosed in parentheses, it is used as closing punctuation at the end of all the material for the associated URL.

Note: There are some example BibTeX entries in Appendix D.

Note: Be careful when using the `prefix` forms for URLs. Unless there is an `addon` entry as well, the phrases produced will have no punctuation, and so unintended run-on phrases and sentences can arise. Imagine a paper with the title: “Lisp and Java Considered,” with a BibTeX item with these BibTeX entries:

```
urlprefix = {See silly things here:},
url = {https://xkcd.com/224},
secondurl = {https://www.oracle.com/java/},
```

This produces the following:

See silly things here: <https://xkcd.com/224> <https://www.oracle.com/java/>

This can be avoided by using an addon that is a string of one punctuation character, like this:

```
urlprefix = {See silly things here:},  
url = {https://xkcd.com/224},  
urladdon = “.”,  
secondurl = {https://www.oracle.com/java/},  
secondurladdon = “.”,
```

which produces the following:

```
See silly things here: https://xkcd.com/224. https://www.oracle.com/java/.
```

B5. Adding a Précis or Synopsis to a BibTeX Entry

The extended style provides a `synopsis` field (it is not called `précis` because BibTeX cannot be counted upon to handle non-ASCII characters such as ‘é’). The text in this field is typeset in the `bibsynopsis` environment (which is similar to the `quote` environment). This field is typeset at the end of the reference, just before the `excerpt` and `note` fields.

```
synopsis = {There are three ways to think about lambda expressions.  
           This paper addresses four of them.}
```

B6. Adding a Quote or Excerpt to a BibTeX Entry

The extended style provides an `excerpt` field, intended to support a direct quote of text that occurs in the referenced material; in the case of an email message or tweet, it might be used to quote the entire content. The text in this field is typeset in the `bibexcerpt` environment (which is similar to the `quote` environment, but uses sans serif fonts by default). This field is typeset at the end of the reference, just after the `synopsis` field and just before the `note` field.

```
excerpt = {Why would you want to think about lambda expressions  
          any other way?}
```

B7. Conference Proceedings That Are Also Journal Issues

In an `@inproceedings` entry, you may supply fields `journal`, `volume`, and `number`, even in the standard ACM style; the extended style also supports a `journaldate` field.

Appendix C: LaTeX / acmart.c1s Bug Workarounds

If a URL your BiXTeX file has an underscore (`_`) in it, and the resulting PDF takes that underscore to mean to make the character after it a subscript, put this line in your LaTeX source file before `\begin{document}`:

```
\def\Ur10rds{\do*\do\-\do\~\do\'\do\''\do\-\do\_}
```

(However, if you use the package `acmshepherd`, then this correction is supplied for you.)

Appendix D: Sample BiBTeX Entries

The following is a list of the LaTeX commands needed to support non-archival material along with a set of BiBTeX entries, citations, and resulting Reference section.

(Some of these examples, such as BibTeX entry test28, go to extremes in order to show off many BibTeX features within a small number of examples. Only rarely would it be appropriate for a single reference to include that many URLs.)

In your LaTeX source file you need to have the following commands, in the following order:

```
\usepackage{acmNArefs}    % only if you want a Non-Archival References section
\usepackage{acmshepherd} % you should always include this

%% Bibliography style
\bibliographystyle{ACM-HOPL-Reference-Format}
\bibliographystyleNA{ACM-HOPL-Reference-Format} % only for Non-Archival Ref. section
...
\begin{document}
...
\bibliography{yourfilename}
\bibliographyNA{yourfilename} % only for Non-Archival Ref. section
\end{document}
```

