Latex Assignment

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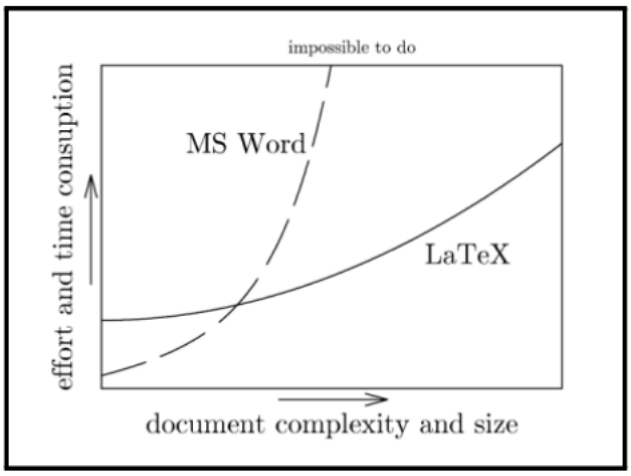
1 Knitting Patterns

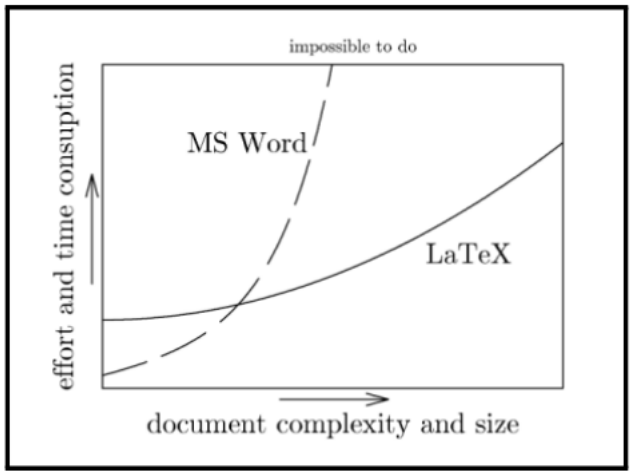
T his class provides a very convenient way to introduce boxed diagrams. We are thus going to use our stock image a few more times. Also, it has a few features to make knitting instructions more readable, however, we can adapt them to make prettier documents for our purposes as well.



We have a way of highlighting important text, or as was originally intended, important instructions. Feel free to choose whatever background and border colour you like when you replicate these features, but try to replicate the dimensions as well as you can.

Course	Credits
Introduction to Computer Programming	6
Abstractions and Paradigms in Programming	6
Abstractions and Paradigms in Programming Lab	3
Data Structure and Algorithms	6
Software Systems Lab	8

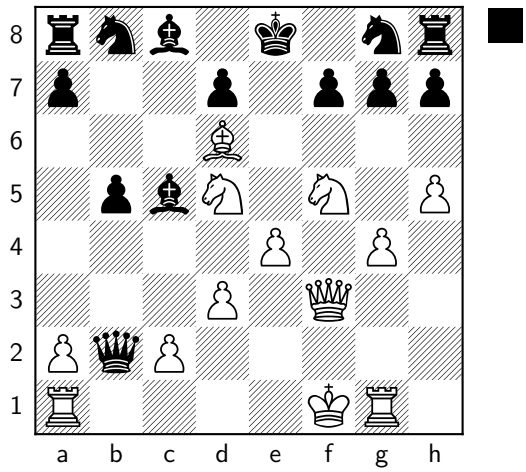
NOTE
This is a note.The feature was introduced to typeset a sequence of knitting instructions .This first coloumn is for the instruction,the second for the number of stitche.But they ,it looks cool !



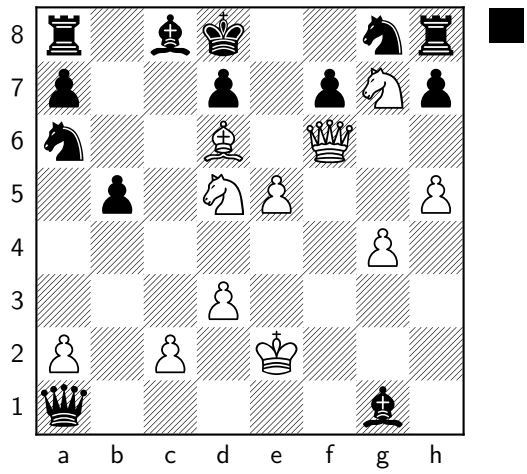
Look at the adjoining graph. Yes, you've seen it before. This time, it is side by side with a paragraph! And there's a beau- tiful box around it! By default, this will be a quarter of the width of the page. If you follow the hint that is the title of this section, you won't have to type in cumbersome code to fit in images. Also, have you noticed that the pages are much wider? A lot of it will be clear when you read up on the knit- tingpatterns class. It is already available with the MacTeX distributions, and of course, online on Overleaf. If your distri- bution does not offer it, download it from here and copy the .cls file to the folder/directory your code is in. See the point where stuff becomes exponentially harder to do without LATEX? We daresay the rest of this assignment crosses that point. Good luck!

