

# FOUNDATIONS OF COMPUTING P/T

## TUTORIAL 1

### SOME OF THE IDEAS BEHIND COMPUTING

#### Questions

1. “\*The matter/form distinction provides a philosophical basis for modern notions such as symbolic computing and data abstraction. In computing (even with numbers) we are manipulating patterns that are the forms of electromagnetic material, with the changes of form of this material representing aspects of the solution process. Abstracting the form from the medium of its representation not only allows these forms to be manipulated computationally, but also provides the promise of a theory of data structures, the heart of modern computer science\*”

Explain this section in your own words.

2. How could Aristotle’s discussion of logic be applied to computing?
3. How useful to computing is the mathematical analysis of processes?
4. Make a simple table of your own following Bacon’s algorithm to determine a small collection of everyday objects.
5. Why was it useful to have ‘exponents reduced to addition and subtraction’?
6. How important is the metaphor of the computer as a human thought process in this extract?
7. The last paragraph of the extract talks about Leibniz’s conception of a calculating machine that produces logically correct conclusions. How far does that cover the range of computing activity in use today? Leibniz’s dreamed of a machine which automated logic for proofs of propositions. How far have we achieved his vision today, and what might be the limitations of such a fully automated logic? How far have we gone along the road of producing automated scientific knowledge, ‘a calculus for reasoning’?

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