This is the title

Clarence T. Fishburn
Simitongue Institute
<clarence.fishburn@gmail.com>

David C. Petty[†*]
Brookline High School
<dcp@mail.com>

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: `amsmath`, `amsthm`, `comment`, `enumitem`, `fancyhdr`, `geometry`, `graphicx`, `hyperref`, `makeidx`, `natbib`, `palatino`, `titlesec`, `totcbibind`, & `verbatim` *plus the font packages:* `amsfonts,amssymb`, `cmmib57`, `eucal`, `(eufrak, euscript)`, & `latexsym`.

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: `amsmath`, `amsthm`, `comment`, `enumitem`, `fancyhdr`, `geometry`, `graphicx`, `hyperref`, `makeidx`, `natbib`, `palatino`, `titlesec`, `totcbibind`, & `verbatim` plus the font packages: `amsfonts,amssymb`, `cmmib57`, `eucal`, `(eufrak, euscript)`, & `latexsym`

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

1.1 The quick brown fox

The quick brown fox jumps over the lazy dog. Nam dui ligula, fringilla a, euismod sodales, sollicitudin

*† The authors wish to thank their families.

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 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.

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

3 The Other Section

In section 3 there are examples of mathematics:

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

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

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

4 The Code Section

```
# 345678901234567890123456789012345678901234567890123456789012345678901234567890
#!/usr/local/env python3
#
# m4tacolor.py
#
# How many mxm patterns are there on an nxn chess board n >=m?
#
def getPattern(i, m, n, x):
    """Return_the_ith_mxm_pattern_in_a_nxn_board_represented_by_x."""
    assert n >= m, 'n_<_m'
    pattern, gap, mask = 0, n - m, 2 ** m - 1
    for j in range(m):
        pattern += x >> i + j * gap & mask << j * m
        #print('*', m, n, i, j, gap, i + j * gap,
        #    x >> i + j * gap, mask, mask << j * m, pattern)
    return pattern

def getPatterns(m, n, x):
    """Return_the_set_of_mxm_patterns_in_a_nxn_board_represented_by_x."""
    assert n >= m, 'n_<_m'
    patterns = set()
    for i in range(n - m + 1):
        for j in range(n - m + 1):
            patterns.add(getPattern(i + j * n, m, n, x))
    return patterns

def square(k, x):
    """Return_the_unicode_black_or_white_square_based_on_the_kth_bit_of_x."""
    #return '\u25a0' if 1 << k & x else '\u25a1'
    return 'X' if 1 << k & x else 'O'

def board(x, n):
    """Return_the_string_representation_of_x_as_an_nxn_board."""
    return '\n'.join([ ''.join(
        [ square(i + j * n, x) for i in range(n) ]) for j in range(n) ])

tests = [ (2, 5,), (4, 259,), (5, 262149,) ]
for m, n in tests:
    f = 'm={}_n={}'
    print(f.format(m, n))
    f += '_board={:0' + str(n * n) + 'b}_{}=len({})'
    for x in range(1000, 2 ** (n * n)):
        patterns = getPatterns(m, n, x)
        if len(patterns) == 2 ** (m * m):
            print(f.format(m, n, x, len(patterns), patterns))
            print(board(x, n))
            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