Research Methods

CSCI 4108
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Lesson 2: the proposal

Prepared by: Dr. Rebhi Baraka
Updated by: Dr. Motaz Saad
Faculty of Information Technology
Islamic University of Gaza

The proposal

- Importance of the proposal
- Structure of the proposal

Importance of the proposal

- To provide a plan for your project.

- It serves as your communication to your advisor

- It is a requirement to approve to pursue your graduation project.

- It serves as an agreement between you and your advisor

- The contents of the proposal becomes your plan of action and outline of work to be done throughout the project.

- The contents of the proposal becomes a part of the graduation project report.

Structure of the proposal

- Title page
- Table of contents
- Abstract
- Introduction
- Statement of the problem
- Objectives
- Importance of the project
- Scope and limitations of the project

- Methodology
- Tools, equipment and methods
- Time Table
- Related Works
- Bibliography (References)

You should follow the template

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Title page

- The cover page of your proposal.

- It includes the title of your project.

- The title should be indicative

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Table of contents (ToC)

- A list of the sections and sub-sections of the report,

- A list of figures/tables and Appendices

- Tip: use styles and formatting to automatically generate the ToC after you finish writing

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Abstract

- A short paragraph summarizing the main contents of the proposal.

- It should include a short statement of:
  - what your project is all about,
  - what are you going to accomplish in the project (objectives)
  - importance of your project proposal.

- The abstract (summary) should be concise, informative and independent of the report.

- **Write the abstract after you have written the report.**

Order of typical elements included in the abstract (BPMRC)

- B = **B**ackground information

- P = The **P**rinciple activity (or Purpose) of the study and its scope

- M = **M**ethodology used in the study

- R = The most important **R**esults of the study

- C = A statement of **C**onclusion or recommendation

Abstract example

Utility programs has benefits for end users. The aim of this project is to develop a utility program (pdf-shuffler) that help end users to reorder the pages of a given pdf document. We use Agile software process model to develop the pdf-shuffler. The proposed utility make ordering pdf pages very easy to end users. Pdf-shuffler is very useful and handy tool for end user.

Background (green)
purpose / principle activity (blue)
Methodology (red)
result (orange)
Conclusion (gray)

