PS 2

Due: Mon, Feb 2

I recommend that you look at problem 2 early (this is related to the lecture for Jan 26 and associated notes). Problems 5-10 are associated with the reading for Wednesday, Jan 28; I recommend you look at (though not necessarily attempt) the problems *before* reading the relevant book sections, and ideally before Wednesday's lecture. You will find some of the problems are nearly solved – or very similar problems are solved – in the chapter text.

1: By the book Book section 4.6, problems 5–10

2: Recognizing rank Consider the MATLAB fragment

```
function [y] = ps2mult(x)
  n = length(x);
  A = reshape(1:n^2, n, n);
  y = A*x;
```

1. What is A for $n = 3$?
2. Show that A has rank two (independent of n).
3. Rewrite `ps2mult` so that it runs in $O(n)$ time.