2 Chess Notation

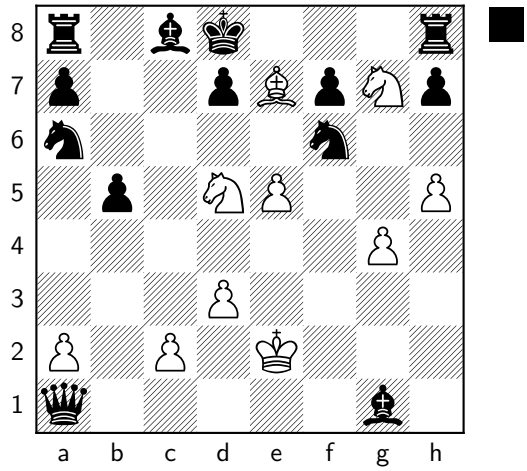
1 e4 e5 2 f4 e×f4 3 ♗c4 ♕h4 4 ♔f1 b5 5 ♗c4×b5 ♘f6 6 ♘f3 ♕h6 7 d3 ♘h5 8 ♘h4 ♕g5 9 ♘f5 c6 10 g4 ♘f6 11 ♖g1 c×b5 12 h4 ♕g6 13 h5 ♕g5 14 ♕f3 ♘g8 15 ♗c1×f4 ♕f6 16 ♘c3 ♗c5 17 ♘d5 ♕f6×b2 18 ♗d6



1 e4 e5 2 f4 e×f4 3 ♗c4 ♕h4 4 ♔f1 b5 5 ♗c4×b5 ♘f6 6 ♘f3 ♕h6 7 d3 ♘h5 8 ♘h4 ♕g5 9 ♘f5 c6 10 g4 ♘f6 11 ♖g1 c×b5 12 h4 ♕g6 13 h5 ♕g5 14 ♕f3 ♘g8 15 ♗c1×f4 ♕f6 16 ♘c3 ♗c5 17 ♘d5 ♕f6×b2 18 ♗d6 **♗c5×g1 19 e5 ♕b2×a1 20 ♔e2 ♘a6 21 ♘g7 ♔d8 22 ♕f6**

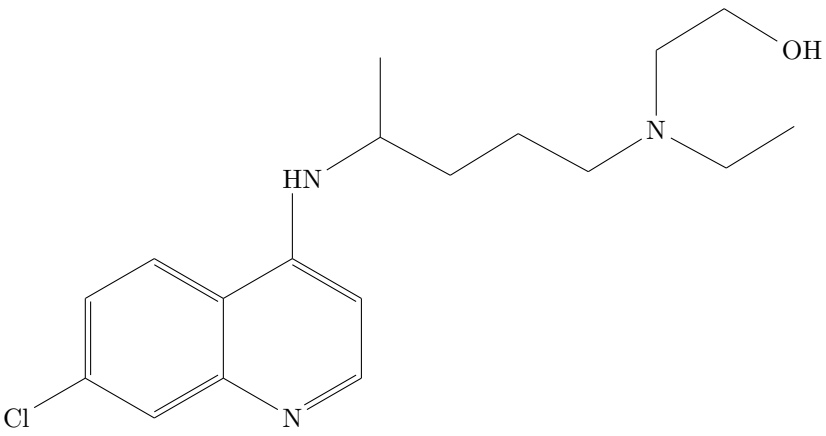


1 e4 e5 2 f4 e×f4 3 ♗c4 ♕h4 4 ♔f1 b5 5 ♗c4×b5 ♘f6 6 ♘f3 ♕h6 7 d3 ♘h5 8 ♘h4 ♕g5 9 ♘f5 c6 10 g4 ♘f6 11 ♖g1 c×b5 12 h4 ♕g6 13 h5 ♕g5 14 ♕f3 ♘g8 15 ♗c1×f4 ♕f6 16 ♘c3 ♗c5 17 ♘d5 ♕f6×b2 18 ♗d6 ♗c5×g1 19 e5 ♕b2×a1 20 ♔e2 ♘a6 21 ♘g7 ♔d8 22 ♕f6 ♘g8×f6 23 ♗e7#



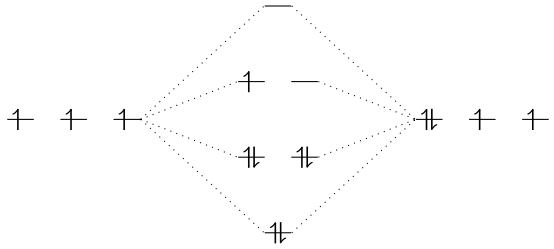
3 Chemistry

3.1 Chemical Formulae



This is the molecule hydroxychloroquine, that recently shot to fame as a proposed cure for COVID-19. Please draw it. This is a helpful Overleaf tutorial to help you get started.

