How to Write a Good Paper: Some suggestions

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On Writing Well

But if a man legislates on his own, and puts it down in writing, he should revise it a thousand times, if possible.

Maimonides
Crisis and Leadership (circa 1165)

There are those who think that clarity, because it is difficult and rare, should be suspect. The rejection of this view has been the deepest impulse in all my philosophical work.

Bertrand Russell

On Refereeing versus Writing

Perhaps the human brain is so constructed that man was ingenious at seeing others' faults and naive and blind as a child about his own.

Isaac Bashevis Singer
Meshugah (1994)

Writing Well: Motivation

- Intellectual challenge

- Good for your career

- Too many "write only" papers

- No education provided

Some General Tips

- **Abstract**

  - Brief: pure facts

- **Introduction**

  - Motivation: for a non-specialist
  - Previous work
  - Obtained results

  Tip: write it at the end

- **Preliminaries**

  - Optional

- **Sections**
  - of comparable length
  - concentrated around a problem/notion
- **Related work**
  - Discuss the work of your referees!
- **Bibliography**
  - don't dump your BibTeX file!

A Unit

- Definition

- Definition

- Lemma

- Lemma

- Theorem

- Corollary

Organization of a Unit

- Introduce
  Definition
  Give intuition, perhaps an example

- Definition

- Introduce or motivate
  Lemma

- Introduce or motivate
  Lemma
  idem; Summarize if possible

- Theorem
  Say why interesting

- Corollary
  Say why useful; Discuss applications

Definitions

- Decide which ones should go to Preliminaries

- Various choices are possible

- Backtracking may be needed

- Names count

- Attention span problem: reminders ("Recall from Section 2 that . . .")

Organization of Proofs

- Isolate notions used

- Put them in definitions

- Prove Lemma's about these notions

- Choose proper notation

- Split too long proofs into lemmata

Organization of a Single Proof

- Local definitions welcome

- Number only those local conclusions that are needed later

- The proof should flow

- Try to give an intuition
  ("The idea is to ...")

- Summarize restrictions
  ("Note that the restriction to ... was crucial")

Typical Errors

- No motivation

- Ad hoc notation

- Inconsistent notation
  (for $i = 1 \dots n$ versus for $1 \leq i \leq n$)

- Badly organized proofs

- Direction of the paper unclear

- Definitions and Lemma's unexplained

- Routine proofs given

Single, Biggest Problem: Combine rigour with clarity

Some Very Well-written Papers

- J.A. Robinson, *A machine-oriented logic based on the resolution principle*, 1965

- E.W.D. Dijkstra, *Cooperating sequential processes*, 1968

- D. S. Scott, *Data Types as Lattices*, 1976

- C.A.R. Hoare, *Communicating Sequential Processes*, 1978

Some Useful Books

- Marie-Claire van Leunen, *A Handbook for Scholars*, 1978

- D. Knuth, T. Larrabee, P.M. Robberts, *Mathematical Writing*, 1989