COS700

Lecture 4: Research proposal, Research Question

Research

- What is research?
  - A systematic investigation to discover facts
  - Want to gain new knowledge
- What is *not* research:
  - A software development project
  - Writing a text book

Research Proposal

Typical Structure

Prefix:

- Page 1: Cover page with essential information
- Page 2: Title repeated with abstract and keywords

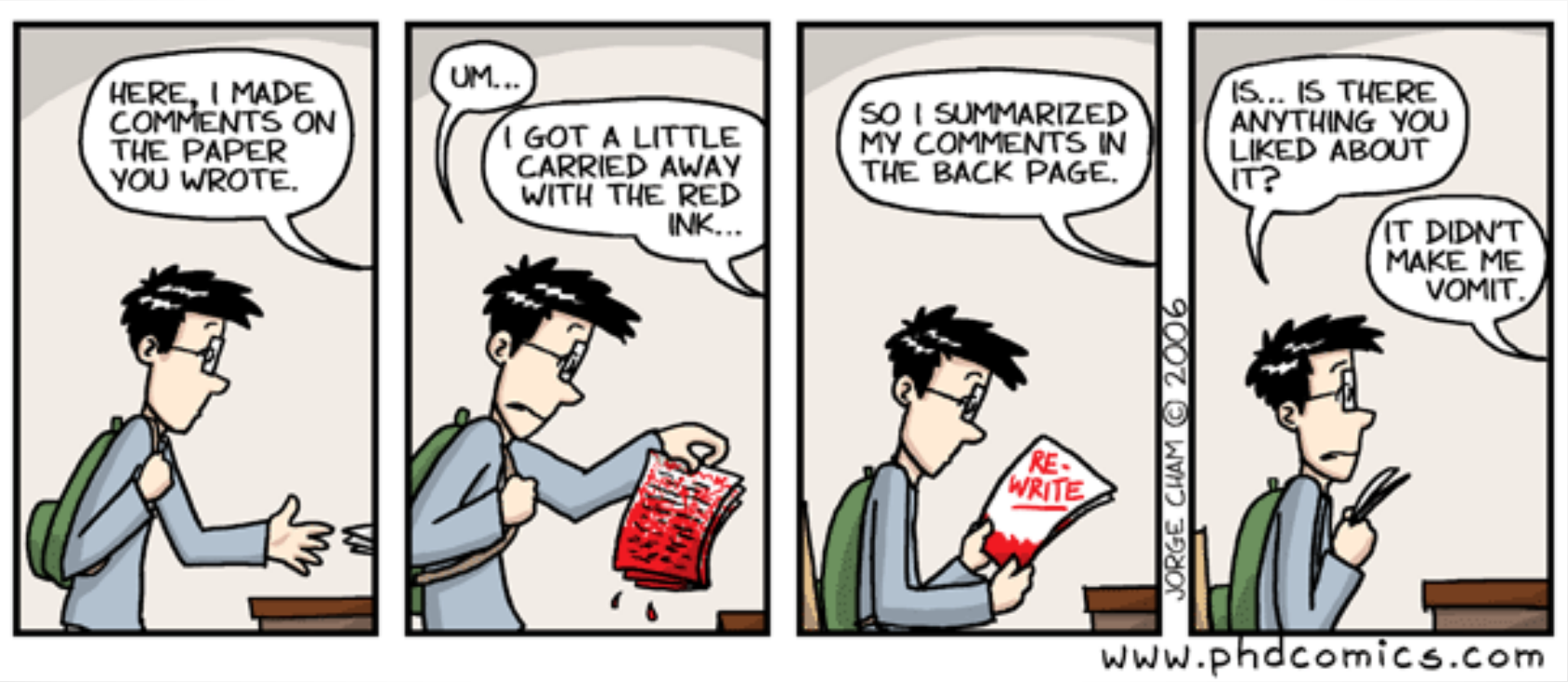
Proposal:

1. Introduction
2. Problem statement
3. Literature survey
4. Methodology
5. Planning
6. References

Slight deviations fine, but basic elements must be there

Research Topic

- Each of you must have a topic and a supervisor by now



Research Topic

The research topic:

- Subject of the research project
- A good topic is focussed:
  1. Within a discipline, there is an area of interest
  2. Within the area of interest, you will be concentrating on one aspect
  3. Within aspect that you focus your topic

