What’s a Paradigm?

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par•a•digm \'păr-ə-'dīm, -'dĭm\ *noun*

Etymology: Middle English, example, from Late Latin *paradīgma*, from Greek *paradeigma*, from *paradeiknunai*, to compare: *para-*, alongside; see *para* + *deiknunai*, to show

Date: 15th century

1: One that serves as a pattern or model.

2: A set or list of all the inflectional forms of a word or of one of its grammatical categories.

3: A set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline.

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3: A set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline.

- This usage, attributed to Thomas Kuhn in *The Structure of Scientific Revolutions* (~1962), is what we're interested in in CS370

What's a Computational Paradigm?

- A particular view/philosophy/standard of what it means to perform a computation
- There are many computational paradigms
- Why study multiple computational paradigms?
  - Using a particular paradigm may lead to "better" solutions or "keener" insights to certain problems
  - Knowing only a limited number of paradigms limits your vision and your reasoning
  - It's always good to know your alternatives

The Wharf-Sapir Hypothesis

Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. It is quite an illusion to imagine that one adjusts to reality essentially without the use of language and that language is merely an incidental means of solving specific problems of communication or reflection. The fact of the matter is that the "real world" is to a large extent unconsciously built up on the language habits of the group ... We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation. --- *Edward Sapir*

With Apologies to Wharf & Sapir

Computer scientists and computer professionals do not work in the objective world alone, nor alone in the world of academic and technical activity as ordinarily understood, but are very much at the mercy of the particular paradigm which has become the medium of expression for their group. It is quite an illusion to imagine that one works without the use of a paradigm and that a paradigm is merely a means of solving specific problems. The fact of the matter is that the academic and technical worlds are to a large extent unconsciously built up on the paradigmatic habits of groups. We reflect and design and program very largely as we do because the paradigmatic habits of our group predispose certain choices of interpretation.

In Other Words

- “When all you have is a hammer, everything begins to look like a nail.”

  (folk saying)

In Other Words

- “When all you have is a hammer, everything begins to look like a nail.”

  (folk saying)
- “When your hammer is Python/Java, everything begins to look like a thumb.”

  (paraphrased from Steve Hoflich, as posted in the newsgroup comp.lang.c++ circa 1994)

Programming Languages & Computational Paradigms

- A programming language is not a computational paradigm
- Rather, we can discuss how well (and how poorly) a given programming language supports a given computational paradigm
- While most programming languages were designed with an eye towards a specific paradigm, you can work with most paradigms in most programming languages