

**AN ODE TO WABI-SABI:  
HOMAGE TO A GREAT AND WONDERFUL PERSON**

by  
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A dissertation  
submitted in partial fulfillment  
of the requirements for the degree of  
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**DEFENSE COMMITTEE AND FINAL READING APPROVALS**

of the dissertation submitted by

Wabi-sabi Admirer

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The following individuals read and discussed the dissertation submitted by student Wabi-sabi Admirer, and they evaluated the presentation and response to questions during the final oral examination. They found that the student passed the final oral examination.

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## DEDICATION

dedicated to Wabi-sabi

## ACKNOWLEDGMENTS

The author wishes to express gratitude to Wabi-sabi. This work would have been partially supported by some particular grant, if there was one.

## **AUTOBIOGRAPHICAL SKETCH**

Wabi-sabi Admirer was born admiring Wabi-sabi. Wabi-sabi Admirer has been tinkering with admiration of Wabi-sabi for a long time. Now it is time to be blessed by Wabi-sabi.

## ABSTRACT

An *abstract* is a brief summary of the document. A typical abstract provides a brief introduction, enough to provide context for the document, explains the purpose of the thesis or dissertation or project, and summarizes the major results and conclusions. Keep in mind that a casual observer is likely to judge the content of the document by the abstract and title alone. (There is an old adage: “in a joke, the punchline comes at the end; in a paper [or thesis], it comes in the abstract.”) A single concise paragraph usually suffices for the abstract. If it spills onto a second page, it is probably too long.

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## **LIST OF ABBREVIATIONS**

**LOL** – Laughing Out Loud

**OMG** – Oh My God!

**ROFL** – Rolling on the Floor Laughing

## LIST OF SYMBOLS

$\sqrt{2}$  square root of 2

$\lambda$  lambda symbol, normally used in lambda calculus but it sometimes gets used for wavelength as well

## CHAPTER 1

### INTRODUCTION

#### 1.1 What is this?

This is a template that allows you to typeset your dissertation (or thesis or project report) in the format approved by the Boise State Graduate College. It greatly reduces your typesetting work and helps you produce an aesthetically pleasing and consistent document. The template depends on a style class, titled `bsu-cs.cls` that was specifically designed for Boise State Computer Science students but would also work for students from other departments.

##### 1.1.1 Where are the style class files?

Please consult the guide from Graduate College (Graduate College, 2021) for resolving any style issues that are not addressed by the style class files that are provided along with this document. The files associated with this style can be found on the GitHub website (Jain, 2025). The style class files modified for Quarto can be found on GitHub as well (Koehn, 2025).

The file `bsu-cs.cls` contains the formatting directives for the *bsu-cs* style. It is based on the standard `LATEX report` style with 12 point font option.

1. To create a new article using this format: `quarto use template CarolynKoehn/bsu-dissertation`.  
This will create a new directory with an example document that uses this format.
2. To add this format to an existing document: `quarto add CarolynKoehn/bsu-dissertation`.  
Then, add the format to your document options:

```
format:  
bsu-dissertation-pdf: default
```

## 1.2 Get ready for Wabi-sabi

So who is Wabi-sabi? We need a lot of text in here to see what happens when we hit the bottom of a page with text and try out things like footnotes <sup>1</sup>. So here is some extra stuff: <sup>2</sup>

stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff stuff  
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<sup>1</sup>What's not to like about footnotes, anyway? Brian O'Nolan and George MacDonald Fraser both used them to great effect.

<sup>2</sup>Too many footnotes, however, can be distracting.

[illegible]





## CHAPTER 2

### THE GREATNESS OF WABI-SABI

#### 2.1 Previous work

The greatness of Wabi-sabi The Great derives from her early work as documented in her books (Great, 1922, 1952).

#### 2.2 What are their names?

Please consult the articles Admirer (1970) and Admirer, Smith, & Doe (1972) for more details. Note that the references are cited by the last names of all authors for three authors or less. For more than three authors, “et al” can be used. This is based on the `cs1` file you add to your project folder.

Check the References on page [12](#) for an example of how to format the references.

#### 2.3 The code of Wabi-sabi

Thesis and dissertation text is normally “double spaced.” It is customary to single-space literal code. Figure [2.1](#) shows a sample Java program.

```

/**
Compute x^n using recursive doubling technique. O(lg n) multiplications.
@param x  The base value, unlimited precision.
@param n  The exponent, an integer.
@return   The computed power as a BigInteger
*/
public static BigInteger power(BigInteger x, int n)
{
    BigInteger temp = x;
    BigInteger result = BigInteger.ONE;
    while (n != 0) {
        if ((n & 1) == 1)
            result = result.multiply(temp);
        if ((n = n >> 1) != 0)
            temp = temp.multiply(temp);
    }
    return result;
}

```

Figure 2.1: Repeated Squaring Power Method. This figure also serves as an example of the inclusion of literal code.