1. Field / Discipline
Computer Science

2. Area of interest
Computational Intelligence

3. Concentration
Optimization

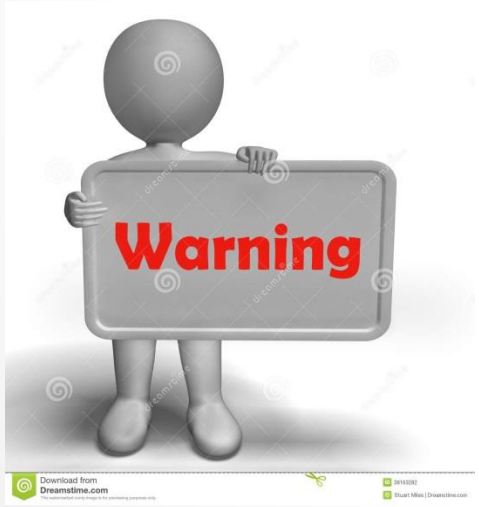
4. Focus
Multi-objective optimization

THE TOPIC
Multi-objective optimization using Computational Intelligence algorithms

Research Topic

Take note:

Research topic is NOT your research question!



1. **Field / Discipline**
   Computer Science

2. **Area of interest**
   Computational Intelligence

3. **Concentration**
   Optimization

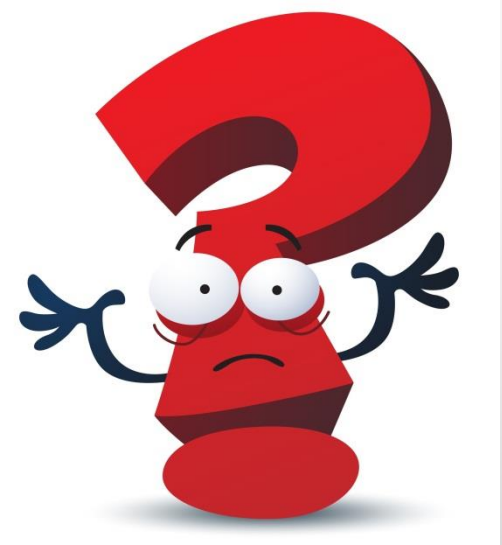
4. **Focus**
   Multi-objective optimization

THE TOPIC

Multi-objective optimization using Computational Intelligence algorithms

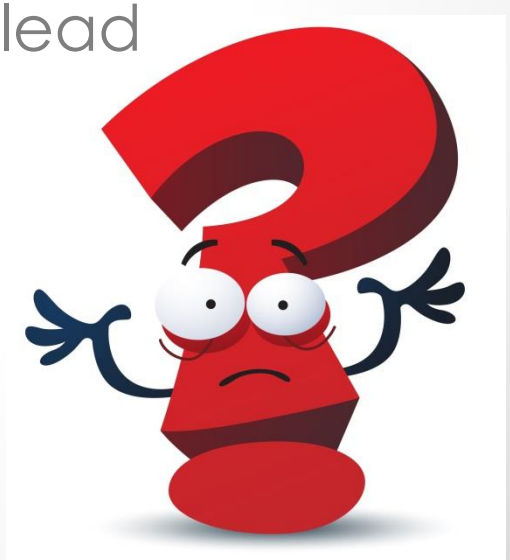
Research Question

- Plays an important role in research
- Places the focus on essential aspects that the research study will address
- Influences the choice of a particular research approach or method
- Assists with the analysis of data that was collected in the study



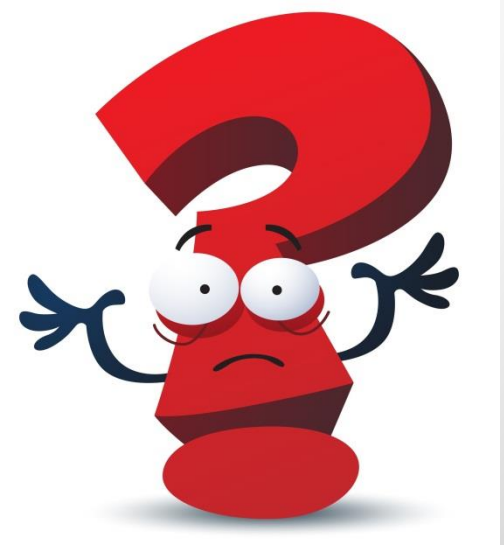
Research Question

- Identify first area of interest (your topic)
- Research question gives an indication of what you are going to investigate
- Typically will divide research question into other sub-questions
- The sub-questions should be simpler
- Answering the sub-questions should lead to answering the original (primary) research question



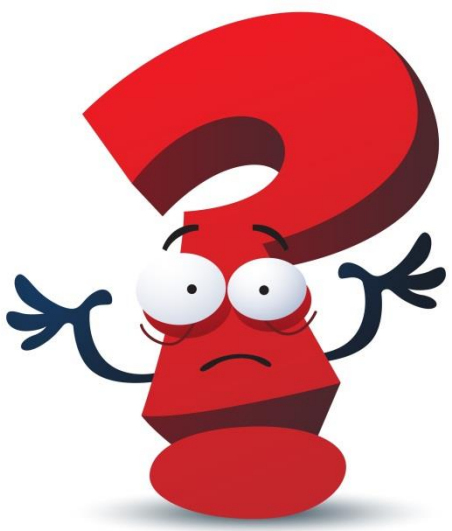
Research Question

Can you define your research question and sub-question(s) for your project topic?