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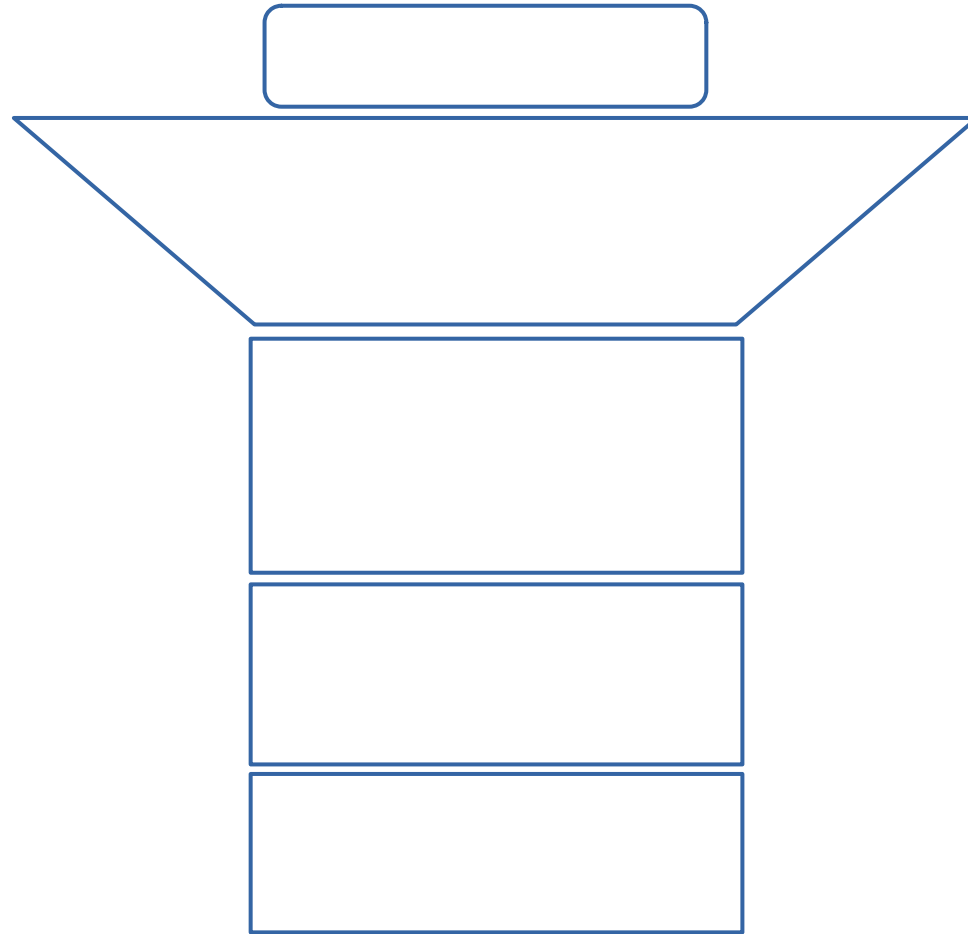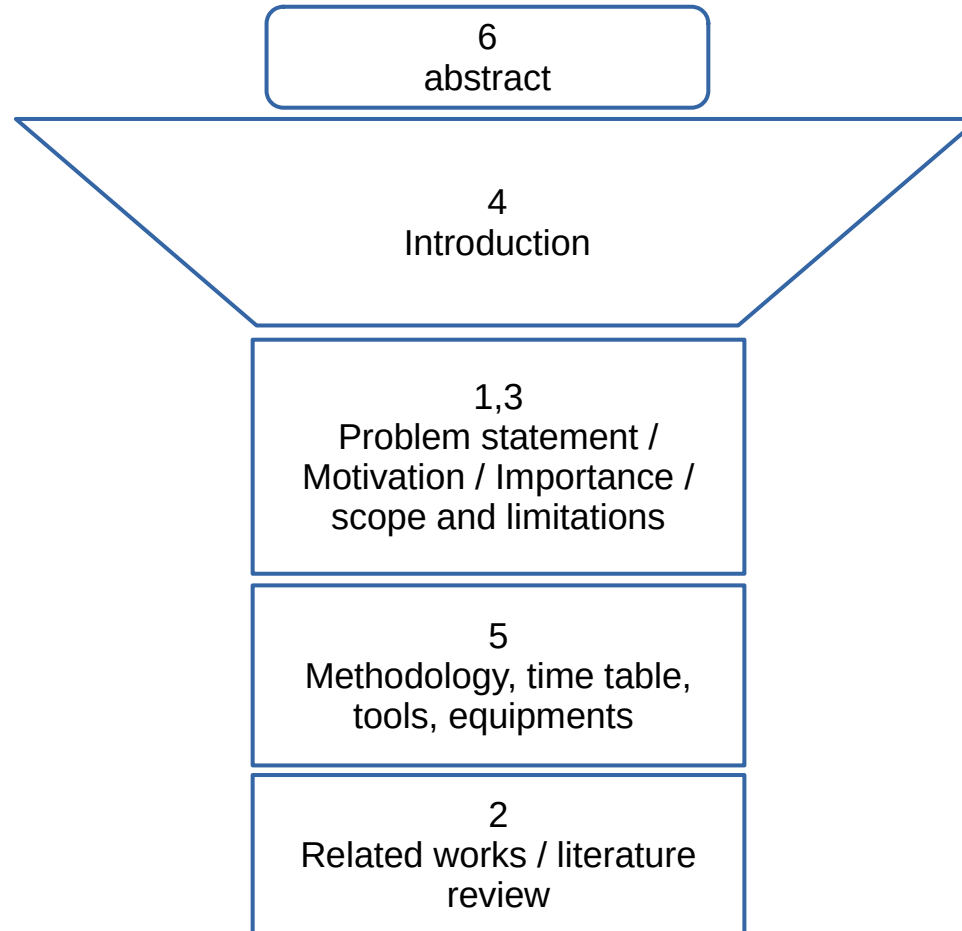- Related Works
- Bibliography (References)

Introduction

- It should give a brief general background to the subject area of the report

- Indicate the proposed development.

- Provide the context and scope of the proposal and should include your terms of reference.

