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# Project Planning

or “How to keep sane  
this year”

# Final Year Project: Perspective

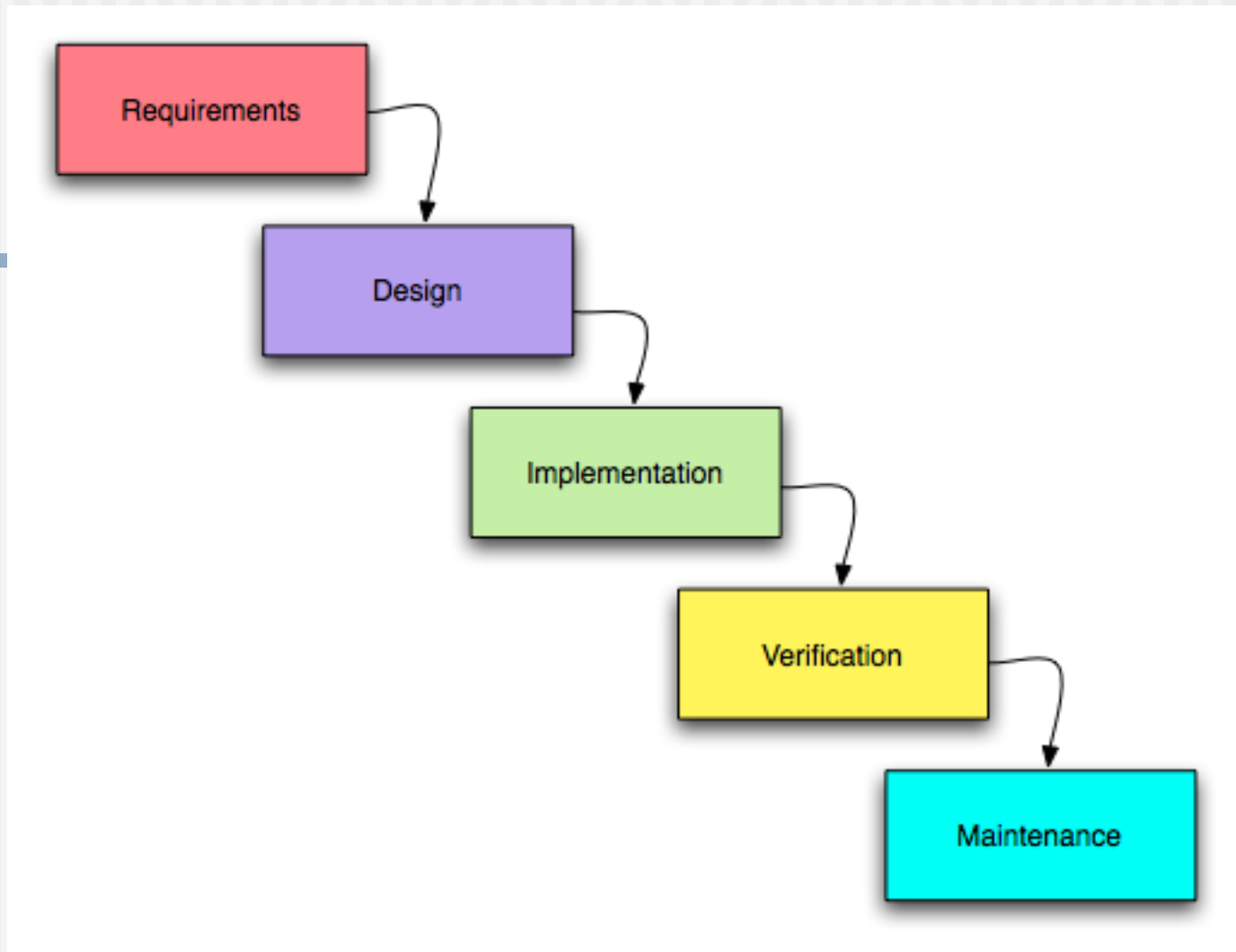
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- “Oh my goodness this is totally new to me!”
  - No it isn't, you have done it before.
- “Where do I even begin??”
  - Where do you begin all of your work?
- “This is way too much, I can't do all of this by the end of year!!!”
  - Probably not ... but you need to evaluate it!
- “Will you do it for me?”
  - No, this is a valuable learning experience.

