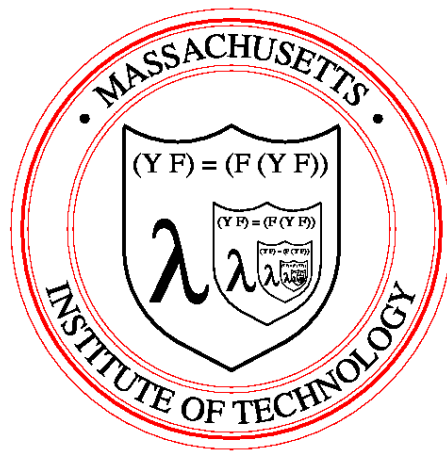# Adventures in
Advanced Symbolic Programming

Officially: Large-scale Symbolic Systems

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with Manushaqe Muco

Spring 2022: U:6.905, G:6.945

Goal: How to make **robust** systems: systems that are

- **general**: have acceptable behavior over a much larger class of situations than was anticipated by their designers.

- **evolvable**: can be easily adapted to new jobs with only minor modification.

This kind of robustness is the

holy grail

of engineering design.

Content

We study concepts and techniques for the design and implementation of large systems that can be adapted to uses not anticipated by the designer.

We learn ways to

- decouple goals from strategy
- implement additive data-directed invocation
- work with partially-specified entities
- manage multiple viewpoints

We consider engineering tradeoffs:
flexibility vs efficiency, correctness, security

6.945 is
for People who LOVE to Program!

Software Design for Fexibility (Chris Hanson and Gerald Jay Sussman) will serve as the basic textbook for the class. https://mitpress.mit.edu/books/software-design-flexibility

Structure and Interpretation of Computer Programs (Abelson & Sussman with Sussman) will provide some background. https://mitpress.mit.edu/books/structure-and-interpretation-computer-programs-second-edition

There will also be readings from relevant papers and articles. Substantial weekly programming assignments and a final project are an integral part of the subject.

We will use Scheme, a dialect of Lisp.

All software will be free (libre) and sharable. No proprietary software will be required for this class and all software created in this class will be free software.

Prerequisites: 6.034 (or comparable programming experience. For example, if you did well in 6.009 that would count as adequate experience.)