- Informally state your objectives, define the limits of the report, outline the method of the work

A big picture for
article structures:
AIMRaD (Abstract, Introduction,
Methods, Results, and Discussion)

Abstract

(b) Introduction (1)

(2)

(3)

(c) Methods

(a) Results

(d) Discussion

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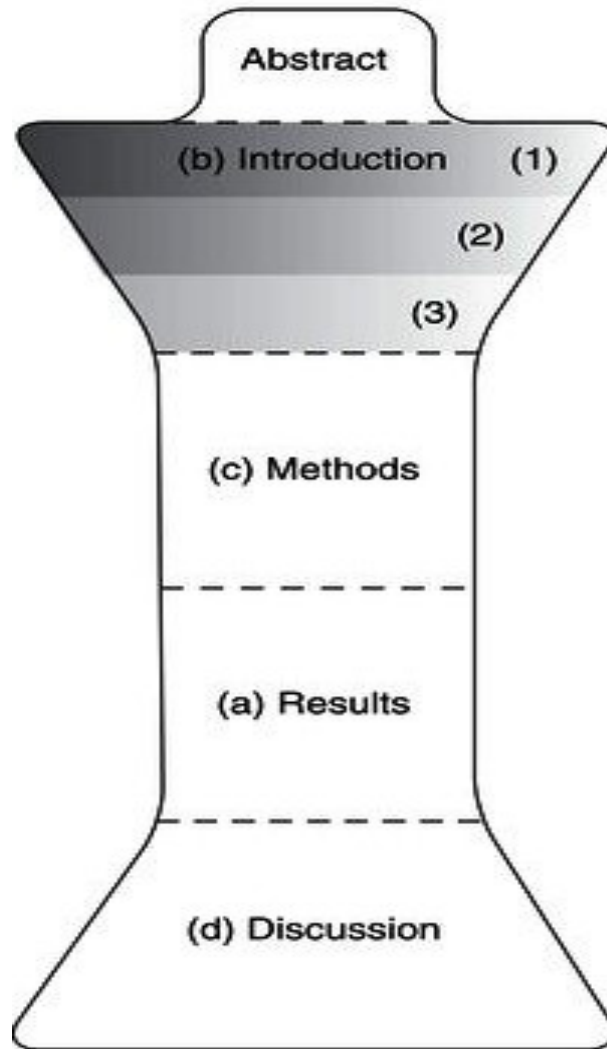
A big picture for
Proposal structures:
Abstract,
Introduction,
Problem statement,
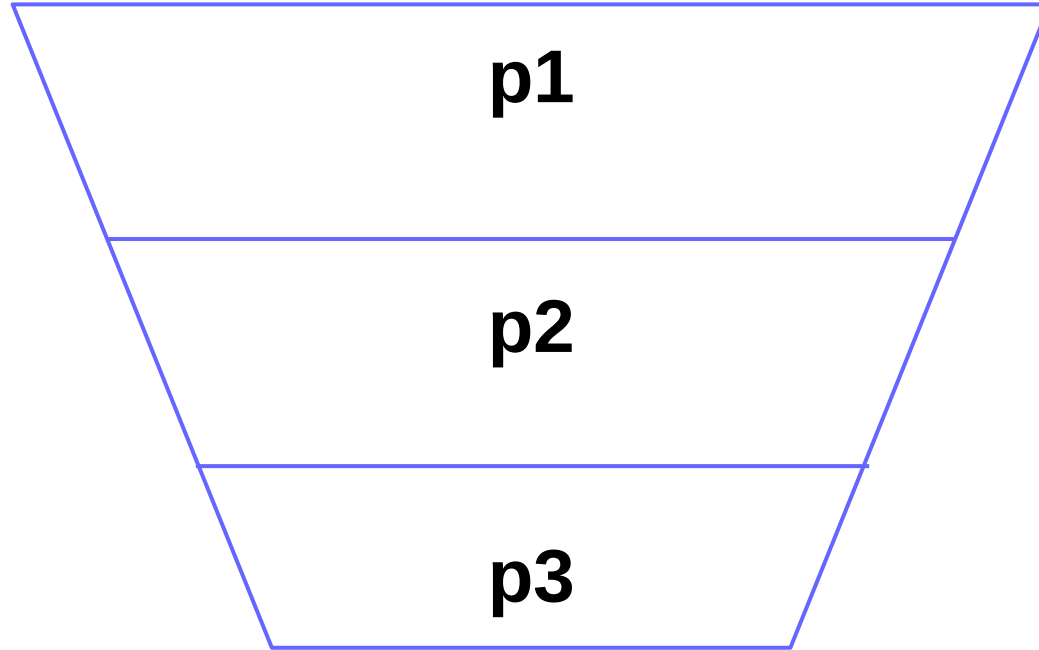objectives, scope and limitations,
Methodology,
related works