# Project Planning: Metaphor

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- Think of your project in terms you understand
  - Think of the project as falling into different stages of the Waterfall model
  - At each stage you have something you have to write up, when you combine all of those things together you will have something for your final report.
  - But how do we structure it into a cohesive description of the project?



[http://en.wikipedia.org/wiki/Image:Waterfall\\_model.png](http://en.wikipedia.org/wiki/Image:Waterfall_model.png)

# Basic Rules (1)

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## ■ Read

- Become an expert in your chosen field.
- Extremely important for literature review (obviously) but also so you can talk about your work (e.g. employment interviews).
- Reading early can keep you from duplicating existing work.
- Reading different perspectives (i.e. sources) can enhance your own ideas.

# Basic Rules (2)

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- Write
  - Write early, write often.
  - Record citations as you go along.
  - Annotate citations as you fill them out.
  - Record thoughts as they come to you.
  - Write up sections as you complete them.
  - Review what you have written often to make sure you are still on the right track (oh ... that's reading again...).

# Basic Rules (3)

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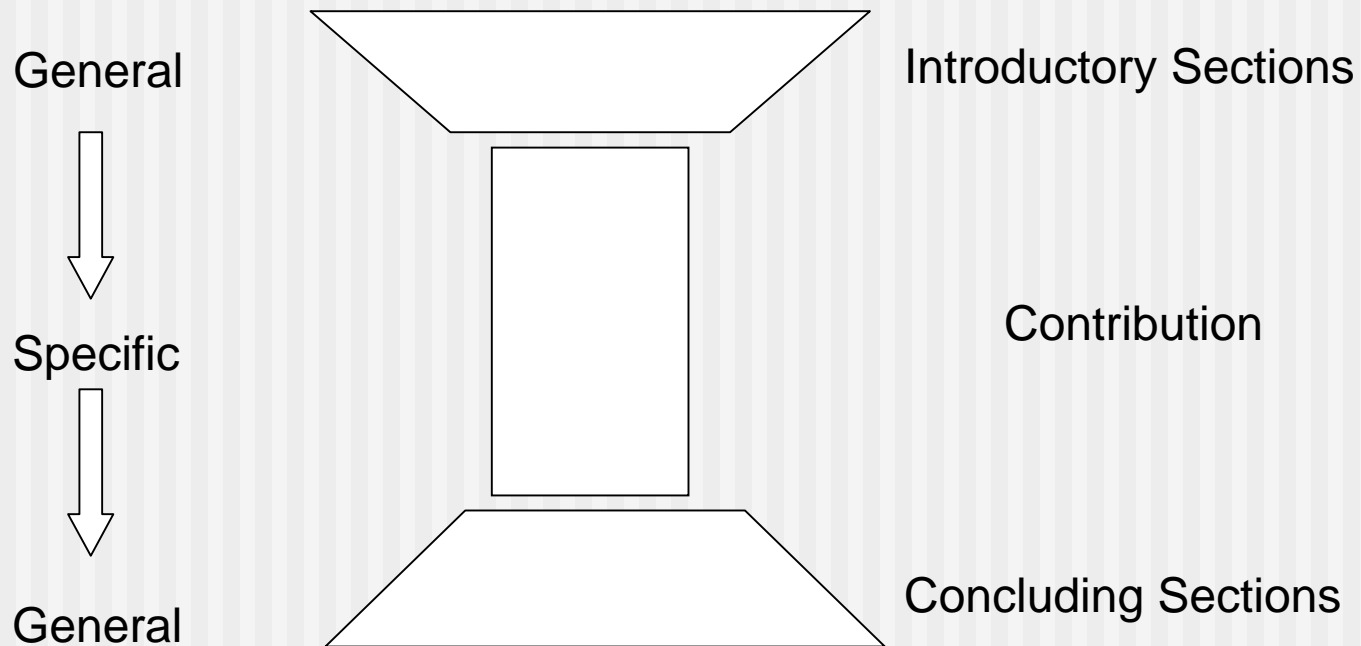
## ■ Organize

- Use “mini” versions of project management tools (PERT/GANTT charts).
- Keep sections of work organized, cross reference previous documents.
- Detailed bibliographic database.

