L1 4102

Algorithms

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jan 21 2016
anthem
let me intro myself
first goal: create an amazing learning experience
second goal: instill enthusiasm for this area
third goal: help prepare you for a job in cs
caveat emptor
This was one of the most brutally difficult courses I have taken. Almost every homework ended with me staying up all night before it was due in order to get it finished. However, all told, this has also been one of the most worthwhile classes I have taken. The work is very difficult, but because of that it was even more rewarding every time I solved a problem. Abhi is incredibly enthusiastic about the topic and really does his best to get the class to actually learn something. He also really knows the subject, and is almost always able to quickly and accurately respond to any student questions.
Algorithms has single-handedly been the most difficult, yet most rewarding class I have ever taken. Ever. The class was taught in the best way for me to learn. Personally, I am able to work my best when I can work on projects on my own schedule. Thus, having all of the work in a 'pset' format was optimal. The homeworks were hard, but they're completely worth the effort; likewise for the exams. Prof. Shelat is really enthusiastic about Algorithms, and that really came through in his teaching. The lectures were interesting and very informative; it was very helpful to have the annotated PDF's and screencasts. Also, I appreciated all of the ways that Shelat made himself available to the students. Piazza was a great way to answer questions, and Shelat was very quick to respond to emails. Despite the high difficulty of the course, there was never a moment where I felt that I couldn't solve a problem. By that, I don't mean that the problems were easy or simple, but rather, I knew that if I put in enough time and effort, I would eventually be able to solve them. This was a significant change in my learning paradigm because Algorithms is the first class I've taken where I've wanted to solve the problems we were given distinctly for the acting of solving them and knowing how they work. There was no busy-work in this class; all of it was meaningful. Taking algorithms this semester was the reason why I was able to pass the programming interviews I had this fall. I supremely enjoyed this class and I am very glad that I took it.
Shelat turned this formerly-easy class into pure hell. All the assignments have been stupid hard, throw-up-your-hands-in-frustration level difficulty. And they rarely have anything to do with the lectures. And the problems are poorly written. And the assignment grading is excessively harsh, frequently arbitrary, and often inconsistent. And Shelat has been completely unresponsive to the many student complaints about all this. This has been the worst kind of hard class; the kind where you work insanely hard only to accomplish nothing meaningful....Bottom line: Shelat should never be allowed to teach an undergraduate course ever again, at any school!
60% hw
30% exams
10% class
what is this course about?
small problems are easy to solve
theme

small problems are easy to solve

solve big problems by making them into smaller ones
theme 2
to convince through reason is a great mark of understanding
CHISTMAS MORNING

Stockings:
Step 1) Get everybody out
Step 2) Cammy looks at hers taking one thing out at a time & showing it to everyone.
Step 3) Then she puts them neatly back in the stocking.
Step 4) Connie does this also. Then Bill.

Presents
1) Cammy is appointed present finder.
2) Cammy finds herself a present & after looking it over & saying the necessary thank yous she passes it around for everyone to see.
3) Then she puts the wrapping paper in a pile & puts the present in a place where all her present will go (everyone has a spot like this). She does this for everyone.
4) Cammy finds a present for Connie.
5) Connie does the second part of #3 then gives the wrapping paper & present to Cammy.
6) Cammy finds a present for Bill.
7) Bill does the second part of #2 then gives the wrapping paper & present to Cammy.
8) This is repeated till there are no more presents.
“how much granite/glass do i need?”
algorithm to compute $\pi$
red perimeter < $\pi d$
red perimeter < $\pi d <$ blue perimeter
\[ x^2 - 3 = 0 \]
\[
\frac{265}{153} \approx \sqrt{3}
\]
red perimeter < $\pi d$ < blue perimeter
Using 96-gon, Archimedes