3.2 Molecular Orbital Diagrams



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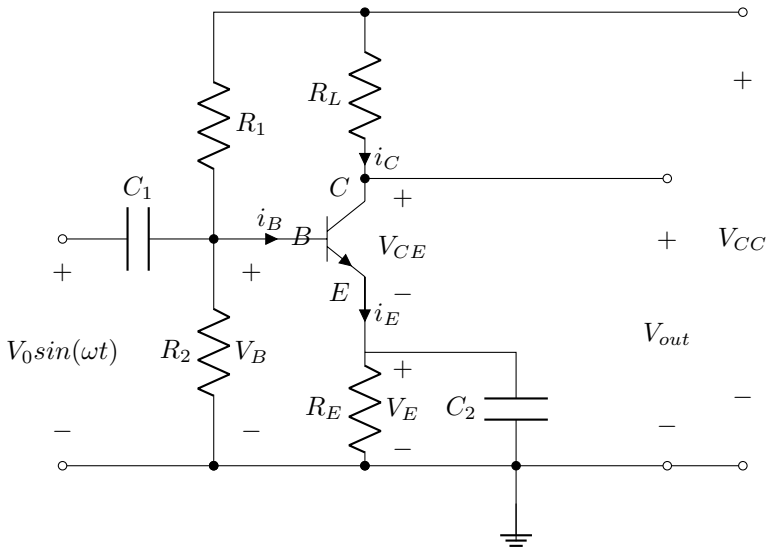
4 Electrical Circuits



5 Typesetting Exams

Maths Assignment IITB #

problem 1. Show that there exists no non trivial unramified extension of Q

solution : If K/Q is a non-trivial number field then $|disk \quad k| >$. But then disk k has a prime factor so that so same prime ramifies in k

Problem 2. complete the following :

(a) how does one prove a cot theorem ?

(b) compute $\int cosxdx$

(c) how does one square $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$?

solutions :

(a) use rollaries

(b) we have

$$\int cosxdx = sinx + c \tag{1}$$

we can check (1) $\frac{d}{dx}(sinx + c) = cosx$

(c) This is routin. □

Problem 3. Prove that $\sqrt{2}$ is irrational.

Proof : . Asuume that $\sqrt{2}=\frac{a}{b}$, Where a,b ϵ Z . Without loss of generality , we may assume gcd (a, b)=1 . Then we have

$\sqrt{2}=\frac{a}{b}$

$$\sqrt{2}^2 = \binom{a}{b}^2 \tag{2}$$

$2=\frac{a^2}{b^2}$

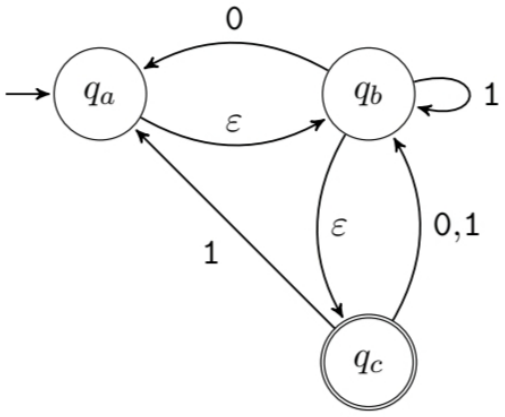
$$a^2 = 2b^2 \tag{3}$$

But then from (3),we know that a^2 is even so that a is even . But then we must have .

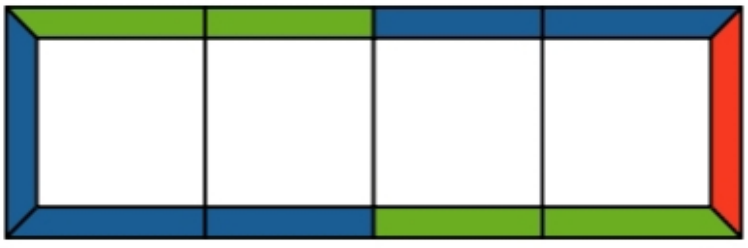
$$2a^2 = b^2$$

so that b^2 is even , implying b is even.But then $\gcd(a, b) \geq 2$, a contradicion .

(b)



4.Solving Puzzles # 1 IN clas we did three puzzles, the first one which is equivalent to finiteautomata. In general , a puzzle of this type has a frame like (but possibly with more/fewer squares and different colors) :



and a finite set of tiles like this (but possibly with more/fewer tiles and different colors): The tiles must be arranged so that adjastment areas have matching colors.there is an

unlimited number of copies of each tile

(a) show how every puzzle of this type can be converted in to a finite automation M and a string w that M accepts w if and only if the puzzle has a solution.

(b) Apply your construction to the above instance.

(c) Briefly describe how this gives an o(n) algorithm for solving puzzles of this type