Assignments Due

- **Now**: Problem Set 1 (both on-line submission and paper)
- **Wednesday, 7 September** (in class): **Quiz 1**: covers Chapters 1-4 of course book, Chapters 1-3 of *The Information*, Classes 1-5 (including questions)
- **Wednesday, 14 September**: **Problem Set 2** (partner assignments will be posted by tomorrow, but you do not need to wait until then to get started)

Upcoming Help Schedule (all office hours are now in Rice Hall)

- Today: noon-1:30pm (Kristina, Rice 1st), 1-2pm (Dave, Rice 507)
- Tuesday: 11am-noon (Dave, Rice 507); 5-8pm (Valerie/Jonathan, Rice 1st)

Recap: Procedures Practice

Define a procedure, `middle`, that takes three numbers as inputs, and outputs the number that is in the middle.

Define a procedure, `find-fixedpoint`, that takes as input a function and an initial value, and outputs the fixed point of the function starting from that value. A fixed point of a function \( f \) is a value \( x \) such that \( (f x) \) evaluates to \( x \).

Given two procedures that implement the same function, how should one decide which is better?

Programming with Data

Is it better to solve problems by thinking about what we need to *do* to solve the problem (*procedures*) or by thinking about what we need to represent to solve the problem (*data*)?
A Pair packages two data values together. The built-in procedures for manipulating Pairs include:

- **cons**: Value x Value → Pair
  Outputs a Pair containing the two input values in its cells.
- **car**: Pair → Value
  Outputs the first cell of the input Pair.
- **cdr**: Pair → Value
  Outputs the second cell of the input Pair.

What does \((\text{car} \ (\text{cons} \ x \ y))\) evaluate to?

What does \((\text{cdr} \ (\text{cons} \ x \ y))\) evaluate to?

What is the value of \((\text{car} \ (\text{cdr} \ (\text{cons} \ 1 \ (\text{cons} \ 2 \ (\text{cons} \ 3 \ null)))))))\)?

Could we define **cons**, **car**, and **cdr** ourselves if Scheme did not have them as primitives?