Compilers Laboratory

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# Research Skills

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# The Five Research Skills

Drawings taken from https://www.facebook.com/AfterSchoolWarriorsOfficial/

# Evaluating – The Ranger

Evaluators are explorers: they set the research questions, they determine the experiments to answer these questions, they lay out the research plan, and, once the means are available, they produce data, analyze results and draw conclusions

- Research questions
- Long term goals
- Data analysis

- Benchmarking
- Analyzing
- Scripting

# Reading – The Druid

Readers know the literature. They avoid doing repeated work. They know where to dig to find out what has already been done. They know the information necessary to build cogent arguments. And, they know the champions in the field.

- The literature
- The fundamentals
- The PC

- Finding
- Understanding
- Synthesizing

# Implementing – The Wizard

Implementers build all the infrastructure necessary to evaluate hypotheses. Stuff they make works just like magic. They know the intricacies of the trade. They know what can be done, and know how to explain that something is impossible to do.

- Languages
- Algorithms
- Theory

- Programming
- Versioning
- Documenting

# Presenting – The Bard

Presenters are in charge of "selling the paper". They know how to build cogent arguments out of the results of experiments and the related literature. They are masters in organizing difficult concepts, and explaining ideas to everyone

- Cogent arguments
- Examples & figures
- Definitions & proofs

- Plotting
- Drawing
- Talking

# Writing – The Warrior

Writers are the warrior of the research world. No matter how good are the ideas and their evaluation - in the end, it is the paper that is judged. Warriors do the competitive work. It is their skills that will determine if a paper is accepted

- Style
- Grammar
- Organization

- Organizing
- Editing
- Revising

# The Essence of Empirical Computer Science

- Posit a hypothesis and design an experiment

- Check what has been done before

- Engineer a concrete implementation

- Conduct the experimental evaluation

- Write a report describing the findings

- Present the results

# The paper

- Abstract
- Introduction
- Overview
- Solution
- Evaluation
- Related Work
- Conclusion










# Is this really true?

- Which experiment can I perform to show that it is true?

- Who has already demonstrated that it is true?

# Research for people

- Section
- Paragraph
- Sentence

- Definition
- Example
- Theorem

# Languages

- English
- Portuguese
- Latex

- Java
- C
- C++
- Matlab

- Bash
- Python
- R

# Who has the skills I need to publish my work?

# How can I be a better researcher?


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