# But how do write it?

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## ■ Hourglass model of writing:





# Introductory Sections (1)

Describe general state of the world of your domain

Describe what problems are left to be solved

Describe what problem you are solving

Describe how you propose to solve it

Describe roadmap for your paper

Describe specific state of the art

# Introductory Sections (2)

Describe general state of the world of your domain

Title

Describe what problems are left to be solved

Abstract

Describe what problem you are solving

Introduction

Describe how you propose to solve it

Describe roadmap for your paper

Describe specific state of the art  
Literature Review

# Introductory Sections (3)

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- What should the introductory chapters achieve?
  - The same as what you do when you start a new software project:
    - Clarify the problem you are trying to solve and situate it in the domain of knowledge.
  - You should present a complete view of the world you are working in and *why your work is important to it!*

# Title (1)

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- This seems like the simplest of all of them ... and it is ... sort of ...
  - Titles can be too long to be of use when someone is looking for something
    - “A Representation of the Wandering Wumpus Problem using Axiomatic Set Theory and Neural Networking Techniques Analyzed from the Perspective of the Wumpus using training data provided by the Fraunhofer Institute”
  - Titles can be missing key terms
    - “A Representation of a Search Problem”
  - Titles can be nonsense in regards to the problem
    - “The Life and Times of the Wandering Wumpus”

# Abstract (1)

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- What is an “Abstract”
  - This is a concise statement about what your paper is about.
  - It should provide enough information that the reader will immediately know if he/she want to continue reading.
  - It should not provide deep details regarding the problem or its solution.
  - It is **not** the first paragraph of the introduction!

# Abstract (2)

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- A good abstract contains:
  - Motivation – why you are solving the problem
  - Problem statement – what are you trying to solve
  - Solution statement – how do you solve it
  - Results – what were the results
  - Conclusions – what are the broader implications
- For large thesis works this should not be more than a few hundred words.

# Introduction (1)

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- Exactly what it says:
  - Introduces your problem domain and the problem you are trying to solve.
  - It is a larger more fleshed out version of the abstract, where the details have been put back in for the reader.
  - By the end of the introduction the reader should know whether they want to continue.
  - Your “thesis” should be stated here
    - “This work will show that...”

# Literature Review (1)

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- Literature review can follow the same process as the rest of the paper
  - Go from the general to the specific
- Show the general state of the field in enough detail that a new reader can “jump in”.
- Describe specific solutions or examples which are relevant to your problem.
  - This includes not only references to previous attempts at solutions, but also a discussion of how you came to your proposed solution.



# Literature Review (2)

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- There are many resources available that you should be aware of:
  - Library Catalogue (you know ... books!)
  - Library Information Literacy Training
  - Online Portals
    - IEEE/ACM online libraries
    - MetaLib Library Portal
  - Online Search (e.g. Google Scholar, Citeseer, Wikipedia)

# Literature Review (3)

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- FACT:

- There are more scientists alive today doing research than in the history of modern civilization.
- How do you find or organize that much information?

