Bard Senior Project Template

A Senior Project submitted to
The Division of Science, Mathematics, and Computing
of
Bard College

by
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Abstract

This template is built from combining the LaTeX template from Prof. Ethan Bloch's webpage `https://faculty.bard.edu/bloch/tex/` [1] and the bibtex citation `https://www.overleaf.com/learn/latex/Bibliography_management_with_bibtex`.

Contents

Dedication

I dedicate this senior project to every person I have ever met in my life.

Acknowledgments

x

1
Introduction

Every senior project should have an introductory chapter that briefly summarizes or previews the content of the whole project. The introductory chapter, which can be thought of as an expanded version of the abstract, is meant to give the big picture, and should include a discussion of the background to the project, place the project in the context of known results, and provide an informal summary of the main results. Additionally, the introductory chapter should make clear what in the project is exposition of known results and what is original work.

2
A Very Nice Chapter teaches you how to create citation

This is how you cite CALCUlUS for example [2], and another citation [?Kark:2006.] Multiple citations [2–4]

2.1   An Even Nicer Section

Before you state a theorem, it's best to give some intuitive idea of what the theorem is about.

Theorem 2.1.1. *Let $f\colon A \to B$ be a function.*

1. *If f has an inverse, then the inverse is unique.*

2. *If f has a right inverse g and a left inverse h, then $g = h$; hence f has an inverse.*

3. *If f has an inverse g, then g has an inverse, which is f.*

Proof. (1). Suppose that $g, h\colon B \to A$ are both inverses of f. We will show that $g = h$. By hypothesis on g and h we know, among other things, that $f \circ g = 1_B$ and $h \circ f = 1_A$. Using a previous lemma we see that

$$g = 1_A \circ g = (h \circ f) \circ g = h \circ (f \circ g) = h \circ 1_B = h.$$

(2). The proof is virtually the same as in Part (1).

(3). Since $g\colon B \to A$ is an inverse of f, then $g \circ f = 1_A$ and $f \circ g = 1_B$. By the definition of inverses, it follows that f is an inverse of g. By Part (1) of this theorem, we know that f is the unique inverse of g. $\qquad\square$

2.2 The Best Section Ever

Whenever possible, break up a long chapter into sections.

Also whenever possible, insert figures to aid the reader. Always refer to the figures in the text. We see the logo of the Mathematics Program at Bard in Figure 2.2.1.
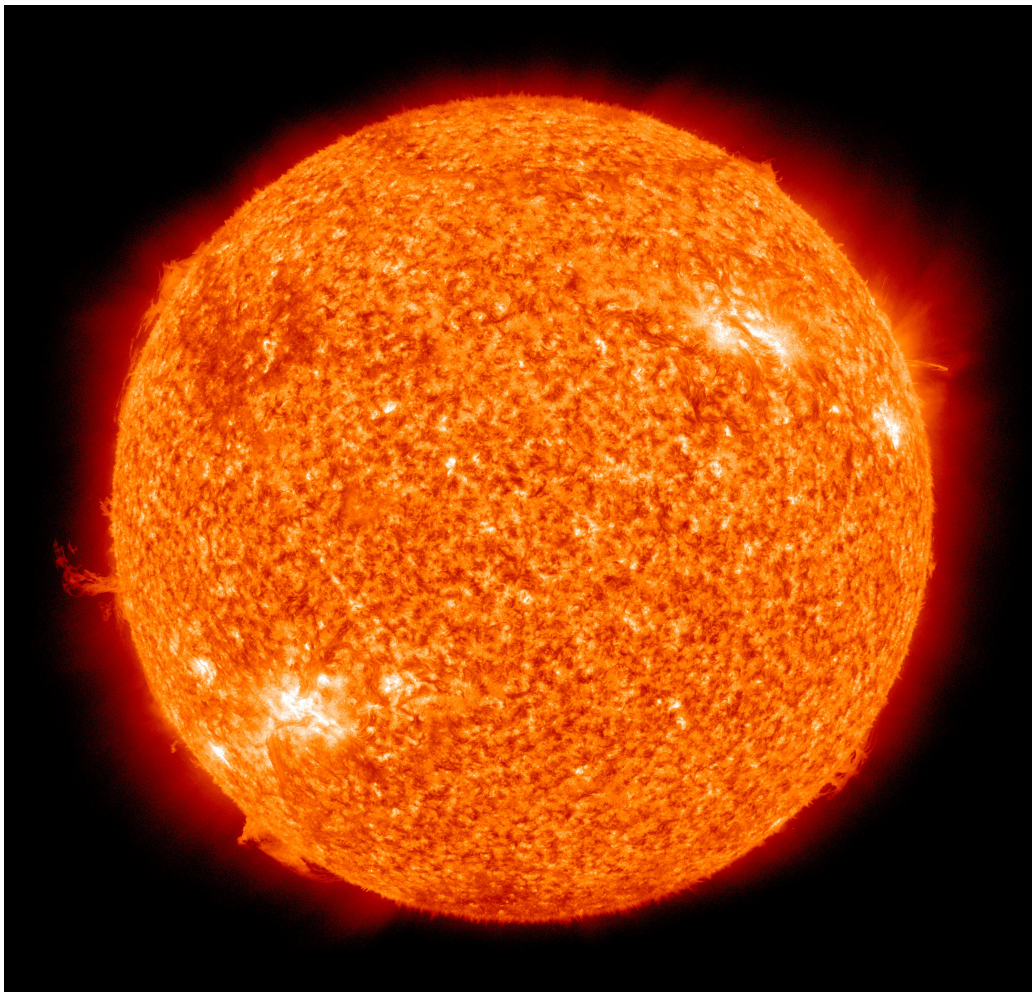

