THESIS TITLE

A thesis written at

YOUR COMPANY HERE, LLC.

and submitted to

KETTERING UNIVERSITY

in partial fulfillment
of the requirements for the
degree of

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

by

JOE Q. STUDENT

December 2013

_____
Author

_____
Employer Advisor - R. U. There

_____
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DISCLAIMER

This thesis is submitted as partial and final fulfillment of the cooperative work experience requirements of Kettering University needed to obtain a Bachelor of Science in Mechanical Engineering Degree.

The conclusions and opinions expressed in this thesis are those of the writer and do not necessarily represent the position of Kettering University or Your Company Here, LLC., or any of its directors, officers, agents or employees with repsect to the matters discussed.

PREFACE

This thesis represents thet capstone of my five years combined academic work at Kettering University and job experience at Your Company Here, LLC.. Academic experiences in Mechanical Engineering proved to be valuable assets while I developed this thesis and addressed the problem it concerns.

Although this thesis represents the compilation of my own efforts, I would like to acknowledge and extend my sincere gratitude to the following persons for their valuable time and assistance, without whom the completion of this thesis would not have been possible:

1. Boss Man 1
2. Boss Man 2
3. Mentor 1
4. Mentor 2

This is the dedication.

ACKNOWLEDGMENTS

This is the acknowledgments.

PREFACE

This is the preface.

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LIST OF FIGURES

Figure Page

B.1 By default figures are not centered. This is a long caption to demonstrate that captions are single spaced. 5

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B.5 This figure has four parts. 7

SYMBOLS

m mass

v velocity

ABBREVIATIONS

abbr	abbreviation
bcf	billion cubic feet
BMOC	big man on campus

NOMENCLATURE

Alanine	2-Aminopropanoic acid
Valine	2-Amino-3-methylbutanoic acid

GLOSSARY

chick female, usually young

dude male, usually young

ABSTRACT

Student, Joe Q. B.S.M.E., Purdue University, December 2013. Thesis Title. Major Professor: John Q. Professor, School of Mechanical Engineering.

This is the abstract.

1. INTRODUCTION

This is the introduction. The first paragraph after a heading is not indented.

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

1.1 Section Heading

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

1.1.1 Subsection heading

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

Subsubsection heading

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

2. SUMMARY

This is the summary chapter.

3. RECOMMENDATIONS

Buy low. Sell high.

APPENDICES

I typed

```
For \LaTeX\ answers I refer to
% note to self: {\em \LaTeX: A Document Preparation System\/}
\cite{Lamport:1994}
and then to
% note to self: {\em The \LaTeX\ Companion\/}
\cite{Goossens:1994}
or
% note to self: {\em A Guide to LaTeX\/} (1999)
\cite{Kopka:1999}.
% note to self: {\em A Guide to LaTeX\/} (1999)
\cite{Kopka:1999}
is an updated edition of the 1995 edition
\cite{Kopka:1995}.
```

to get

For LaTeX answers I refer to [1] and then to [2] or [3]. [3] is an updated edition of the 1995 edition [4].

The `h` specifier used in all the examples below tells LaTeX to put the figure "here" instead of trying to find a good spot at the top or bottom of a page. Specifiers can be combined, for example, "`\begin{figure}[htbp!]`".

The complete list of specifiers:

Specifier	**Description**
`b`	bottom of page
`h`	here on page
`p`	on separate page of figures
`t`	top of page
`!`	try hard to put figure as early as possible

Label "fi:not-centered" is "B.1". Label "sf:four-parts-c" is "B.5(c)".

This is the first paragraph. This is the first paragraph. This is the first paragraph. This is the first paragraph. This is the first paragraph.

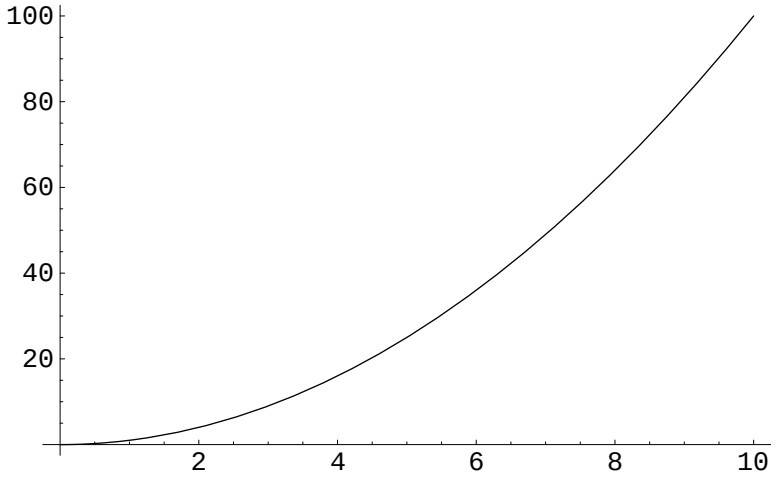


Figure B.1. By default figures are not centered. This is a long caption to demonstrate that captions are single spaced.