6
abstract

4
Introduction

1,3
Problem statement /
Motivation / Importance /
scope and limitations

5
Methodology, time table,
tools, equipments

2
Related works / literature
review

Introduction

Introduction

p1

p2

p3

p1: the introduction begins with broad focus. You should attract the attention and the interest of the reader.

p2: between B1 and B2 background information and previous works are connected here together to logically connect previous work with the problem that you address in your project

p3: the introduction ends with exactly one point (the result of the project). Usually it is a statement of purpose / aim of the work.

Introduction Example

Computers are used nowadays every where in our life. They are used in many applications such as business, medicine, education, and so many other domains. (p1)

PDF documents are widely used as a standard electronic document format because it preserve the formatting. PDF utilities are handy tools that help end users to process their documents, in addition, it is widely used. (p1)

There are many pdf utilities available in the app store such as tools that convert documents into pdf format, and tools that combines pdf files. (p2)

The application XX provides functionality to convert files from various formats (doc, ppt, xls, jpg) into pdf format. (p2)

The application YY provides functionality to combine pdf documents into one file. (p2)

However, these tools does not provide functionality to manipulate the order of pages of a given pdf document. (p2)

The aim of this project is to develop a desktop application that provides functionality to manipulate the order of pages in a pdf document. We call this application as "pdf shuffler". (p3)

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Another introduction Example

The synthesis of flexible polymer blends from polylactide and rubber

Introduction.

Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits. PLA is a polymer obtained from corn and is produced by the polymerisation of lactide. It has many possible uses in the biomedical field and has also been investigated as a potential engineering material. However, it has been found to be too weak under impact to be used commercially.

One way to toughen polymers is to incorporate a layer of rubber particles and there has been extensive research regarding the rubber modification of PLA. For example, Penney et al. showed that PLA composites could be prepared using blending techniques and more recently, Hillier established the toughness of such composites. However, although the effect of the rubber particles on the mechanical properties of copolymer systems was demonstrated over two years ago, little attention has been paid to the selection of an appropriate rubber component.

The present paper presents a set of criteria for selecting such a component. On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydrocarbon rubber (PI). This combination of two mechanistically distinct polymerisations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.

The synthesis of flexible polymer blends from polylactide and rubber

Introduction

1 Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits. 2 PLA is a polymer obtained from corn and is produced by the polymerisation of lactide. 3 It has many possible uses in the biomedical field and has also been investigated as a potential engineering material. 4 However, it has been found to be too weak under impact to be used commercially.

5 One way to toughen polymers is to incorporate a layer of rubber particles and there has been extensive research regarding the rubber modification of PLA. 6 For example, Penney et al. showed that PLA composites could be prepared using blending techniques and more recently, Hillier established the toughness of such composites. 7 However, although the effect of the rubber particles on the mechanical properties of copolymer systems was demonstrated over two years ago, little attention has been paid to the selection of an appropriate rubber component.

8 The present paper presents a set of criteria for selecting such a component. 9 On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydrocarbon rubber (PI). 10 This combination of two mechanistically distinct polymerisations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.

1. the writer establishes the <u>importance of this research topic</u>
2. the writer provides <u>general background information</u>
3. the writer does the same as in S1 and S2 but in a <u>more specific/detailed way</u>
4. the writer <u>describes general problem area</u> or current research focus of the field
5. the writer provides <u>a transition between general problem area and literature review</u>
6. the writer provides a brief overview of key research projects in this area
7. the writer describes a <u>gap</u> in the research
8. the writer <u>describes the work itself</u>
9. the writer gives details about the <u>methodology</u> reported in the project
10. the writer announces the <u>findings</u>

An example of an Introduction to a Research Report

The synthesis of flexible polymer blends from polylactide and rubber

Writer establishes importance of this research topic

Present simple: to state truths and facts

Polylactide (PLA) has received much attention in recent years due to its biodegradable properties, which offer important economic benefits. PLA is a polymer obtained from corn and is produced by the polymerization of lactide. It has many possible uses in the biomedical field and it has been investigated as a potential engineering material. However, it has been found to be too weak under impact to be used commercially.