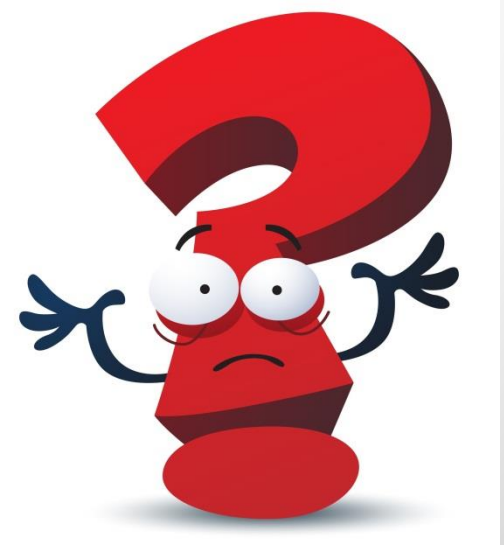
Introduction

How will you approach writing the introduction?



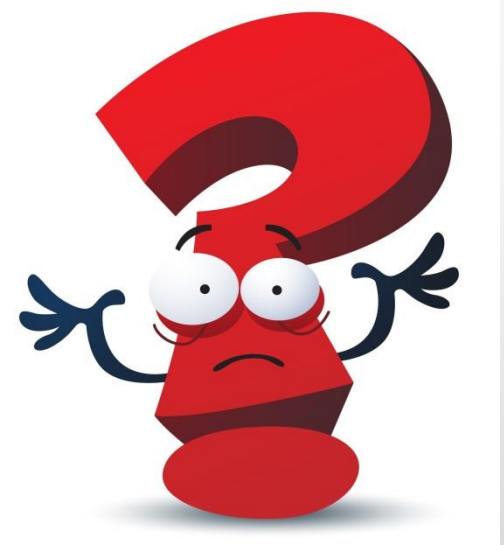
Keywords

How will you define keywords for your project topic?



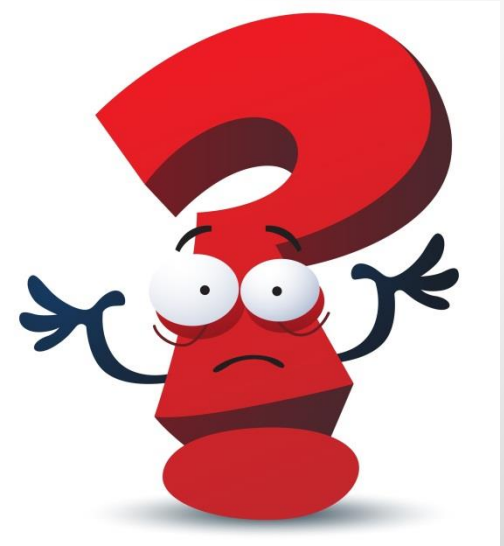
Literature Study

How will you use your keywords for your literature study?



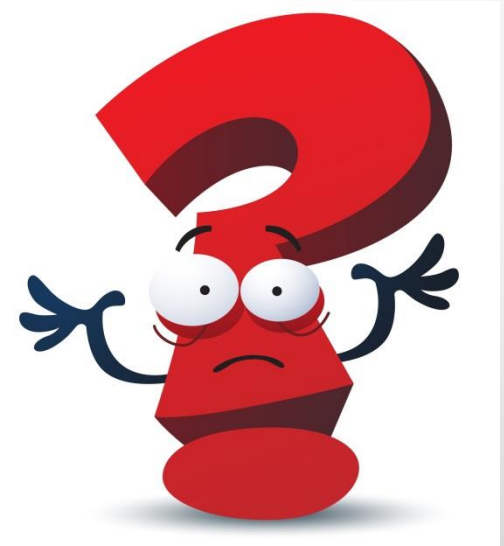
Project Plan

How will you define tasks and deadlines for your project?



Abstract

How will you approach writing the abstract?



References for Lecture 3

- "Constructing a Good Dissertation", Erik Hofstee, 2011, EPE Publishers
- "Information Technology Research: A practical guide for Computer Science and Informatics", Martin S. Olivier, 2nd edition, 2004, Van Schaik
- "Research Methods in Computing: What are they, and how should we teach them?", H.J. Holz, A. Applin, B. Haberman, D. Joyce, H. Purchase, C. Reed, ITiCSE 2006, Bologna, Italy
- Adapted slides of Dr Katherine Malan