This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph. This is the second paragraph.

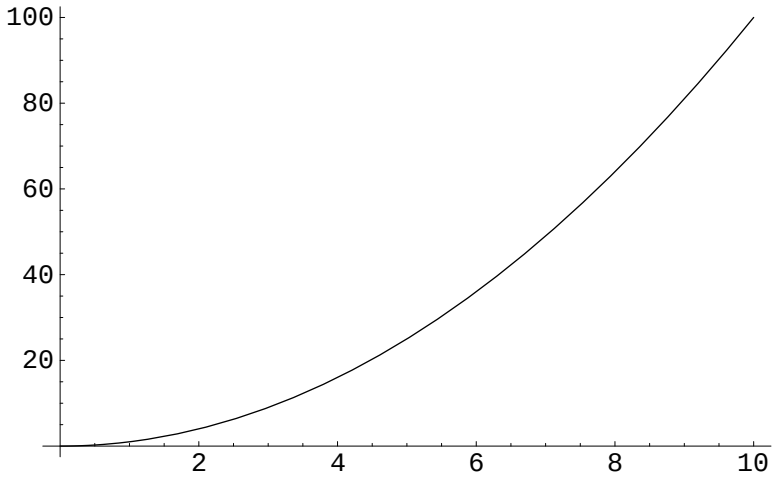


Figure B.2. Use `\centering` to center figures.

This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph. This is the third paragraph.

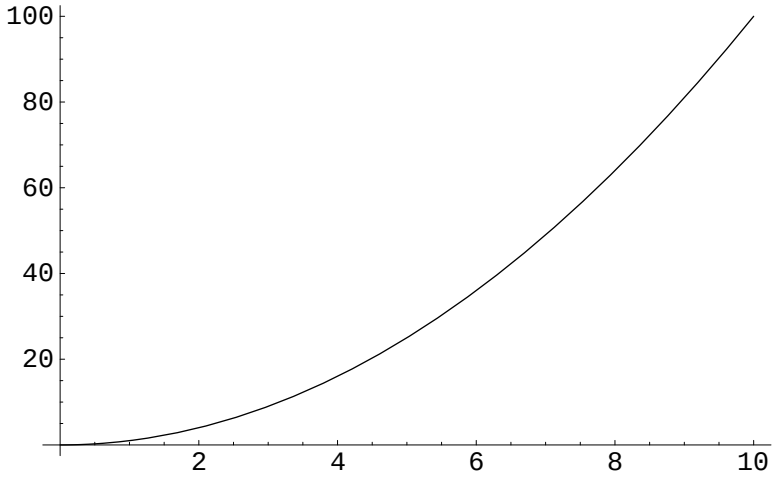
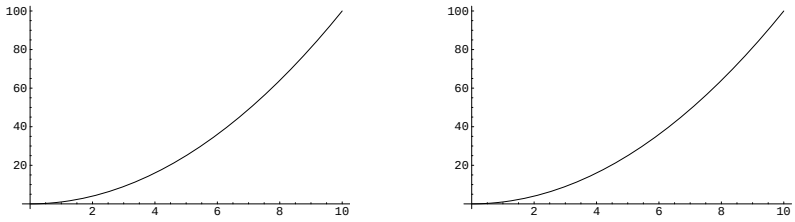


Figure B.3. This is another figuure.

This is the fourth paragraph. This is the fourth paragraph. This is the fourth paragraph. This is the fourth paragraph. This is the fourth paragraph. This is the fourth para-