Present perfect tense: to indicate relevance

Brief overview of key research projects in this area

One way to toughen polymers is to incorporate a layer of rubber particles and extensive research has been done into the rubber modification of PLA. For example, Penney et al. (2006) showed that PLA composites could be prepared using blending techniques. More recently, Hillier established the toughness of such composites. However, although researchers have demonstrated the effect of the rubber particles on the mechanical properties of copolymer systems over two years ago, little attention has been paid to the selection of an appropriate rubber component.

A gap in the research

Present simple: to describe this work

Description of current paper

The present paper presents a set of criteria for selecting such a component. On the basis of these criteria it then describes the preparation of a set of polymer blends using PLA and a hydro-carbon rubber (PI). This combination of two mechanistically distinct polymerizations formed a novel copolymer in which the incorporation of PI significantly increased flexibility.

Writing is impersonal

Introduction FAQs

- Q: How many pages should I write in the introduction?
- A: There is no concrete answer. It depends.

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- State of the art / literature review / related works
- Bibliography (References)

Statement of the problem

Statement of the problem

- The **heart** of the project is the problem
- It is important to **articulate** <u>an acceptable problem</u>
- It should be **well written** and <u>clearly stated</u>

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Objectives

Objectives

- Think about how you are going to **achieve** the solution to your project problem, think in terms of **sub-goals** (**objectives**) that will lead you towards the solution of the problem.

- By fulfilling each of the objectives you should reach the solution.

- Each objective is a **small, achievable** and assessable unit, i.e. a sub-goal of the project.

- Objectives should be formulated in such a way that fulfilling the objectives leads to the overall aim being satisfied.

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Importance of the project

- What is the application / impact of your project?

- What practical value does the project have?

- What good is the project?

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Scope and limitations of the project

- Delimit the research
  - What you intend to do and do not intend to do

- State the assumptions
  - Offer a clear statement of all assumptions upon which the project will rest

- Define the terms
  - Give the meaning of all terms in the problem and subproblems that have any possibility of being misunderstood.

Scope vs Limitation

- The difference between scope and limitation is
  - The scope is the breadth, depth or reach of a subject; a domain.
  - The App/Film targets children aged 8-12 years old.
  - Limitation
    - The act of limiting or the state of being limited.
    - A restriction; a boundary, real or metaphorical, caused by some thing or some circumstance.
    - The bounds, are influences that you cannot control. They are the shortcomings, conditions.
    - Example: The app requires high speed Internet connection but we have 2G network!