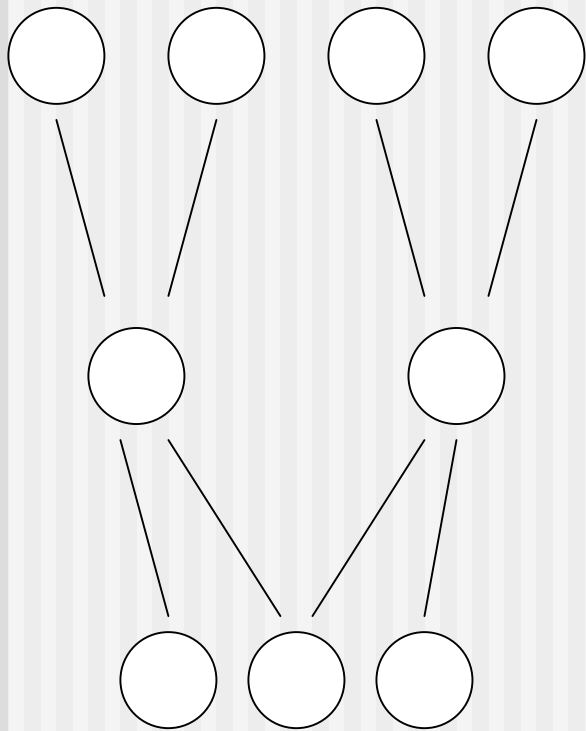
# Literature Review (4)

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- Easiest is to think of it in terms of a tree
  - Read general references for your field; books, survey articles etc.
  - Find out who they cite, retrieve those articles.
  - Read specific articles and see who they cite
    - Recurse as necessary
  - When you find the original source material for your field, work forward looking for sources that you missed that cite those canonical works

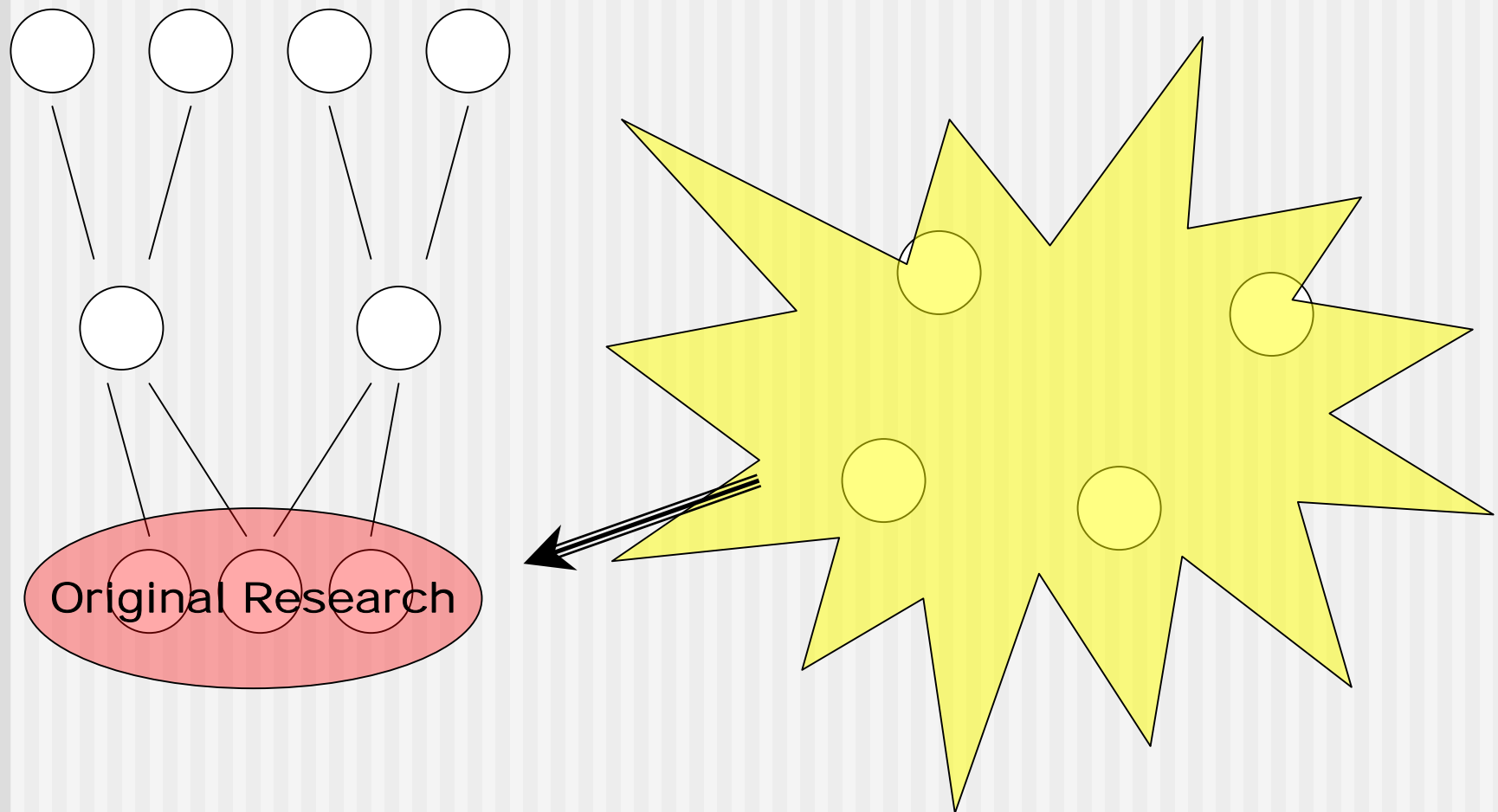
# Literature Review (5)