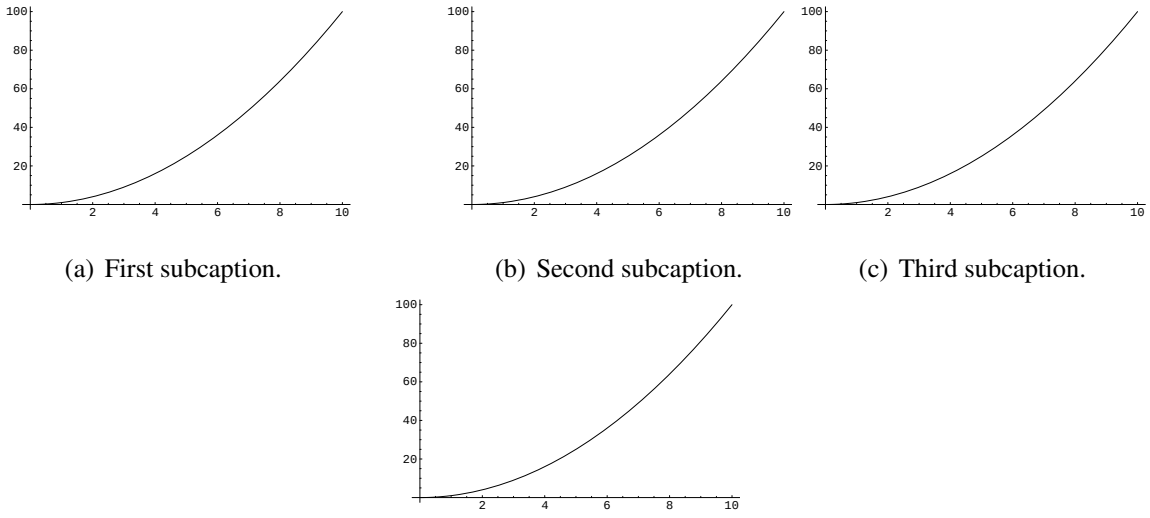
graph. This is the fourth paragraph. This is the fourth paragraph. This is the fourth paragraph. This is the fourth paragraph.



(a) First subcaption. (b) Second subcaption.

Figure B.4. This figure has two parts.

This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph. This is the fifth paragraph.



(a) First subcaption. (b) Second subcaption. (c) Third subcaption.

(d) Fourth subcaption.

Figure B.5. This figure has four parts.

This is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph. This

is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph. This is the sixth paragraph.

```
% From _More Math Into LaTeX_, 4th Edition, page 152:
%     TeX uses $$ to open and close a displayed math environment.
%     In LaTeX, this may occassionally cause problems.  Don't do it.
\[
    E = mc^2
\]
```

$$E = mc^2$$

```
\begin{equation}
    E = mc^2
\end{equation}
```

$$E = mc^2 \tag{C.1}$$

```
% Mydefs.tex defines \be to be \begin{equation} and
% \ee to be \end{equation}.
\be
    E = mc^2
\ee
```

$$E = mc^2 \tag{C.2}$$

```
\be
    x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}
\ee
```

$$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a} \tag{C.3}$$

```
% requires \usepackage{amsmath}; use align* for no equation number
\begin{align}
    a = {}& b + c\\
    x = {}& y + z
\end{align}
```

$$a = b + c \tag{C.4}$$
$$x = y + z \tag{C.5}$$

```
\[
    Z = \left(
        \begin{array}{cc}
            a& b\\
            c& d
        \end{array}
    \right)
\]
```

$$Z = \left(\begin{array}{cc} a & b \\ c & d \end{array} \right)$$

```
\begin{equation}
    \begin{split}
        a = {}& b + c\\
            {}& + d + e
    \end{split}
\end{equation}
```

$$\begin{aligned} a = {} & b + c \\ & + d + e \end{aligned} \tag{C.6}$$

```
\be
    (\cos x)^2 + (\sin x)^2 = 1
\ee
```

$$(\cos x)^2 + (\sin x)^2 = 1 \tag{C.7}$$

```
If $X = \cos x$ and $Y = \sin x$ then $X^2 + Y^2 = 1$.
```

If $X = \cos x$ and $Y = \sin x$ then $X^2 + Y^2 = 1$.

This is one column. This is one column.

This is two columns. This is two columns. This is two columns.

This is five columns. This is five columns. This is five columns.	This is five columns. This is five columns. This is five columns.	This is five columns. This is five columns. This is five columns.	This is five columns. This is five columns. This is five columns.	This is five columns.

E. DEMONSTRATE TABLES

Here is a really simple table.

Table E.1. American Presidents

Number	**Name**
1	George Washington
2	John Adams
3	Thomas Jefferson

There are 72.27 points per inch. I like to put 2 points of vertical space between the heading (Number Name) and the first line (1 George Washington) of the table.

Table E.2. American Presidents with 2pt vertical space after heading

Number	**Name**
1	George Washington
2	John Adams
3	Thomas Jefferson

LaTeX can print horizontal and vertical rules in tables. I don't like the way this looks.

Table E.3. American Presidents with horizontal and vertical lines

#	**Name**
1	George Washington
2	John Adams
3	Thomas Jefferson

Here is a more complicated table.