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Methodology
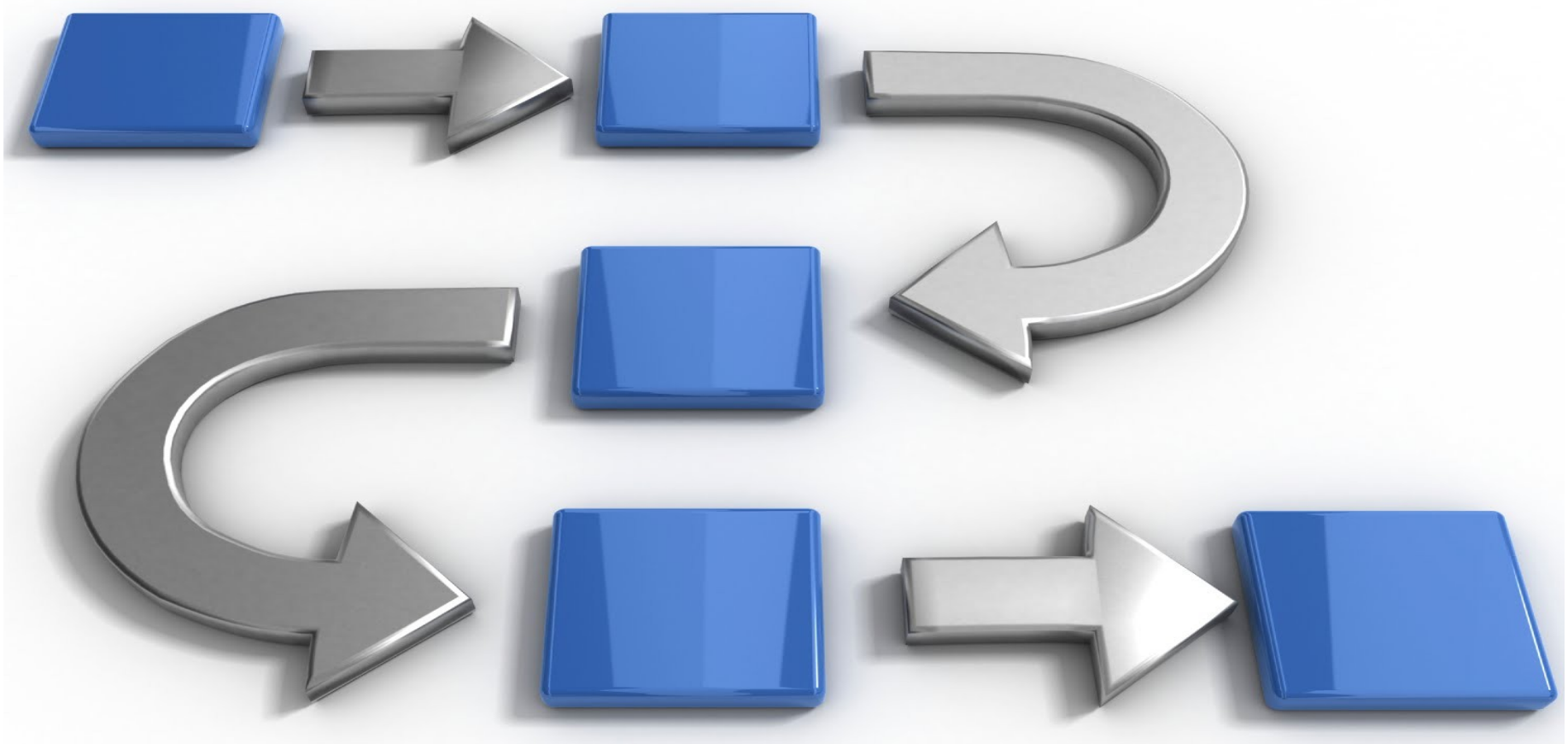
Methodology

- State how you will carry out your project. Could be the following:

  - How will you collect your data?

  - Will you carry out interviews or questionnaires, What measurements will you make?

  - What software methodology will you use? What programming methodology will you use?

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Tools and equipments

Tools, equipment and methods

- Software tools, packages, APIs, software libraries, special environments, frameworks, etc. that are necessary to carry out the project.

- Any special equipment, devices, hardware, etc. need for the project.

- Any existing method such as software methods, algorithms, approaches that are needed in the project.

