Check List and Style Manual

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The section and list-item numbers below may be used in feedback from your proofreaders.

A ASTRA Style

1. Each heading has capitalised nouns, verbs, etc.
2. Each "if" has its ", then" and ", else" (note commas). Omitting the word "then" often leads to ambiguity when the condition itself has one or more commas.
3. Each "above" and "below" has a `\ref` to somewhere: not everyone has a phenomenal memory.
4. There are no words like "simple", "easy", "clear", etc, in order not to belittle less astute readers.
5. There is no elision like in "can't", "don't", "it's", etc. Note that "cannot" is more frequent than "can not".
6. There is "x, or y, or both" rather than "x and/or y". Avoid "/" as not everyone uses it only for "or".
7. Each word "Boolean" and "Cartesian" is capitalised.

B Structure

1. Each (sub)section $*.1$ comes relatively *early* within (sub)section $*$ and has a counterpart (sub)section $*.2$: a technical text is a *tree*, not a list.
2. Each (sub)section except Section 1 is announced with a `\ref`: readers need guidance about the structure.
3. Each concept is defined exactly *once* and typeset with `\emph` exactly *once*, namely *within* its definition and not at a first occurrence that announces the definition.
4. Each abbreviation is introduced *before* its first use, and capital letters are *only* used in the abbreviation. Ex: ... constraint programming (CP) ... CP is great.
5. Each float (numbered figure, table, etc) and numbered formula has at least one `\ref`, and the source code of a float is placed *immediately* after its first `\ref`. Else the object is *not* numbered and, if a float, is *inlined* within the text where it is to be read.
6. Each float is placed to the top (`[t]`) or bottom (`[b]`) of a page, but *not* to "here" (`[h]`), as unnumbered inlining is then to be used (see the previous item).
7. Each `enumerate` list has items whose order matters; otherwise an `itemize` list is used.

C Grammar

1. Each sentence has a verb.
2. Each subject and verb agree in numbers. Counterexamples: "He have" and "the tests is".
3. Each definition is for the *singular* of the concept. Counterexample: For "apes have mothers", does each ape have one mother or potentially several mothers?
4. All items of a list have the same grammatical form. Counterexample: A *stack* has three operations: creating an empty stack; push an item to the top of the stack; and the popping of the top item from the stack.

D Vocabulary and Language

1. The noun "system", often overloaded, is replaced by "application", "compiler", "solver", etc.
2. The noun "user", often overloaded, is replaced by "customer", "modeller", "programmer", etc.
3. The adjective "certain" is replaced by "some" when probabilities (are suspected by a reader to) play a role in your work. Counterexample: in a certain way.
4. Synonyms are *not* used alternately in technical writing. It is fine to write "x, also known as y and z in the literature", but then stick to x throughout the text.
5. The running text, captions of floats, legends of figures, and comments of source code are spellchecked in *Oxford English* rather than Cambridge English or North-American English. If you are interested, then note that the English Style Guide of UU lists the most important differences and has a lot of other valuable advice on how members of UU are supposed to communicate with the outside world.
6. The English quotation marks of "CP", say, are entered as ``` `` ``` (those are *two* grave accents) and `''` (those are *two* apostrophes), respectively. Note that quotation marks often differ between languages: for example, Swedish uses the English closing quotation mark for *both* opening and closing, giving "CP".
7. All text is grammar-checked.

E Punctuation

1. Each list of at least three items has a final comma. Examples: "x, y, and z" and "x, y, or z". Omitting this Oxford comma often leads to ambiguity when a list item itself contains one or more "and" or "or".

2. Each abbreviation ending in "." and followed by a space is entered with ".\ " instead of ". " so that LaTeX uses a *short* interword space instead of a *long* inter-sentence space. Example: observe the aesthetic difference between "Prof. X is great" (2 sentences) and "Prof. X is great" (1 sentence). Oxford English never uses "." for abbreviations ending in the last letter of the abbreviated word, say "Dr X is great", and never uses ":" in such abbreviations (unlike the Swedish "S:t X är bra").

3. Each Latin abbreviation for "that is" and "for example" is both prefixed *and* suffixed by commas: ", i.e.," and ", e.g.,". Better: do not show off that you know some Latin! Note however the correct spelling "et al." of the Latin abbreviation for "et alii", and remember the previous item if using it.

4. Each parenthetical expression is between commas. Example: CP, a great paradigm, is for smart people.

5. Each "which" *that*(!) cannot be replaced by "that" is preceded by a comma; otherwise it is replaced by "that". Example: "The set has one item, which is positive" is *very* different from "The set has one item that is positive", hence avoid the comma-less "The set has one item which is positive" (which means the same as the version with "that"): your readers do not know whether you know your punctuation or not, and you do not know whether your readers know their punctuation or not!

6. Each footnote pointer *follows* punctuation, if any. Ex: note *no* space in "`CP is great.\footnote{Yeah!}`".

F Spacing and Alignment

1. See Table 1 at page 4 for the numbers of spaces in English before and after many common symbols. These numbers often differ between languages!