Table E.4. C Bitwise Operators

A	B	A|B	A&B
0	0	0	0
0	1	1	0
1	0	1	0
1	1	1	1

You can use Plain TEX's `\halign` command to make tables also. If you can't do a complicated table using LATEX commands you may want to try using Plain TEX commands. LATEX's table making commands use Plain TEX commands.

Table E.5. American Presidents using `\halign`

Number	Name
1	George Washington
2	John Adams
3	Thomas Jefferson

The next page shows how to do a table that is too long to fit on one page.

Table E.6. : State Abbreviations

State	Abbreviation
Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
Florida	FL
Georgia	GA
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
Nevada	NV
New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Ohio	OH
Oklahoma	OK
Oregon	OR
Pennsylvania	PA
Rhode Island	RI
South Carolina	SC
South Dakota	SD

continued on next page

Table E.6. : *continued*

State	Abbreviation
Tennessee	TN
Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY

Table E.7. sidewaystable \begin{tabular}... \end{tabular}

Number	Name
1	George Washington
2	John Adams
3	Thomas Jefferson

Table E.8. sidewaystable `\halign{...}` table

Number	**Name**
1	George Washington
2	John Adams
3	Thomas Jefferson

```
This is a sentence.
This is a sentence.
This is a sentence.
This is a sentence.
This is a sentence.

This is a sentence.
This is a sentence.
This is a sentence.
This is a sentence.
This is a sentence.
```

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

This is a sentence. This is a sentence. This is a sentence. This is a sentence. This is a sentence.

```
From \verb+http://www.biblegateway.com/passage/?book_id=1&chapter=1&version=50+:

\begin{quote}
    1 In the beginning God created the heavens and the earth.
    2 The earth was without form,
    and void;
    and darkness was on the face of the deep.
    And the Spirit of God was hovering over the face of the waters.

    3 Then God said,‘‘Let there be light’’;
    and there was light.
    4 And God saw the light,
    that it was good;
    and God divided the light from the darkness.
    5 God called the light Day,
    and the darkness He called Night.
    So the evening and the morning were the first day.
\end{quote}
```

From `http://www.biblegateway.com/passage/?book_id=1&chapter=1&version=50`:

> 1 In the beginning God created the heavens and the earth. 2 The earth was without form, and void; and darkness was on the face of the deep. And the Spirit of God was hovering over the face of the waters.
>
> 3 Then God said,“Let there be light”; and there was light. 4 And God saw the light, that it was good; and God divided the light from the darkness. 5 God called the light Day, and the darkness He called Night. So the evening and the morning were the first day.

```
\begin{description}
    \item[apple]
        A red fruit.
    \item[banana]
        A yellow fruit.
        This sentence is to make the entry longer so you can see what happens.
        This sentence is to make the entry longer so you can see what happens.
    \item[cherry]
        A red friut.
\end{description}
```

apple A red fruit.

banana A yellow fruit. This sentence is to make the entry longer so you can see what happens. This sentence is to make the entry longer so you can see what happens.

cherry A red friut.

```
\begin{enumerate}
    \item apple
    \item banana
        This sentence is to make the entry longer so you can see what happens.
        This sentence is to make the entry longer so you can see what happens.
    \item cherry
\end{enumerate}
```

1. apple
2. banana This sentence is to make the entry longer so you can see what happens. This sentence is to make the entry longer so you can see what happens.
3. cherry

```
\begin{itemize}
    \item apple
    \item banana
        This sentence is to make the entry longer so you can see what happens.
        This sentence is to make the entry longer so you can see what happens.
    \item cherry
\end{itemize}
```

- apple
- banana This sentence is to make the entry longer so you can see what happens. This sentence is to make the entry longer so you can see what happens.
- cherry

LIST OF REFERENCES

LIST OF REFERENCES

[1] Leslie Lamport. *LaTeX: A Document Preparation System*. Addison-Wesley, Reading Massachusetts, 1994.

[2] Michel Goossens, Frank Mittelbach, and Alexander Samarin. *The LaTeX Companion*. Addison-Wesley, Reading Massachusetts, 1994.

[3] Helmut Kopka and Patrick W. Daly. *A Guide to LaTeX, : Document Preparation for Beginners and Advanced Users*. Addison-Wesley, Reading Massachusetts, third edition, 1999.

[4] Helmut Kopka and Patrick W. Daly. *A Guide to LaTeX : Document Preparation for Beginners and Advanced Users*. Addison-Wesley, Reading Massachusetts, second edition, 1995.