\[
3 \frac{10}{70} > \pi > 3 \frac{10}{71}
\]
how to analyze this approach?
\[ \pi = \frac{9801}{\sqrt{8}} \left( \sum_{n=0}^{\infty} \frac{(4n)!(1103 + 26390n)}{(n!)^4396^4n} \right)^{-1} \]
\[ \pi = \frac{9801}{\sqrt{8}} \left( \sum_{n=0}^{\infty} \frac{(4n)!(1103 + 26390n)}{(n!)^4396^{4n}} \right)^{-1} \]
\[
\pi = \frac{9801}{\sqrt{8}} \left( \sum_{n=0}^{\infty} \frac{(4n)! (1103 + 26390n)}{(n!)^4 396^4 n} \right)^{-1}
\]

\[
\pi \approx_0 \frac{9801}{\sqrt{8}} [1103]^{-1}
\]

\[3.14159273001330576017\]
\[
\pi = \frac{9801}{\sqrt{8}} \left( \sum_{n=0}^{\infty} \frac{(4n)!(1103 + 26390n)}{(n!)^4 396^{4n}} \right)^{-1}
\]

\[
\text{n=1}
\]
\[
\pi = \frac{9801}{\sqrt{8}} \left( \sum_{n=0}^{\infty} \frac{(4n)! (1103 + 26390n)}{(n!)^4 396^{4n}} \right)^{-1}
\]

\[
n = 1
\]

\[
\pi \approx \frac{9801}{\sqrt{8}} \left[ 1103 + \frac{24 \cdot 27493}{396^4} \right]^{-1}
\]

3.14159265358979387799890582630
benefits?
good algorithms touch every aspect of our lives
good algorithms defend freedom
what skills do you need for this course?
precision

creativity
ingenious
how to learn in this class
no cookbook
develop general problem solving skills
understand
known
techniques
work with your peers
work with your peers

but do not copy
You searched for algorithms. 118 matches

- **Algorithms, Part I**
  - Princeton University

- **Approximation Algorithms Part I**
  - École normale supérieure
LaTeX
The Not So Short Introduction to LaTeX - Tobi Oetiker - Oetiker+

tobi.oetiker.ch/lshort/lshort.pdf

A LaTeX installation is available, ready to use. Information on how to access the local LaTeX installation should be provided in the Local Guide [5]. If you.

LaTeX - Wikibooks, open books for an open world

en.wikibooks.org/wiki/LaTeX - Cached

This is a guide to the LaTeX markup language. It is intended to form a useful resource for everybody from new users who wish to learn, to old hands who need a ...

LaTeX/Mathematics - LaTeX/Document Structure - LaTeX/Text Formatting - Links

Short Math Guide for LaTeX - FTP Directory Listing - American ...


Guide to LaTeX (4th Edition): Helmut Kopka, Patrick W. Daly ...


Guide to LaTeX (4th Edition) [Helmut Kopka, Patrick W. Daly] on Amazon.com. * FREE* super saver shipping on qualifying offers. Published Nov 25, 2003 by ...

A Beginner's Guide to LATEX - Princeton University

www.cs.princeton.edu/courses/archive/spr10/cos433/Latex/latex-guide.pdf - Cached - Similar

A Beginner's Guide to LaTeX. David Xiao dxiao@cs.princeton.edu. September 12, 2005. 1 Introduction. LATEX is the standard mathematical typesetting ...