2. References and citations use *non*-breaking spaces and uppercase. Example: `see Section~\ref{intro} in~\cite{GCCat}`. Use `\usepackage{cleveref}` or embed `\ref` in your own reference commands. Ex: you can define `\secref{#1}` as `Section~\ref{#1}`.

3. Numbers and units are tied by *non*-breaking spaces. Example: `We generated $100$~instances.`

4. Each numeric column in each table is *right*-aligned. Further, each number in a column of a table is formatted to the *same* decimal precision, so that the numbers of each column are aligned on the decimal point. Example: Note the 78.90 instead of 78.9 in Table 2 at page 4: due to the right alignment, this enables the *visual* comparison of the orders of magnitude of the numbers of a column.

G Mathematics and Algorithms

1. See Table 3 at page 4 for the typesetting of symbols.

2. No clause starts with a mathematical object.
Example 1: Replace "`... end. $v$ denotes ...`" by "`... end. Variable~$v$ denotes ...`".
Example 2: Replace "`... in~$D$, $C$ is ...`" by "`... in~$D$, and~$C$ is ...`", so that the comma in "D, C" does *not* look like an operator.

3. Use `\cdot` rather than $*$ or $\times$ for numeric products.

4. Use `\times` only for Cartesian products and the indication of matrix dimensions.

5. Use `=`, `\neg`, `\land`, `\lor`, and `\gets` (or `\coloneqq`) for equality, negation, conjunction, disjunction, and assignment within mathematics and algorithms, but *not* programming-language-style obscenities (such as ==, !, &&, ||, and =) in these contexts.

6. Use `\mathit{...}` for each *multi*-letter identifier to avoid typesetting it like the product of *one*-letter ones. Counterexample: `$fm$` typesets as fm, which looks like the product of f by m, but `$\mathit{fm}$` typesets as fm, which does *not* look like a product.

7. Commands, possibly parametric ones, are defined and used in order to allow quick notation changes in case a notation is not agreed upon yet.
Example: Upon

```
\newcommand{\Cardinality}[1]
  {\left\lvert#1\right\rvert}
```

the snippet `$\Cardinality{S}$` typesets the cardinality of set S as $|S|$, with autosizing bars. One can now redefine *just* the command and recompile in order to typeset *all* occurrences as, say, $\#S$ instead.

8. There are many useful commands in https://www.it.uu.se/research/group/optimisation/astra.sty, which is explained in https://www.it.uu.se/research/group/optimisation/astra.pdf.

H Bibliography

1. The *official* publications, available from many publishers while on the UU network, but not while on Eduroam, were read, rather than preprints at authors' homepages or elsewhere: preprints often have errors that are not in the official publications.

2. A tool like BibTeX is used with `astra.bib` (at https://github.com/astra-uu-se/astra-bib) and possibly with your own additional bibliography file, say `myBiblio.bib`. (If you directly write a list of `\bibitem`, then each key has at least one `\cite`.)

3. The bibliography items of all types are formatted in a uniform way, say like those in `astra.bib`. Do *not* rely on the content at bibliography servers: in particular, many get the issue in the following item wrong.

4. Use `author = {LastName, FirstName}` at least for authors with compound last names, in order to inform BibTeX which part of the name belongs where. Counterexample: `author = {Vincent van Gogh}` compiles into the wrong "V. v. Gogh" and is wrongly sorted under the letter "G", but `author = {van Gogh, Vincent}` compiles into the correct "V. van Gogh" and is correctly sorted under the letter "v".

5. Once your additional bibliography file, say `myBiblio.bib`, is approved, you can make a pull request to https://github.com/astra-uu-se/astra-bib.

I Experiment Design

1. The purpose of the experiments is stated and argued.

2. The hardware and software platform is indicated.

3. Instances that need more than a second are chosen, as there is too much measurement noise when making statistical operations for easier instances.

4. If randomisation is involved (such as in constraint-based local search (CBLS), or in CP with randomised variable or value selection), then every instance is run $n \geq 10$ times (ideally $n \geq 25$), and suitable statistical operations are applied. Example: see Table 2.

5. If the starting assignment is randomised (in CBLS), then there are n starting assignments per instance, rather than $m \cdot n$, so that all m models for the same problem start from the same n assignments.

6. The applied statistical operations are indicated and motivated. For example, statistical operations are often only applied for the *successful* runs (in CBLS).

J Experiment Reporting

1. The use of colours is encouraged in figures, but the colour names should *not* be referred to and the colours must be distinguishable on a black-and-white print-out. For instance, upon tracing a first curve as dotted in blue and a second curve as dashed in red, you can refer to the dotted and dashed curves, rather than to the blue and red curves, even though a reader with a colour print-out can also distinguish them as blue and red. Never use green and red within the same figure, as many people cannot distinguish these colours.

2. All results of statistical operations on run times are rounded to a centi-second precision, as anything below that is measurement noise.