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Time table
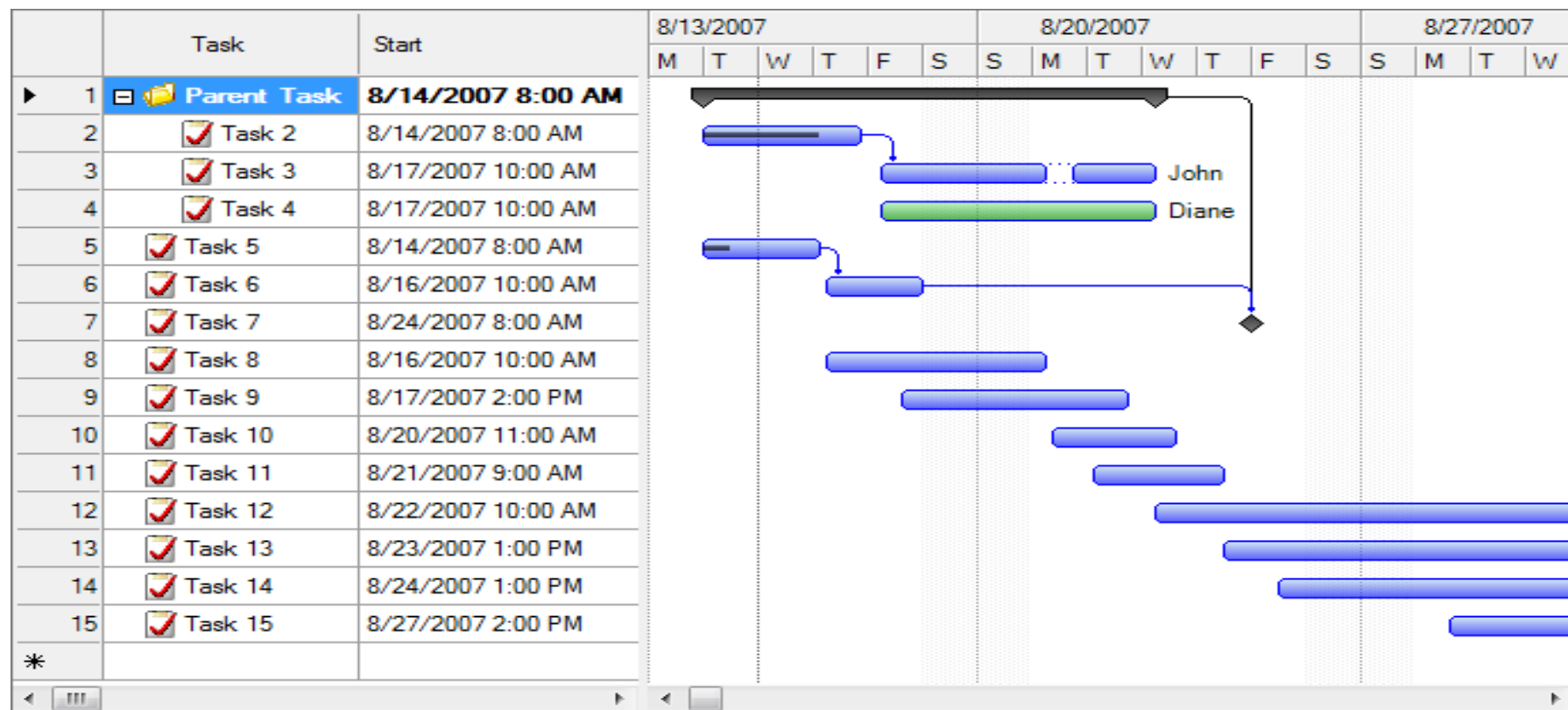
Time Table

- Project **breakdown**: Decompose your project into tasks, define the dependency between tasks and estimate the required time for each task.
  - Dates for submission of drafts, final versions.
  - Dates for completion of phases or objectives
  - ….
- The **difficult part** with developing a time plan is to **accurately estimate** the time required for each activity. Thus, it is important that you **continuously update** your