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# Literature Review (5)

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# Introductory Sections (4)

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- Consider the introductory sections to be the “Requirements” of the Waterfall cycle
  - Here you define what the problem is that you are going to solve.
  - You state what you consider to be the success criteria (e.g. providing a working tool, proving/disproving various theorems, providing evidence supporting a hypothesis).
- Provide a roadmap for the rest of the paper.

# Contribution

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Methodology

Implementation

Results

# Contribution

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Design

Implementation

Verification



# Contribution

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Not so fast...

... what type of work

are you doing?

# Contributions

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- The contributions you make will depend on your area of research.
- Depending on the contribution type you will have different requirements.
- Types of scientific research papers:
  - Empirical Research
  - Case Study Research
  - Methodology Research
  - Theory Research

# Empirical Research (1)

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- Based on experimentation (Systems Research, CHI, AI)
- Methodology Section:
  - Explain hypothesis
  - Explain experimental design
  - Explain analysis methods
- Implementation Section:
  - Explain the population and the sample
  - Explain apparatus and environment
  - Explain data collection
- Results Section:
  - Explain what came out of the experiments
  - Perform analysis (e.g. statistics)

# Case Study Research

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- Based on a case study of a system (SE, CHI, Graphics)
- Methodology Section:
  - Explain reasons for using methods and theories to build a system
- Implementation Section:
  - Application of methods to create new artifact
- Results Section:
  - Compare and contrast new artifact with previous attempts.

# Methodology Research

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- Change in the status quo in how a problem is solved.
- Methodology Section:
  - Analysis of current solutions
  - Description regarding what is not addressed by current solutions.
  - Proposed alternate solution based on theoretical principles.
- Implementation Section:
  - Application of new methodology to solving a specific problem (proof of existence)
- Results Section:
  - Compare and contrast successes (and failures) of new methodology

