

Using the Bard Project Style File for  
Bard Senior Projects  
and  
Bard M.A.T. Mathematics Research Projects

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# 1 Introduction

This manual explains how to use the Bard Project style file, which is the  $\LaTeX$  style file `bardproj.sty`. This style file is designed for Bard senior projects and M.A.T. mathematics research projects, and takes care of a number of formatting issues for senior projects, such as the title page, dedication, acknowledgements and correct margins; it also includes formatting for theorems, definitions and the like, as well as a few miscellaneous items. It is assumed that you already know the basics of  $\LaTeX$ . Only the specific commands defined in this style file are discussed here.

## 1.1 *Obtaining the Bard Project Style File*

The file `bardproj.sty`, as well as the associated template `bardproj_template.tex`, can be downloaded from the website

`http://math.bard.edu/bloch/tex.shtml`.

If you find any errors in `bardproj.sty`, or you have any suggestions for improvements, please send an email to `bloch@bard.edu`.

## 1.2 *Read this Whole Manual*

Though it may seem obvious, please read through this entire manual before starting to write your project. Familiarizing yourself with what has already been defined in the Bard Project style file will save you the effort of figuring out how to do those things yourself.

## 1.3 *Read the Writing Guidelines for Bard Senior Projects and Bard M.A.T. Mathematics Research Projects*

Knowing the proper  $\LaTeX$  commands for the Bard Project style file is very helpful for writing a project, but even more important is to follow good writing practices for mathematics. For help with mathematical writing, please read the Writing Guidelines for Bard Senior Projects and Bard M.A.T. Mathematics Research Projects. The Writing Guidelines can be downloaded from the same place as the Bard Project style file.

## 2 Document Formatting

The first three topics regarding document formatting listed below include commands that are specific to the Bard Project style file; the remaining three topics, though no less important, use standard  $\LaTeX$  commands.

### 2.1 Title Page

When you are ready to put your project into final form, add the title page command as follows, immediately after `\begin{document}`. Make sure to put in your own title, name, and month and year of graduation, and remove the [ ] symbols (which are meant to imply that your own text needs to be inserted).

1. Bard undergraduate senior project

```
\titlepg{[title of project]}{[your name]}
{[month of graduation]}{[year of graduation]}
```

2. Bard M.A.T. mathematics research project

```
\titlepgmat{[title of project]}{[your name]}
{[month of graduation]}{[year of graduation]}
```

For drafts of your project, you can comment out the title page command.

### 2.2 Abstract, Dedication and Acknowledgments

Every project requires an abstract. To put an abstract in your project, insert

```
\abstr
```

after the titlepage and before the table of contents, and then put in the text of your abstract.

It is customary (though not required) to put a dedication and/or acknowledgments in your senior project. These should be put right after the title page, before the main part of the text.

To put a dedication in your project, insert

```
\dedic
```

and then put in the text of your dedication.

To put acknowledgments in your project, insert

```
\acknowl
```

and then put in the text of your acknowledgments.

When you use any of the above three commands, the appropriate heading, pagebreaks and the like will be done automatically.

The abstract, dedication and acknowledgments are usually written when you are done writing the bulk of your project. For drafts of your project, you can comment out these three commands.

### **2.3 *Double-Spaced vs. Single-Spaced***

In the final draft of your project, the main part of the text needs to be double-spaced. You might or might not want your drafts to be double-spaced. For double spacing, insert

```
\doublespace
```

into your text immediately prior to the main part of the text, after the title page, acknowledgments and dedications.

When you double-space your text, you might wish to make the bibliography single-spaced, which can be done by inserting

```
\singlespace
```

just before your bibliography.

The default setting found in the template `bardproj_template.tex` is that the abstract, table of contents, dedication and acknowledgments are single-spaced, the main part of the text is double-spaced, and the bibliography is single-spaced. These settings can be modified by adding or removing (or commenting out) the various single spacing and double spacing commands.

### **2.4 *Double-Sided vs. Single-Sided***

The default setting for Bard senior projects is single-sided printing, meaning printing only on the left-facing side of every sheet of paper. The command for single-sided printing is included in the template `bardproj_template.tex`, and can be seen in the first line of the sample project outline in Section 4 below, where the word “`oneside`” has been placed in the `\documentclass` declaration.

If you want to print your project double-sided, you **MUST** change the default setting, which is done by removing “`oneside,`” (including the comma) from the `\documentclass` declaration in the very first line of the document. If you print double-sided, it is very important to make this change, or else the margins and page numbers will not be formatted correctly.

