This is the title

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Abstract

Keywords: keyword1, keyword2, keyword3

In this paper there are examples of all the useful things you can do with LaTeX. This document includes settings and examples for using the following packages: `amsthm`, `appendix`, `array`, `booktabs`, `cancel`, `ccicons`, `comment`, `empheq`, `endnotes`, `enumitem`, `float`, `graphicx`, `indentfirst`, `lastpage`, `lipsum`, `listings`, `makeidx`, `mathtools`, `multicol`, `multirow`, `palatino`, `paracol`, `setspace`, `standalone`, `tabularray`, `tabularx`, `verbatim`, `wrapfig`, `hyperref`, `geometry`, `xolor`, `tcolorbox`, `textpos`, `tikz`, `tkz-euclide`, `titlesec`, `eucal`, `mathdesign`, `inconsolata`.

1 Introduction

This paper is a template for writing LaTeX papers for Brookline High School and other audiences.

In this paper there are examples of all the useful things you can do with LaTeX. This document includes settings and examples for using the following packages: `amsthm`, `appendix`, `array`, `booktabs`, `cancel`, `ccicons`, `comment`, `empheq`, `endnotes`, `enumitem`, `float`, `graphicx`, `indentfirst`, `lastpage`, `lipsum`, `listings`, `makeidx`, `mathtools`, `multicol`, `multirow`, `palatino`, `paracol`, `setspace`, `standalone`, `tabularray`, `tabularx`, `verbatim`, `wrapfig`, `hyperref`, `geometry`, `xolor`, `tcolorbox`, `textpos`, `tikz`, `tkz-euclide`, `titlesec`, `eucal`, `mathdesign`, `inconsolata`.

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*The author wishes to thank poop.

†The authors also wish to thank their families.

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1.1 The quick brown fox

The quick brown fox jumps over the lazy dog. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

2 This Section

In section 2 there are examples of the various types of lists[1]:

Item 1 header   This is item one...The quick brown fox jumps over the lazy dog.

Item 2 header   This is item one...The quick brown fox jumps over the lazy dog.

Item 3 header   This is item one...The quick

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[1]These correspond to the <dl>, <ol>, & HTML tags.

brown fox jumps over the lazy dog.

1) **Item 1 header** — This is item one...The quick brown fox jumps over the lazy dog.

2) **Item 2 header** — This is item two...The quick brown fox jumps over the lazy dog.

3) **Item 3 header** — This is item three...The quick brown fox jumps over the lazy dog.

▸ **Item 1 header** — This is item one...The quick brown fox jumps over the lazy dog.

▸ **Item 2 header** — This is item two...The quick brown fox jumps over the lazy dog.

▸ **Item 3 header** — This is item three...The quick brown fox jumps over the lazy dog.

3 The Other Section

In section 3 there are examples of mathematics:

$$y = mx + b \qquad \text{Linear} \qquad (3.1)$$

$$f(x) = \int_{-\infty}^{+\infty} e^{i\theta} d\theta \qquad \text{Integral} \qquad (3.2)$$

$$z = 2^k - \binom{k}{1}2^{k-1} + \binom{k}{2}2^{k-2} \quad \text{Binomial} \quad (3.3)$$

4 The Code Section

```
1   # 34567890123456789012345678901234567890123456789012345678901234567890
2   #!/usr/local/env python3
3   #
4   # m4tacolor.py
5   #
6   # How many mxm patterns are there on an nxn chess board n >=m?
7   #
8   def getPattern(i, m, n, x):
9       """Return the ith mxm pattern in a nxn board represented by x."""
10      assert n >= m, 'n_<_m'
11      pattern, gap, mask = 0, n - m, 2 ** m - 1
12      for j in range(m):
13          pattern += x >> i + j * gap & mask << j * m
14          #print('*', m, n, i, j, gap, i + j * gap,
15          #    x >> i + j * gap, mask, mask << j * m, pattern)
16      return pattern
17
18  def getPatterns(m, n, x):
19      """Return the set of mxm patterns in a nxn board represented by x."""
```

```
20        assert n >= m, 'n_<_m'
21        patterns = set()
22        for i in range(n - m + 1):
23            for j in range(n - m + 1):
24                patterns.add(getPattern(i + j * n, m, n, x))
25        return patterns
26
27    def square(k, x):
28        """Return_the_unicode_black_or_white_square_based_on_the_kth_bit_of_x."""
29        #return '\u25a0' if 1 << k & x else '\u25a1'
30        return 'X' if 1 << k & x else 'O'
31
32    def board(x, n):
33        """Return_the_string_representation_of_x_as_an_nxn_board."""
34        return '\n'.join([ ''.join(
35            [ square(i + j * n, x) for i in range(n) ]) for j in range(n) ])
36
37    tests = [ (2, 5,), (4, 259,), (5, 262149,) ]
38    for m, n in tests:
39        f = 'm={}_n={}'
40        print(f.format(m, n))
41        f += '_board={:0' + str(n * n) + 'b}_{}=len({})'
42        for x in range(1000, 2 ** (n * n)):
43            patterns = getPatterns(m, n, x)
44            if len(patterns) == 2 ** (m * m):
45                print(f.format(m, n, x, len(patterns), patterns))
46                print(board(x, n))
47                break
```

Listing 1: `m4tacolor.py` module

5 Conclusion

This last section provides a citation so that a bibliography is automatically included for (Bretscher, 2009) & (Eliot, 1871).

References

Bretscher, O. (2009). *Linear algebra with applications* (4th). Pearson Prentice Hall. http://isbn.nu/9780136009269

Eliot, G. (1871). *Middlemarch*. Penguin Books. http://isbn.nu/9780141439549

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