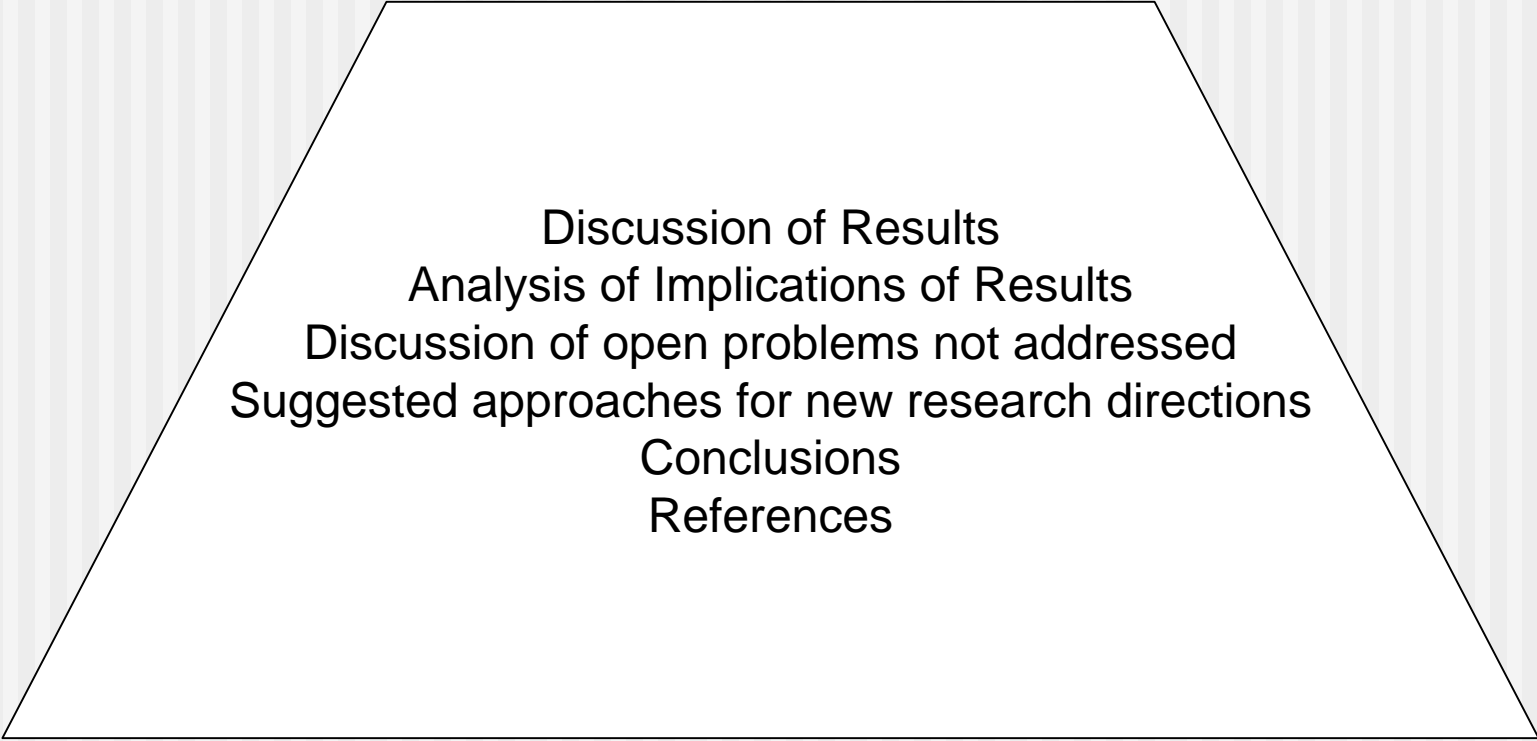
# Theory Research

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- New theoretical approaches
- Methodology Section:
  - Analysis of phenomenon being studied for common features and attributes to be described.
- Implementation Section:
  - Creation of abstract notions required to describe the features and attributes of an artifact.
- Results Section:
  - True and valid proof that theoretical system meets requirements described in methodology.

# Concluding Sections (1)

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Discussion of Results  
Analysis of Implications of Results  
Discussion of open problems not addressed  
Suggested approaches for new research directions  
Conclusions  
References

Note: I could not think of a long way to say the last two.

# Concluding Sections (2)

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- The “Maintenance” section of your paper
  - It describes what people should take away from your work (“the moral of the story ...”)
  - Describes future directions of work
    - A well written future directions section will demonstrate to readers that you have thoroughly thought through the problem.
- Closes the paper describing everything you have done for your project. This should be similar to the introduction, with more direct references to the implementation and results.



# References

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- Possibly the most important part of any paper.
- They show depth and breath of knowledge.
- They show the reader and future researchers where the basis for your work came from.
- Use a consistent referencing style throughout the paper.
- Use a consistent format at the end of the paper.
- Highly recommend the use of a reference management tools such as RefMan (\$\$!) or BibTex (Free! JabRef for PC/Linux, Bibdesk for Mac)

# What if things go wrong?

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A few suggestions:

1. Look closely at the problem, did it go wrong or have you just shown something unexpected?
2. Did you bite off more than you can chew? Carve back requirements, but maintain the above structure.
3. Talk to your supervisor early about problems, they may know of a way to salvage what you have!

# References:

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