BiBTeX Entries

```
@article{test5,
  Key="McCarthy",
  Author="McCarthy, John",
  Title="History of LISP",
  publisher="ACM SIGPLAN",
  journal="HOPL",
  date="1978" # aug # {13T14:30} # "/" # {1978} # aug # {17T17:00},
  Address="Los Angeles",
  Editor="Wexelblat, Richard L.",
  Pages="215-224",
  volume = {1}, number = {43},
  numpages={10},
  articleno={2345},
  synopsis= "Here Lux juxtaposes the old, quaint parts of the town---presumably representing the
parts of the town that still remain from the time when the town was livable---with the convenience
store. In this line---a list of two---the two parts are of equal weight, and hence an equality is
set up, implying that to the townspeople these two items are held equally, and hence without
notice (for who can notice a convenience store unless short of RC Cola?).",
  excerpt="This list is long and really presents little new information as it goes along except
the repetitiveness of the place as conveyed through the repetitiveness of the images, though each
is well-presented and displayed in the form of the lines. This seems one of the major pacing
elements in the poem.",
}
```

```

@misc{test8,
  Key="McCarthy",
  Author="Joe Fabeets",
  Title="Tweet",
  institution="Twitter",
  date="1978" # aug # {13T14:15-08},
  excerpt="Grody to the max. Like, gag me with a spoon.",
}

@inproceedings{test28,
  Key="McCarthy",
  Author="McCarthy, John and Magnolia Sims",
  Title="Keynote about LISP",
  publisher="ACM SIGPLAN",
  booktitle="Mystic Functional Conference",
  Year="1978",
  Address="Davenport, Iowa",
  Pages="1--2",
  archivedrepository={SaveStuff},
  archivedurl="http:savestuff.org/mccarthy/lisp/history.pdf",
  archivedate={1973} # dec # {25},
  archivedurladdon = ".",
  videourl="http:fabeets.net/bogosity/history-video.m4a",
  videourldate={1943} # oct # {31},
  videourladdon = ".",
  slidesurl="http:fabeets.net/bogosity/history-slides.pdf",
  slidesurldate={2020} # feb # {29},
  slidesurladdon = ".",
  urlprefix="Look at",
  url="http:urlplace.org/randomness/history-1.pdf",
  urladdon = ".",
  urldate={2001} # apr # {1},
  secondurlprefix="Also look at",
  secondurl="http:firewall.org/randomness/history-2.pdf",
  secondurladdon={behind firewall},
  secondurldate={2001} # may # {2},
  thirduurl="http:firewall.org/randomness/history-3.pdf",
  thirduurladdon={also behind firewall},
}

@misc{test97,
  Author="Richard P. Gabriel",
  Title="Worse Is Better",
  Year={1907},
  urlprefix="\NA",
  url="http://dreamsongs.com/WorseIsBetter.html",
  urladdon = "orange background",
  urldate="2020" # aug # "10",
  archivedurl="https://web.archive.org/web/20200209181438/http://dreamsongs.com/WorseIsBetter.html",
  secondurlprefix={For commentary see:},
  secondurl={https://en.wikipedia.org/wiki/Worse\_is\_better},
  secondurldate={2053} # dec # {19},
  secondurladdon={describes ``The MIT approach''},
}

```


Citations in the Paper

No Non-Archival References section requested. The paper contains these citations:

```
\cite{test5}...\cite{test8}...\cite{test28}...\cite{test97}
```

References Produced

Joe Fabeets. 1978. Tweet.

Grody to the max. Like, gag me with a spoon.

Richard P. Gabriel. 1907. Worse Is Better. NON-ARCHIVAL <http://dreamsongs.com/WorseIsBetter.html> (orange background; retrieved 10 Aug. 2020; also at Internet Archive 9 Feb. 2020 18:14:38). For commentary see: https://en.wikipedia.org/wiki/Worse_is_better (describes “The MIT approach”; retrieved 19 Dec. 2053).

John McCarthy. 1978. History of LISP. HOPL 1, 43 (13 Aug. 1978 14:30–17:00), Article 2345, 10 pages.

Here Lux juxtaposes the old, quaint parts of the town—presumably representing the parts of the town that still remain from the time when the town was livable—with the convenience store. In this line—a list of two—the two parts are of equal weight, and hence an equality is set up, implying that to the townspeople these two items are held equally, and hence without notice (for who can notice a convenience store unless short of RC Cola?).

This list is long and really presents little new information as it goes along except the repetitiveness of the place as conveyed through the repetitiveness of the images, though each is well-presented and displayed in the form of the lines. This seems one of the major pacing elements in the poem.

John McCarthy and Magnolia Sims. 1978. Keynote about LISP. In Mystic Functional Conference. ACM SIGPLAN, Davenport, Iowa, 1–2. Look at <http://urlplace.org/randomness/history-1.pdf> (retrieved 1 April 2001). Archived at SaveStuff: <http://savestuff.org/mccarthy/lisp/history.pdf>. Video at <http://fabeets.net/bogosity/history-video.m4a> (retrieved 31 Oct. 1943). Slides at <http://fabeets.net/bogosity/history-slides.pdf> (retrieved 29 Feb. 2020). Also look at <http://firewall.org/randomness/history-2.pdf> (behind firewall; retrieved 2 May 2001). <http://firewall.org/randomness/history-3.pdf> (also behind firewall).