Figure 2.2.1: The Bard Mathematics Program Logo

Appendix A
I Like Appendices

A.1   A Lovely Appendix

An appendix is very nice when you want to include some useful material that you don't want to put in the main text, in order to avoid disrupting the flow of your writing. An appendix could contain background material, data, computer code and the like.

You can have as many appendices as you wish.

Each appendix is a chapter. Each appendix can have sections if you wish. If you put theorems and the like in an appendix, it should have sections, because otherwise the theorem numbering will have a 0 for middle number.

You put theorems and the like in appendices exactly as you put them in the rest of the senior project.

Theorem A.1.1. *Let $f \colon A \to B$ be a function.*

1. *If f has an inverse, then the inverse is unique.*

2. *If f has a right inverse g and a left inverse h, then $g = h$; hence f has an inverse.*

3. *If f has an inverse g, then g has an inverse, which is f.*

Proof. (1). Suppose that $g, h \colon B \to A$ are both inverses of f. We will show that $g = h$. By hypothesis on g and h we know, among other things, that $f \circ g = 1_B$ and $h \circ f = 1_A$. Using a

previous lemma we see that

$$g = 1_A \circ g = (h \circ f) \circ g = h \circ (f \circ g) = h \circ 1_B = h.$$

(2). The proof is virtually the same as in Part (1).

(3). Since $g \colon B \to A$ is an inverse of f, then $g \circ f = 1_A$ and $f \circ g = 1_B$. By the definition of inverses, it follows that f is an inverse of g. By Part (1) of this theorem, we know that f is the unique inverse of g. $\square$

Bibliography

[1] Ethan Bloch, *Bard tex style files*. `https://faculty.bard.edu/bloch/tex/`.

[2] Cathy Calculus, *Why everyone should love calculus*, Journal of Fun Mathematics **314** (2099), 100–101.

[3] Fred Fractal, *How to write a great senior project in mathematics*. `http://www.www.www.edu`.

[4] Harold Homology, *Algebraic topology for dummies*, Math Lights, Simplicialville, NY.

Bibliography

[1] Cathy Calculus, *Why everyone should love calculus*, Journal of Fun Mathematics **314** (2099), 100–101.

[2] Fred Fractal and Germaine Graph, *How to Write a Great Senior Project in Mathematics*, `http://www.www.www.edu`.

[3] Harold Homology, *Algebraic Topology for Dummies*, Math Lights, Simplicialville, NY, 2099.