

# GPU101: CUDA implementation of the symmetric Gauss-Seidel algorithm

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# 1 Notes

SW algorithm:

1. what it is
2. explanation
3. implementation
4. figures with steps

## Abstract

Enter a short summary here. What topic do you want to investigate and why? What experiment did you perform? What were your main results and conclusion?

# 2 Introduction

Please, be careful about paragraph separation: double backslash (`\\`) is used to break the line without spacing, and should be used only to break a single, long paragraph. Instead, to create a new paragraph two line breaks should be used.

This is, for example, a new, properly spaced paragraph (you can see the indentation at the beginning). Remember you can put references to external sources, in particular scientific articles or websites. To cite a source, you need to add the reference to the “biblio.bib” file in the Bibtex format, which lists the main information about the source. Since writing a Bibtex reference manually can be long, you can usually find the whole Bibtex reference on the internet, for example in the IEEE or ACM websites. Google is always a good source. In general, the procedure to cite a new source is:

1. find the Bibtex reference (if any)
2. copy or manually write it into the “biblio.bib” file
3. give it a label you like (in this example, you can see “vantage” or “sandy\_slides”), provided it is *unique*
4. use it throughout the text, with the `\cite` directive: for example, [2] or [1]

The list of referenced sources will appear at the end of the report.

### 3 Section 1

In the following, Equation (1) shows an example of equation centered within the page.

$$\text{maximize } \sum_{i=17}^{31} \sum_{j=i+1}^{32} [x_{i,j} \times s_{i,j} + (1 - x_{i,j}) \times d_{i,j}] \quad (1)$$

To type any mathematical expression in the text without breaking the line, you can surround it with the  $\$$  symbol, for example to refer to  $i$  and to  $\sum_{j=i+1}^{32} [x_{i,j} \times s_{i,j} + (1 - x_{i,j}) \times d_{i,j}]$ .

If you need to show code snippets, you can use the *listing* environment, as in the following example. As for the other elements, you can refer to a listing through its label as in algorithm 1. Remember to make your code well readable by indenting it and using concise pseudo-code snippets, without pasting your own code as it is (unless it is REALLY expressive and short).

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**Algorithm 1** Example of code snippet

---

```
1 globaldata: list_head buddies [MAXORDER] [MAXCOLORS]
2
3 procedure InsertBuddy(buddy b, order ord)
4     buddy twin
5     mcolor mcol
6
7     mcol = Mcolor(b, ord)
8     twin = GetTwinBuddy(b, ord)
9     if ord < MAXORDER-1 AND BuddyIsFree(twin)
10         RemoveFromList(buddies[ord][Mcolor(twin, ord)])
11         b = CoalesceBuddy(b, twin, ord)
12         InsertBuddy(b, ord+1)
13     return
14 else
15     InsertHead(buddies[ord][mcol], b)
16 end procedure
```

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#### 3.1 Subsection 1

This is the way to refer to Figure 1, and similarly for Section 3. You will notice  $\text{\LaTeX}$  freely moves elements like figures and tables around the page, and often in the pages around the current paragraph. In particular,  $\text{\LaTeX}$  always places these elements at the bottom or top of the page (otherwise instructed):

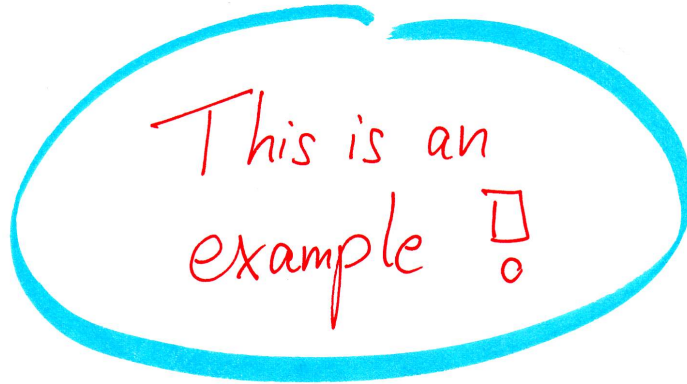


Figure 1: Example caption.

Table 1: Table title (without stop!)

label0	label1	label2
row 0, col 0	row 0, col 1	row 0, col 2
row 1, col 0	row 1, col 1	row 1, col 2
row 2, col 0	row 2, col 1	row 2, col 2
row 3, col 0	row 3, col 1	row 3, col 2

this choice obeys to the main typesetting guidelines, and should work well most of the times. You should not force a specific position for these elements, and keep in mind that *L<sup>A</sup>T<sub>E</sub>X* *most of the time is right* (it is its job to do lay out elements, not yours). If you need to move an element, move its *L<sup>A</sup>T<sub>E</sub>X* code up or down.

## 3.2 Subsection 2

Table 1 provides an example of a table. According to many people, this table style (without vertical lines separating columns) is the most elegant and clean possible; to set this tables style, this document adds the `\usepackage{booktabs}` directive at the beginning. In the *L<sup>A</sup>T<sub>E</sub>X* code, you can notice that an ampersand (&) separates columns and a double backslash (\\) moves to a new line.

Since tables in *L<sup>A</sup>T<sub>E</sub>X* are verbose, you should:

- place them in a specific file, to be included with a `\input{filename}` directive

Table 2: Table title (without stop!)

label0	label1	label2
row 0, col 0	row 0, col 1	row 0, col 2
row 1, col 0	row 1, col 1	row 1, col 2
row 2, col 0	row 2, col 1	row 2, col 2
row 3, col 0	row 3, col 1	row 3, col 2

- for large tables, fill them on applications or websites like <https://www.tablesgenerator.com/>, then copy their code and paste it in the dedicated file; finally, you can customize the style from the  $\text{\LaTeX}$  code

Here you can see the same table as before but included from an external file *table.tex*: the result is the same.

## References

- [1] Oded Lempel. *2nd Generation Intel Core Processor Family: Intel Core i7, i5 and i3*. 2011. URL: [http://www.hotchips.org/wp-content/uploads/hc\\_archives/hc23/HC23.19.9-Desktop-CPUUs/HC23.19.911-Sandy-Bridge-Lempel-Intel-Rev%5C%207.pdf](http://www.hotchips.org/wp-content/uploads/hc_archives/hc23/HC23.19.9-Desktop-CPUUs/HC23.19.911-Sandy-Bridge-Lempel-Intel-Rev%5C%207.pdf).
- [2] Daniel Sanchez and Christos Kozyrakis. “Vantage: Scalable and Efficient Fine-Grain Cache Partitioning”. In: *Proc. of ISCA*. 2011.