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Proof Without Words: The Pigeonhole Principle
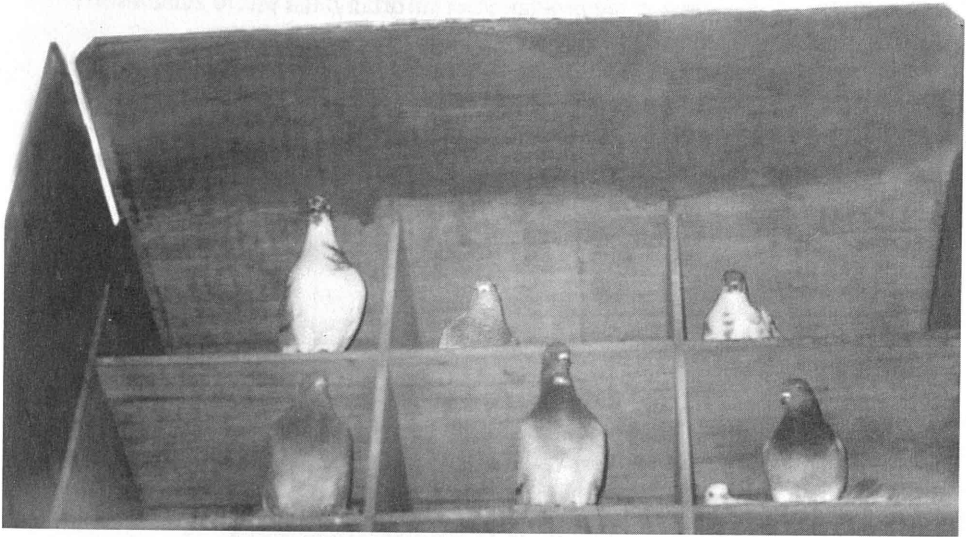
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Harvey Mudd College

Recommended Citation

Proof Without Words:
The Pigeonhole Principle

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Seven pigeons in six boxes

Letter to the Editor

Dear Editor:

The article by Dresden in the October 2001 issue presents a solution to the problem of the periodicity of the sequence of rightmost nonzero digits of $n!$. This problem has appeared in several places. I first learned about it from *Crux Mathematicorum* **19** (1993), 260–261 and **20** (1994) 45, where is was presented as an unused Olympiad problem. A discussion of the problem that focuses on the issue of a fast algorithm to get, say, the rightmost nonzero digit of the factorial of a googol appears as Problem 90 in my book *Which Way Did the Bicycle Go?* (with D. Velleman and J. Konhauser, MAA, 1996). And in Exercise 4.40 of *Concrete Mathematics* by Graham, Knuth, and Patashnik (Addison-Wesley, 1989) one finds a formula (see also Problem 90.2 of my book) for this digit in base p, when p is prime.

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