## 2.5 *Table of Contents and List of Figures*

When you are ready to put your project into final form, insert

```
\tableofcontents
```

into your text immediately after the title page.

To see the table of contents, or to have it updated if you make changes, you need to run your file twice through  $\LaTeX$ .

If you need a list of figures, insert

```
\listoffigures
```

into your text immediately after the table of contents. For most projects, such a list is not necessary.

## 2.6 *Chapters and Sections*

The format for chapter and section headings are

```
\chapter{[chapter name]}\label{[label]}
```

and

```
\section{[section name]}\label{[label]}
```

Make sure to put in your own chapter name, section name and labels, and remove the [ ] symbols (which are meant to imply that your own text needs to be inserted). Keep in mind that every chapter and every section needs a different label. Mnemonic labels such as “chapmainresults” are helpful, but not necessary.

Do NOT write the chapter number or section number as part of the chapter name or section name, because the number is inserted automatically by  $\LaTeX$ .

To refer to a chapter or section, write

```
Chapter~\ref{[label]}
```

and similarly for sections.

### 3 Mathematical Formatting

Whereas  $\LaTeX$  has a very large number of built-in mathematical structures, for example matrices, there is one important type of mathematical structure that is not pre-defined in  $\LaTeX$ , which includes theorems, definitions, proofs and the like. These structures, which the user would otherwise have to set up, have been defined in the Bard Project style file, as described in the following section, and can be used without any additional set up.

#### 3.1 Theorems, Definitions, Proofs and the Like

The format for theorems, definitions, proofs and the like are shown below, using the particular case of theorems as an example. The analogous commands for lemmas, corollaries, definitions, etc. are given in the table on the following page.

Do NOT write the theorem number manually, because the number is inserted automatically by  $\LaTeX$ .

##### 1. Plain Theorem

**Theorem 3.1.** *This theorem is automatically numbered.*

```
\thm\label{thmA}
This theorem is automatically numbered.
\ethm
```

##### 2. Theorem with a Name

**Theorem 3.2 (Smith's Theorem).** *This theorem is automatically numbered, and it also has a name.*

```
\thmnamed{Smith's Theorem}\label{thmB}
This theorem is automatically numbered, and it also has a name.
\ethmnamed
```

##### 3. Referring to a Theorem

This is Theorem 3.1; it is automatically numbered, so you use `\ref` with the theorem label.

```
This is Theorem~\ref{thmA}; it is automatically numbered,
so you use \verb+\ref+ with the internal label.
```

#### 4. Plain Proof

**Proof.** How could this theorem not be true? □

```
\demo
How could this theorem not be true?
\edemo
```

#### 5. Proof of a Named Theorem

**Proof of Theorem 3.2.** Obviously, this theorem is true. □

```
\demonamed{Proof of Theorem~\ref{thmB}}
Obviously, this theorem is true.
\edemonamed
```

#### 6. Numbered Equation

If you want to number an equation, for example

$$A + B = C. \tag{1}$$

you write it as follows, without `\[ ... \]` or `$$ ... $$`

```
\begin{equation}\label{eqD}
A + B = C.
\end{equation}
```

#### 7. Referring to a Numbered Equation

This is Equation 1; it is automatically numbered, so you use `\ref` with the equation label.

```
This is Equation~\ref{eqD}; it is automatically numbered,
so you use \verb@\ref@ with the internal label.
```



| <b>Symbol</b> | <b>Command</b>                               |
|---------------|--|
| Definition    | <code>\defn\label{[label]} ... \edefn</code> |
| Theorem       | <code>\thm\label{[label]} ... \ethm</code>   |
| Lemma         | <code>\lem\label{[label]} ... \elem</code>   |
| Corollary     | <code>\coro\label{[label]} ... \ecoro</code> |
| Proposition   | <code>\prop\label{[label]} ... \eprop</code> |
| Conjecture    | <code>\conj\label{[label]} ... \econj</code> |
| Claim         | <code>\clm\label{[label]} ... \eclm</code>   |
| Example       | <code>\expl\label{[label]} ... \eexpl</code> |
| Remark        | <code>\remk\label{[label]} ... \eremk</code> |
| Algorithm     | <code>\alg\label{[label]} ... \ealg</code>   |
| Exercise      | <code>\exer\label{[label]} ... \eexer</code> |
| Problem       | <code>\prob\label{[label]} ... \eprob</code> |

