

# What makes a good thesis?

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An exhaustively researched presentation by  
the Senior Thesis Writing Group

# What to do

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- Explanation of relevant details
  - Real-world context of your problem
  - Clear statement of the problem
  - Clear statement of your methodology
  - Explanation of your results
- Technical content
- Clear prose style

# Relevant details

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- Historical context
  - “This thesis studies how Amaranth Advisors lost more than \$6 billion over two weeks in September 2006, the largest ever loss by a hedge fund.”
- Convince the reader that your problem matters

# Relevant details

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- Description of the real-world setting
  - “Only a small percentage of exchange-traded natural gas forward and futures contracts result in physical delivery, typically less than 1% per year.”
- Even better if backed by technical results
  - “Natural gas time series data is characterized by extraordinary stochastic volatility and the above-average likelihood of extreme shocks.”

# Relevant details

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- Description of the work
  - “This thesis explores the tools of statistics to analyze various aspects of the fiction published in the New Yorker magazine.”
  - “This paper will assign a concrete value of return to the different analyst recommendations as well as examine the effectiveness of those recommendations.”

# Relevant details

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- The more concrete, the better
  - “We assess the validity of both an extreme value distribution and a generalized autoregressive conditional heteroscedasticity (GARCH) model.”
  - “A matrix-based method of ranking takes as input previous interactions among teams and returns an eigenvector with the relative value assigned to each team.”

# Relevant details

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- Clarifying the scope of the work
  - “This thesis focuses on fiction, rather than one of the New Yorker’s other art forms such as cartoons.”

# Technical content

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- Technical content = quality
- Statistical analysis is the minimum
  - Hypothesis tests, ANOVA
  - Linear regression
- More is usually better
  - Dynamic program?
  - Markov chain model?



# Technical content

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- But don't worry about "making a discovery"
  - "All of the other results for the fraudulent companies are insignificant from a statistical standpoint, but some are more than others..."
- Sometimes even the data are interesting
  - Categorizing New Yorker stories by setting and protagonist
  - "Are the distributions of story settings the same under different editors?"

# Technical content

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- It's great to write some code, but...

```
float budlight;

//Print the gradient
for(int fuckyou=0;fuckyou<M;fuckyou++)
{
    budlight= Cur_Vi.m_Vi[fuckyou+1];
    System.out.println(""+budlight);
}
return t_Vo;
}
return (float)9999;
}
```

# What not to do

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- Padding
  - “The really thick theses tend to be the weaker ones” (Anonymous OR&FE professor)
  - Tempting, but easy to detect
- Lack of technical content
- Bad prose

# Padding

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- Irrelevant words
  - “Located in New York City at the corner of 42<sup>nd</sup> Street and Broadway, the Conde Nast Publications skyscraper houses a host of important American periodicals, including such familiar names as Vogue, Vanity Fair, Bon Appetit, Glamour, Architectural Digest, and GQ. An impressive array, but none possesses the cachet of the legendary occupant of the 20<sup>th</sup> and 21<sup>st</sup> floors.”

# Padding

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- Irrelevant facts
  - “32-year-old Brian Hunter, based 2500 miles from Wall Street in his hometown of Calgary, bought and sold billions of dollars of commodities from Amaranth.”

# Lack of technical content

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- Errors due to lack of understanding
  - “The coefficients were calculated by minimizing the sum of square errors for the set of predictions for each variable using the Microsoft Excel Solver tool. This tool performs a linear optimization using the simplex method with bounds on the variables.”
  - Minimizing the sum of squares is not a linear optimization problem...

# Bad prose

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- Generic words and phrases
  - “Much insight...was obtained”
- Generic expressions
  - “...a consideration which we should do well to bear in mind...”
- Pretentious diction
  - “In my opinion it is not an unjustifiable assumption that...”

# Bad prose

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- “Sensational” tone
  - “32-year-old Brian Hunter...bought and sold billions of dollars”
- Vacuous adjectives
  - “An impressive array”
- Passive voice
  - “Results were obtained that support the hypothesis that was made earlier”



# Progress report

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- Due Monday, 11/17/2008
- Approximately 10-15 pages
- Content:
  - Detailed problem description
  - Preliminary review of the literature (including a bibliography of major sources)
  - Summary of major data requirements
  - Summary of project work (e.g. coding)
  - Schedule of tasks (i.e. milestones)