LaTeX documentation
The Not So Short Introduction to \LaTeX\ 2ε

Or \LaTeX\ 2ε in 157 minutes

by Tobias Oetiker
% change this by adding your uva id into the {}
\begin{document}
% no need to change anything in this section
\begin{enumerate}
\item homework(1) % 0 for solution, 1 for problem-set only
\item due date (Fri Jan 29, 2016 at 5p)
\item duelocation (via \texttt{Vhref} [https://church.cs.virginia.edu/16s-4102]{submission site})
\item noprof (abhie shelat)
\item course \texttt{Vhref} [https://www.cs.virginia.edu/~shelat/16s-4102] (cs4102 - algorithms - s'16)
\end{enumerate}
\begin{documentclass}\{11pt\}\{article\}
% no need to edit any of this stuff
%
% standard installations of latex include all of the files that are referenced in this section. However,
% if you are having compile problems, consider commenting some of these commands out
\usepackage\{colorlinks, urlcolor=blue\}\{hyperref\}
\usepackage\{osf\}\{mathpazo\}
\usepackage\{amsmath, amsfonts, graphicx\}
\usepackage\{latexsym\}
\usepackage\{top=1in, bottom=1.4in, left=1.5in, right=1.5in, centering\}\{geometry\}
\definecolor\{mdb\}(rgb\{0.3, 0.0, 0.02\})
\definecolor\{cit\}(rgb\{0.05, 0.2, 0.45\})
\makeboth\{yourname\}\{yourname\}
% should be no need to edit anything in this section
\newenvironment\{proof\}\{\par\indent\texttt{V Proof.} \hspace*\{1em\}\$\Box$\$\bigskip\}
\newcommand\{qed\}\{$\Box$}
\newcommand\{alg\}[1]\{[\mathsf{#1}]\}
\renewcommand\{\handout\}{\begin{center}\texttt{\{yourname\}\{\Hnumber\}-\arabic\{page\}\}}
\noindent\% \begin{center}\%
% \\
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% \%box to \columnwidth \{sc\} course \texttt{vfill}\% \\
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% \%box to \columnwidth \{sc\} due \texttt{MakeLowercase} \{duedate\} \texttt{vfill} \{\Huge\texttt{yourname}\}
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% \%box to \texttt{center} \%
% \\
% \end{center}\%
\end{document}
About 189,000 results (0.37 seconds)

TeXShop
pages.uoregon.edu/koch/texshop/ • University of Oregon •
TeXShop (v 3.59) Release 01/01/2016. (Mountain Lion or Higher Strongly Recommended). (for Lion, Mountain Lion, Mavericks, Yosemite, El Capitan) ...

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\extramarks{}{(Continued on next page\ldots)

Some text that may or may not be needed here.

\extramarks{Continued}
\end{verbatim}

\CmdIndex{extramarks}

Note that the \texttt{\textbackslash Cmd(extramarks)} command must be close to the text, i.e. no empty lines (paragraph boundaries) should intervene. Otherwise the page may be broken at that boundary and the extramarks would come on the wrong page.

There are two new marks that can be used in the page layout with this package: If commands of the form

\verb|\extramarks{\$m_1\$|\verb}{{\$m_2\$|\verb}}| are given

\CmdIndex{firstmark}
\CmdIndex{lastmark}

\CmdIndex{firstmark} gives you the first $m_1$ value and
\CmdIndex{lastmark} gives you the last $m_2$ value of the current page.

\CmdIndex{firstleftmark}
\CmdIndex{lastrightmark}

\begin{verbatim}
\begin{verbatim}
\end{verbatim}
\end{verbatim}

\texttt{\textbackslash Cmd(firstmark) and \textbackslash Cmd(lastmark)}

\texttt{at complement the standard \texttt{\LaTeX/} marks.}

The point that marks are the correct way to do this, let me say again that this will not work \footnote{Actually there is no such thing as \texttt{\LaTeX/} passing. You can put \texttt{\textbackslash Cmd(label)} before and after the text and compare the \texttt{\textbackslash Cmd(pageref).}}.

\texttt{-i-ni-tion would}

\texttt{\LaTeX/ Warning: Label(s) may have changed. Rerun to get cross-references right.}
Submitting HW

https://www.cs.virginia.edu/~shelat/16s-4102/submission.html
counting
stand
1 stand

2 set your “number” to one
1 stand
2 set your “number” to one
3 greet a neighbor (pause if odd person out)
1 stand

2 set your “number” to one

3 greet a neighbor (pause if odd person out)

4 if you are older, give “number” and sit
   if you are younger, add “numbers”
1. stand

2. set your “number” to one

3. greet a neighbor (pause if odd person out)

4. if you are older, give “number” and sit
   if you are younger, add “numbers”

5. if you are standing & you have a neighbor, goto 3
lets analyze this alg
how fast does it work:
how fast does it work:

\[ T(n) \]

# steps to finish in a room with n people
how fast does it work:

\[ T(n) = 1 + 1 + T(\lceil n/2 \rceil) \]