Algoritmos de ordenação - bubble, quick, insertion

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Abstract. *Ordering algorithms are computational methods for organizing and / or ordering a list of numbers or words according to their individualities, they can take care of each case that best suits their needs and then improve certain problems that are related to the retrieval of data in lists, that is, facilitate the search of information. This article presents its implementation, execution and comparative among three sorting algorithms that are: Insertion Sort, Bubble Sort, and Quick Sort. For the purpose of analyzing your results and checking the positives and negatives of each.*

Resumo. *Os algoritmos de ordenação são métodos computacionais para organizar e ou ordenar lista de números ou palavras, de acordo com suas individualidades, podem atender cada caso que se adeque melhor a sua necessidade para então melhorar certos problemas que estejam relacionados a recuperação de dados em listas, ou seja, facilitam a busca das informações. Este artigo apresenta a sua implementação, execução e comparativo entre três algoritmos de ordenação que são: Insertion Sort, Bubble Sort, e Quick Sort. Com a finalidade de analisar seus resultados e verificar os pontos positivos e negativos de cada um.*

Algoritmos

Algorithm 1 Bubble Sort

1: **function** $\text{BUBBLESORT}(A, n)$
2:     **for** $i = 0$ **to** $i < (n - 1)$ **do**
3:         **for** $j = 0$ **to** $j < (n - i - 1)$ **do**
4:             **if** $A[j] > A[j + 1]$ **then**
5:                 $temp = A[j]$
6:                 $A[j] = A[j + 1]$
7:                 $A[j + 1] = temp$
8:             **end if**
9:         **end for**
10:     **end for**
11: **end function**

Algorithm 2 Insertion Sort

1: **function** INSERTIONSORT(A, p, r)
2:     **for** $j = 2$ **to** n **do**
3:         $temp = A[j]$
4:         $i = j - 1$
5:         **while** $(i > 0)$ **and**$(A[i] > temp)$ **do**
6:             $A[i + 1] = A[i]$
7:             $i = i - 1$
8:         **end while**
9:         $A[i + 1] = temp$
10:     **end for**
11: **end function**

Algorithm 3 Quick Sort

1: **function** PARTITION(A, p, r)
2:     $x = A[r]$
3:     $i = p - 1$
4:     **for** $j = p$ **to** $r - 1$ **do**
5:         **if** $A[j] <= x$ **then**
6:             $temp = A[i]$
7:             $A[i] = A[j]$
8:             $A[j] = temp$
9:         **end if**
10:     **end for**
11:     $temp = A[i + 1]$
12:     $A[i + 1] = A[r]$
13:     $A[r] = temp$
14:     **return** $i + 1$
15: **end function**
16:
17: **function** QUICKSORT(A, p, r)
18:     **if** $p < r$ **then**
19:         $q = PARTITION(A, p, r)$
20:         $QUICKSORT(A, p, q - 1)$
21:         $QUICKSORT(A, q + 1, r)$
22:     **end if**
23: **end function**

General Information

All full papers and posters (short papers) submitted to some SBC conference, including any supporting documents, should be written in English or in Portuguese. The format paper should be A4 with single column, 3.5 cm for upper margin, 2.5 cm for bottom margin and 3.0 cm for lateral margins, without headers or footers. The main font must be Times, 12 point nominal size, with 6 points of space before each paragraph. Page numbers must be suppressed.

Full papers must respect the page limits defined by the conference. Conferences that publish just abstracts ask for **one**-page texts.

First Page

The first page must display the paper title, the name and address of the authors, the abstract in English and "resumo" in Portuguese ("resumos" are required only for papers written in Portuguese). The title must be centered over the whole page, in 16 point boldface font and with 12 points of space before itself. Author names must be centered in 12 point font, bold, all of them disposed in the same line, separated by commas and with 12 points of space after the title. Addresses must be centered in 12 point font, also with 12 points of space after the authors' names. E-mail addresses should be written using font Courier New, 10 point nominal size, with 6 points of space before and 6 points of space after.

The abstract and "resumo" (if is the case) must be in 12 point Times font, indented 0.8cm on both sides. The word **Abstract** and **Resumo**, should be written in boldface and must precede the text.

CD-ROMs and Printed Proceedings

In some conferences, the papers are published on CD-ROM while only the abstract is published in the printed Proceedings. In this case, authors are invited to prepare two final versions of the paper. One, complete, to be published on the CD and the other, containing only the first page, with abstract and "resumo" (for papers in Portuguese).

Sections and Paragraphs

Section titles must be in boldface, 13pt, flush left. There should be an extra 12 pt of space before each title. Section numbering is optional. The first paragraph of each section should not be indented, while the first lines of subsequent paragraphs should be indented by 1.27 cm.

Subsections

The subsection titles must be in boldface, 12pt, flush left.

Figures and Captions

Figure and table captions should be centered if less than one line (Figure 1), otherwise justified and indented by 0.8cm on both margins, as shown in Figure 2. The caption font must be Helvetica, 10 point, boldface, with 6 points of space before and after each caption.

In tables, try to avoid the use of colored or shaded backgrounds, and avoid thick, doubled, or unnecessary framing lines. When reporting empirical data, do not use more

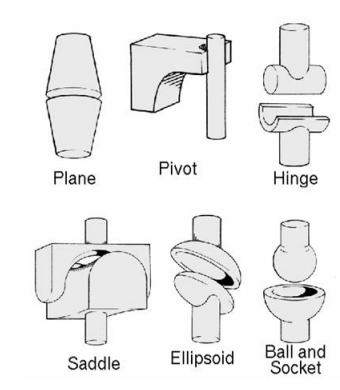**Figura 1. A typical figure**

Figura 2. This figure is an example of a figure caption taking more than one line and justified considering margins mentioned in Section 6.

decimal digits than warranted by their precision and reproducibility. Table caption must be placed before the table (see Table 1) and the font used must also be Helvetica, 10 point, boldface, with 6 points of space before and after each caption.

Images

All images and illustrations should be in black-and-white, or gray tones, excepting for the papers that will be electronically available (on CD-ROMs, internet, etc.). The image resolution on paper should be about 600 dpi for black-and-white images, and 150-300 dpi for grayscale images. Do not include images with excessive resolution, as they may take hours to print, without any visible difference in the result.

References

Bibliographic references must be unambiguous and uniform. We recommend giving the author names references in brackets, e.g. [Knuth 1984], [Boulic and Renault 1991], and [Smith and Jones 1999].

Tabela 1. Variables to be considered on the evaluation of interaction techniques

	Chessboard top view	Chessboard perspective view
Selection with side movements	6.02 ± 5.22	7.01 ± 6.84
Selection with in-depth movements	6.29 ± 4.99	12.22 ± 11.33
Manipulation with side movements	4.66 ± 4.94	3.47 ± 2.20
Manipulation with in-depth movements	5.71 ± 4.55	5.37 ± 3.28

The references must be listed using 12 point font size, with 6 points of space before each reference. The first line of each reference should not be indented, while the subsequent should be indented by 0.5 cm.

Referências

Boulic, R. and Renault, O. (1991). 3d hierarchies for animation. In Magnenat-Thalmann, N. and Thalmann, D., editors, *New Trends in Animation and Visualization*. John Wiley & Sons ltd.

Knuth, D. E. (1984). *The T$_{\!E}$X Book*. Addison-Wesley, 15th edition.

Smith, A. and Jones, B. (1999). On the complexity of computing. In Smith-Jones, A. B., editor, *Advances in Computer Science*, pages 555–566. Publishing Press.