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Related words
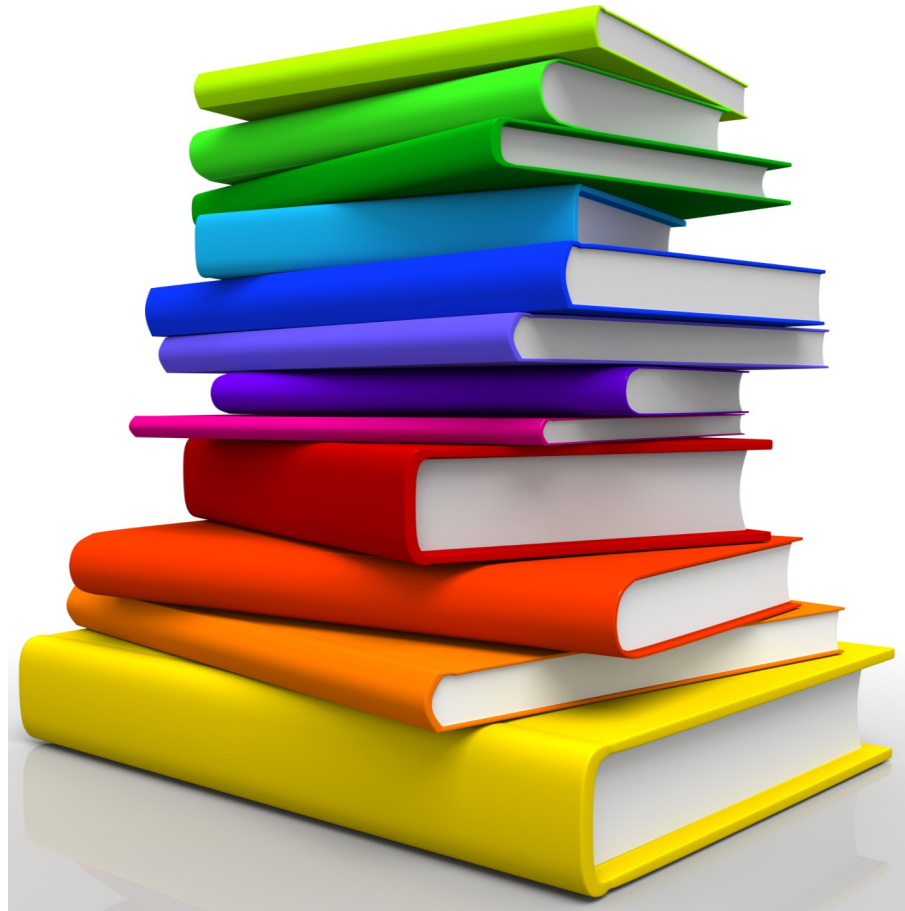
State of the art / literature review / related works

- Find works **similar to your works** and review them.
- **Positioning** your work in the context of other people's work in the area.
- To **reveal sources of data** not known to you
- To **attack** the problem
- To see your work in **historical and field perspective**
- To **provide** you with **new ideas** and **approaches**
- **Review the work do not reproduce it.**

State of the art / literature review / related works

- **You should show how your work is different from other similar works.**
  - Main differences could be
    - In the problem
    - Same problem but different approach / methodology
    - In the deliverables

Review related works

- Visit the library

- Use online resources

- Be selective

- Keep up to date (continuous review)

How to select the literature

- Read the **title** and decide if it is pertinent or not.

- If not, read the **abstract** and decide whether to read the entire article or not.

- If not clear, read some parts of the article to decide if it is pertinent or not.

Related works FAQs

- Q: How many related work should I review?

- A: there is no concrete answer. You should continue to review literature until you feel that you reviewed all related works

- Q: How many details should I cover in the review?

- A: The project idea, the functionalities, the methodology, the result / impact. Each review should not exceeds one half page.

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Bibliography (References)

- A reference is a description that identifies an **information source**.
- Example: citing a journal article written by K. Anderson:
  - Anderson, K. (2008). The Untold Story of Computer Science. International Journal of Computer Science, 2(1), 23–35.1
- Citation is import because you:
  - Show how your work extends the current state-of-the-art knowledge
  - Show the originality of your work
  - Give credit to other people's work (and thereby avoid being accused of plagiarism)
  - Support and validate arguments made in your report
  - Show that you are familiar with the work done in the area
- References cab be:
  - **Books, previous student projects**, journals, conference and workshop proceedings, theses, **magazines, Web pages, newspapers**, and other documents such as manuals, etc.
- You should follow a citation style: (Chicago, MLA, ASC, ….).
  - You can use on-line tools such as www.easybib.com

Writing

- Write simple English
- Make your the structure is correct (SVO)
- Use spell checker
- Make good transition between paragraphs
- Make the reader enjoy reading
- Please read what your write before submitting
- Good writing style can not be taught, but rather requires a lot of practice

Style

- Write in the "we" rather than "I" form, and use the present tense (e.g. "We calculate the premiums under those assumptions").

- **Avoid** direct **quotes** unless absolutely essential. Instead, you should **paraphrase** what others have said, but still **reference** them.

- Avoid "n't" and "it's" as they are examples of how we talk, but not how we write in formal terms – e.g. write "cannot" and "it is" in full.

- Use simple present tense in the proposal. You can only use past tens when you review for the related works.

Formatting

- It is recommended to use automatic formatting

- Do not forget the captions for tables and figures.

- Do not forget to refer to tables and figures in the text.

- Always introduce a figure/table in the text before it appears (i.e. leave no surprises for the reader).

End of slides