3. Run times (in CBLS and CP), iterations (in CBLS), and failures (in CP) are reported, with boldfacing of the best results for each instance, such as in Table 2. There is no need for statistical operations if no randomisation is involved. Note that a *fixed*-size font is necessary for boldface digits to take the same space as normal ones: this enables the *visual* comparison of the orders of magnitude of numbers.

4. An experiment script writes the results directly into files that are imported via `\input{...}` into tables. This allows the re-run of experiments with only re-compilation of the report, but *no* (manual) re-editing.

		number of spaces after	
		0	1
number of spaces before	0	/ -	, : ; . ! ?)] } ’ ” %
	1	([{ ‘ “	– (n-dash) — (m-dash)

Table 1: Spacing rules of English

Run time (in seconds)

instance	Model 1					Model 2				
p–q–r	%	median	min	max	dev	%	median	min	max	dev
1–2–3	**80**	**45.67**	**12.34**	89.01	23.45	75	56.78	23.45	78.90	34.56
4–5–6	95	56.78	23.45	78.90	34.56	**100**	**45.67**	**12.34**	89.01	23.45

Table 2: Run time (in seconds) for the two models of the XYZ problem. A timeout of t seconds per instance was set and each instance was run n times, starting from the same assignments for each model. Column % indicates the percentage of successful runs, for which the median, minimum, maximum, and standard deviation are reported. Numbers in boldface indicate the best results for an instance.

Topic	LaTeX code	Appearance
Greek letter	`$\Theta,\Omega,\epsilon$`	Θ, Ω, ϵ
multiplication	`$m \cdot n$`	$m \cdot n$
division	`$\frac{m}{n}, m \div n$`	$\frac{m}{n}, m \div n$
rounding down (autosizing)	`$\left\lfloor n \right\rfloor$`	$\left\lfloor n \right\rfloor$
rounding up (autosizing)	`$\left\lceil n \right\rceil$`	$\left\lceil n \right\rceil$
binary modulus	`$m \bmod n$`	$m \bmod n$
unary modulus	`$m \equiv n \mod \ell$`	$m \equiv n \mod \ell$
root	`$\sqrt{n},\sqrt[3]{n}$`	$\sqrt{n}, \sqrt[3]{n}$
exponentiation, superscript	`$n^{i}$`	n^{i}
subscript	`$n_{i}$`	n_{i}
overline	`$\overline{n}$`	$\overline{n}$
base 2 logarithm	`$\lg n$`	$\lg n$
base b logarithm	`$\log_b n$`	$\log_b n$
binomial	`$\binom{n}{k}$`	$\binom{n}{k}$
sum	`$\displaystyle\sum_{i=1}^n i$`	$\displaystyle\sum_{i=1}^{n} i$
numeric comparison	`$\leq,<,=,\neq,>,\geq$`	$\leq, <, =, \neq, >, \geq$
non-numeric comparison	`$\prec,\nprec,\preceq,\succeq$`	$\prec, \nprec, \preceq, \succeq$
extremum	`$\min,\max,+\infty,\bot,\top$`	$\min, \max, +\infty, \bot, \top$
function	`$f \colon A \to B,\circ,\mapsto$`	$f \colon A \to B, \circ, \mapsto$
sequence, tuple	`$\langle a,b,c \rangle$`	$\langle a, b, c \rangle$
set	`$\{a,b,c\},\emptyset,\mathbb{N}$`	$\{a, b, c\}, \emptyset, \mathbb{N}$
set membership	`$\in,\not\in$`	$\in, \notin$
set comprehension	`$\{i \mid 1 \leq i \leq n\}$`	$\{i \mid 1 \leq i \leq n\}$
set operation	`$\cup,\cap,\setminus,\times$`	$\cup, \cap, \setminus, \times$
set comparison	`$\subset,\subseteq,\not\supset$`	$\subset, \subseteq, \not\supset$
logic quantifier	`$\forall,\exists,\nexists$`	$\forall, \exists, \nexists$
logic connective	`$\land,\lor,\neg,\Rightarrow$`	$\land, \lor, \neg, \Rightarrow$
logic	`$\models,\equiv,\vdash$`	$\models, \equiv, \vdash$
miscellaneous	`$\&,\#,\approx,\sim,\ell$`	$\&, \#, \approx, \sim, \ell$
dots	`$\ldots,\cdots,\vdots,\ddots$`	$\ldots, \cdots, \vdots, \ddots$
dots (context-sensitive)	`$1,\dots,n; 1+\dots+n$`	$1, \dots, n; 1 + \dots + n$
parentheses (autosizing)	`$\left(m^{n^k}\right),(m^{n^k})$`	$\left(m^{n^k}\right), (m^{n^k})$
identifier of > 1 character	`$\mathit{identifier}$`	$\mathit{identifier}$
hyphen, n-dash, m-dash, minus	`-`, `--`, `---`, `$-$`	-, –, —, −

Table 3: The typesetting of elementary mathematics. Note very carefully when italics are used by LaTeX and when not, as well as all the horizontal and vertical spacing performed by LaTeX.