How to present your Experimental Results?

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How to do experiments?

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Implementation Platform

- Fix one platform for implementation
  - All experiments should be performed in the SAME platform
    - Otherwise, you need to explicit mention which were performed in which platform and WHY???
- Describe your platform in your Thesis
  - Machine: OS, CPU, RAM, …
  - Language: C/C++/Java/VHDL/Verilog/SystemC (versions)
  - Tools: Compiler, Synthesizer, Profiler, Linter, …
  - Libraries: Graphics, GUI, …

Implementation Details

- Use only standard language versions: ISO C/C++, etc.
- Use the latest up-to-date functions
  - Don't use obsolete functions: gets(), …
- Ensure compatibility across machines
  - Windows, Linux, FreeBSD, …
- Measure the following
  - CPU Time Usages, Memory Usages (getresources)
- Parameterize everything!!!
  - Don't use "constants" in your program statements! Use #define or variables.

Implementation Details

- Perform error checking!!!
  - Input files, wrong data input, enough memory, buffer overflow, …
- Variable naming
  - Variable names should be consistent with that in your Thesis!!!
- Last but not the least: /* COMMENTS */
  - Add comments to your code wherever possible, especially in all the data structure definitions in header files
  - Use English, (preferably no Chinese!)
- One more please!!!
  - Makefile: that would save a lot of efforts!!!

Examples

- Toy Example
  - To illustrate the important steps/concepts in your method, algorithm, architecture, design, implementation
  - Run it both manually and using your programs!
- Large Real-World Examples
  - To illustrate how your method, algorithm, architecture, design scales to complex and large examples in the real-world
- Random Examples
  - To illustrate how your method, algorithm, architecture, design handles future systems
  - To show the statistics!!!

How to analyze your results?

- Goals
  - To show the advantages of your method
    - Novelty, time/space efficiency, scalability, simplicity, robustness, adaptivity, …
  - To discover the limitations in your method
    - Functional: Cannot do something …
    - Non-functional: Poor in doing something …
  - To compare your method with other existing methods
    - A naïve method
    - The most similar method(s)
    - Other methods

How to analyze your results?

- The Expected
  - Do you see what you expected?
    - Yes: Congratulations! You got what you wanted.
    - No: Find the cause!
      - Found: Congratulations! You got what you wanted.
      - Not found: Well, …
        - Was your expectation correct?
        - Was your design and implementation correct?
- The Unexpected
  - Do you see something unexpected?
    - No: Mmmm….
    - Yes: Explore further, may be you found something worth investigating!

How to analyze your results?

- Try to be as thorough as possible!
  - Don't leave out any cases!!! (How many cases are there?)
    - Example: 6 features ➔ at least 6 different sets of experiments!
  - Don't take the results for granted!!! (Think! Think! Think!)
- Be in the shoes of the authors with whom you are comparing!
  - Would you like to be criticized or deemed inferior without solid evidences? No!!!

How to present your results?

- Use different formats
  - Tables
    - For toy example and illustration
  - Graphs
    - For statistics and scalability
- Use tools such as spreadsheets and graph plotters
  - MS Excel (to collect your results)
  - Matlab (to co-relate your results)
  - Gnuplot (to plot your results)

Conclusions

- The way you do and the way you present your experimental results have a great impact on what the readers conclude about your work
- Be confident about your advantages
- Be humble about your limitations
- Be sure about your future work