### 3.2 Common Mathematical Commands

The first eight of the following commands are specific to the Bard Project Style file; the others are simply common  $\LaTeX$  commands that are listed here for convenience. For the union, intersection, sum and product, the in-line versions are shown; the display versions are typed the same way, but look differently.

| Symbol                         | Command                                   |
|--------------------------------|---|
| $\mathbb{N}$                   | <code>\nn</code>                          |
| $\mathbb{Z}$                   | <code>\zz</code>                          |
| $\mathbb{Q}$                   | <code>\qqq</code>                         |
| $\mathbb{R}$                   | <code>\rr</code>                          |
| $\mathbb{R}^n$                 | <code>\rrr{n}</code>                      |
| $\mathbb{C}$                   | <code>\cc</code>                          |
| $f: A \rightarrow B$           | <code>\func fAB</code>                    |
| $g \circ f$                    | <code>g \rc f</code>                      |
| $\{x \in X \mid \text{blah}\}$ | <code>\{x \in X \mid \text{blah}\}</code> |
| $A \subseteq B$                | <code>A \subseteq B</code>                |
| $A \subsetneq B$               | <code>A \subsetneqq B</code>              |
| $\bigcup_{i \in I} A_i$        | <code>\bigcup_{i \in I} A_i</code>        |
| $\bigcap_{i \in I} A_i$        | <code>\bigcap_{i \in I} A_i</code>        |
| $\sum_{i=1}^n a_i$             | <code>\sum_{i=1}^n a_i</code>             |
| $\prod_{i=1}^n a_i$            | <code>\prod_{i=1}^n a_i</code>            |
| $\mathcal{A}$                  | <code>\mathcal{A}</code>                  |
| $\mathbf{A}$                   | <code>\mathbf{A}</code>                   |
| $\mathbb{A}$                   | <code>\mathbb{A}</code>                   |

## 4 Sample Project Outline

The basic structure of a .tex file that uses the Bard Project style file is seen on the following two pages. This same outline can be found in the template for bardproj.sty, which is called bardproj\_template.tex.

To start writing your project, download the template and rename it with your own file name. To allow your adviser and others to keep track of your drafts, the new name you give the template should include your name and either the version number of your draft, for example janessmith1.tex, or the date of the draft, for example janessmith09-23-2015.tex. Every time you write a new draft, save it as a new file with an appropriate name.

Most of the elements of the project found in the template are discussed in this manual; figures and bibliography are discussed in the Writing Guidelines for Bard Senior Projects and Bard M.A.T. Mathematics Research Projects.

In the template, make sure to put in your own replacements for what is written between [ ] symbols, and remove the [ ] symbols (which are meant to imply that your own text needs to be inserted).

Use \titlepg for senior projects, and use \titlepgmat for M.A.T. mathematics research projects, and delete the one you are not using.

```

\documentclass[11pt, onside, reqno]{book}
\usepackage{amssymb, amsthm, amsmath, amsfonts}
\usepackage{bardproj}
\usepackage{graphics}
\usepackage{amsrefs}

%[your macros, if you have any]

\begin{document}

%For senior projects:
\titlepg{[title of Project]}\{[your Name]\}
    {[month of Graduation]}\{[year of Graduation]\}

%For M.A.T. mathematics research projects,
%uncomment the following, and remove the above:
%\titlepgmat{[Title of Project]}\{[Your Name]\}
%    {[Month of Graduation]}\{[Year of Graduation]\}

\abstr

[text of abstract]

\tableofcontents

\dedic

[text of dedication]

\acknowl

[text of acknowledgments]

\doublespace

\chapter{[title of first chapter]\}
\label{[label]\}

\section{[title of first section]\}
\label{[label]\}

[text]

```

```

\section{[title of second section]}
\label{[label]}

[text]

\singlespace

\begin{bibdiv}
\begin{biblist}[\normalsize]

\addcontentsline{toc}{chapter}{Bibliography}
\markboth{Bibliography}{Bibliography}

\bib{[label]}{book}{
author = {[last name], [first name]},
title = {[title]},
publisher = {[publisher]},
address = {[city]},
date = {[year]}
}

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journal = {[journal name]},
volume = {[volume number]},
date = {[year]}
pages = {[starting page--ending page]}
}

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eprint = {[web address]}
}

\bib{[label]}{report}{
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title = {[title]},
note = {[arXiv address]}
}

\end{biblist}

```

```
\end{bibdiv}
```

```
\end{document}
```