When you want to show an algorithm or equation, use the  $\text{\LaTeX}$  math environment denoted by  $\$$  (Equation 2.1).

$$P(E) = \binom{n}{k} p^k (2-p)^{n-k} \quad (2.1)$$

## 2.4 Other mysteries of Wabi-sabi

Here is an itemized list of all the mysteries of Wabi-sabi.

- Mystery 1.
- Mystery 2.

- Mystery 3.
- Mystery 4.

Here is a simple pipe table (<https://quarto.org/docs/authoring/tables.html>).

Table 2.1: The Approximate Time of Parallelizing Each Code

| Parallel library/language | WRS Code | OCS Code    | ICSAMD Code |
|---------------------------|----------|-------------|-------------|
| MPI                       | 20 hours | 2 weeks     | 1 month     |
| HPF                       | 3 hours  | 1 1/2 weeks | 1 month     |

## CHAPTER 3

### THE NOT SO GREAT THINGS ABOUT WABI-SABI

#### 3.1 Figures

Check Figure [3.1](#) for what happens when Wabi-sabi gets compiled. This example shows how to include an image (in PDF, JPG or PNG) into a Quarto document.



Figure 3.1: How to Correct Errors in a Fuzzy Image

## 3.2 Tables

Table 3.1 shows the formatting and labeling for a table. For complicated formats, you can use raw  $\text{\LaTeX}$  tables (<https://www.overleaf.com/learn/latex/Tables>) inside cross-reference div syntax (<https://quarto.org/docs/authoring/cross-references-divs.html>).

Table 3.1: Complexity of Selection and Search in Sorted Matrices

|                                   | Sorted $X + Y$  | Matrix with sorted rows<br>and sorted columns |              | Matrix with sorted<br>columns |
|-----------------------------------|-----------------|---|--------------|-------------------------------|
|                                   | $ X  =  Y  = n$ | $n \times m, m \leq n$                        | $n \times n$ | $n \times m$                  |
| $k = \Theta(mn)$ or $\Theta(n^2)$ | $\Theta(n)$     | $\Theta(m \log(2n/m))$                        | $\Theta(n)$  | $\Theta(m \log n)$            |

Here’s an example of a table created with imported data files and code processing with packages `tidyverse` and `kableExtra` in a code chunk (Table 3.2).

Table 3.2: Comparison of Slow MPI Version and the Fast MPI Version

| Parameters |     |                | Process Number |      |      |      |       |       |       |
|------------|-----|----------------|----------------|------|------|------|-------|-------|-------|
| N          | M   |                | 1              | 5    | 10   | 15   | 20    | 25    | 30    |
| 128        | 100 | Slow MPI(secs) | 2.11           | 3.91 | 5.78 | 8.26 | 10.91 | 14.17 | 19.47 |
|            |     | Fast MPI(secs) | 2.10           | 1.20 | 1.56 | 1.95 | 2.79  | 3.22  | 4.07  |

Here’s an example of a table using raw  $\text{\LaTeX}$  code with no Quarto processing (Table 3.3).

Table 3.3: The Speedup of the MPI WRS Code and the HPF WRS Code

| Parameters |     |              | Process Number |      |       |       |       |       |       |
|------------|-----|--------------|----------------|------|-------|-------|-------|-------|-------|
| N          | M   |              | 1              | 10   | 20    | 30    | 40    | 50    | 60    |
| 128        | 600 | MPI(speedup) | 1              | 5.18 | 7.67  | 8.24  | 6.99  | 5.55  | 4.49  |
|            |     | HPF(speedup) | 1              | 8.40 | 12.15 | 13.98 | 14.73 | 13.52 | 13.21 |
| 256        | 300 | MPI(speedup) | 1              | 6.70 | 7.74  | 6.47  | 5.19  | 3.72  | 2.94  |
|            |     | HPF(speedup) | 0.99           | 7.24 | 9.65  | 10.58 | 10    | 9.48  | 8.73  |
| 512        | 150 | MPI(speedup) | 1              | 6.75 | 10.64 | 12.14 | 13.35 | 13.87 | 13.98 |
|            |     | HPF(speedup) | 0.98           | 6.72 | 9.88  | 11.55 | 12.86 | 13.38 | 13.83 |
| 1024       | 75  | MPI(speedup) | 1              | 2.13 | 2.30  | 2.36  | 2.38  | 2.39  | 2.40  |
|            |     | HPF(speedup) | 0.95           | 1.94 | 2.06  | 2.10  | 2.13  | 2.13  | 2.14  |

## CHAPTER 4

## CONCLUSIONS

### 4.1 What have we done so far?

### 4.2 Future directions

The coming revolution in Wabi-sabi-lets offers many opportunities for further research.



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## APPENDIX A

### TIMING MEASUREMENTS

Here is Appendix A. See [Appendix B](#) for the experimental setup.

## **APPENDIX B**

### **EXPERIMENTAL SETUP**

Here is Appendix [B](#).

