

IN DISCRETE MATHEMATICS

Using Discrete Mathematics in the Classroom

Issue #5

November 1994

Speaking discretely...

by Deborah S. Franzblau

First, some news on the *Leadership Program in Discrete Mathematics*. Beginning next summer, we plan to introduce new programs for K-8 teachers, and to continue our in-service workshops. Please tell your colleagues, and circulate our flyer (p. 11) widely!

If you've ever tried scheduling final exams, or organizing a conference, you'll appreciate the focus in this issue on discrete scheduling problems. In the lead article (p. 1) and Minibliography (p. 10), Joseph Malkevitch discusses the mathematics of scheduling, and sketches the useful "Critical-Path" method for planning complex projects. L. Charles Biehl (p. 4) explains the use of graph coloring to resolve conflicts when scheduling meetings or exams. Kevin DeVizia (p. 2) describes a class project to find the best arrangement of songs on a cassette tape---which turns out to be equivalent to a well-known scheduling problem!

If you are looking for ideas to enliven the class around election time, you should look at the article by Michael Ecsedy (p. 5), showing how a method of voting influenced a real election, and the teaching brief by Sherida Hare (p. 4).

Diane Amelotte (p. 7), takes a fresh look at a familiar problem from algebra and calculus: that of creating a garden plot with minimum cost. She turns the problem into a Thanksgiving story suitable for students at many levels. William Bowdish (p. 3) shares his experience on bringing the concept of "fractal complexity" into an algebra class.

Is It on Time?

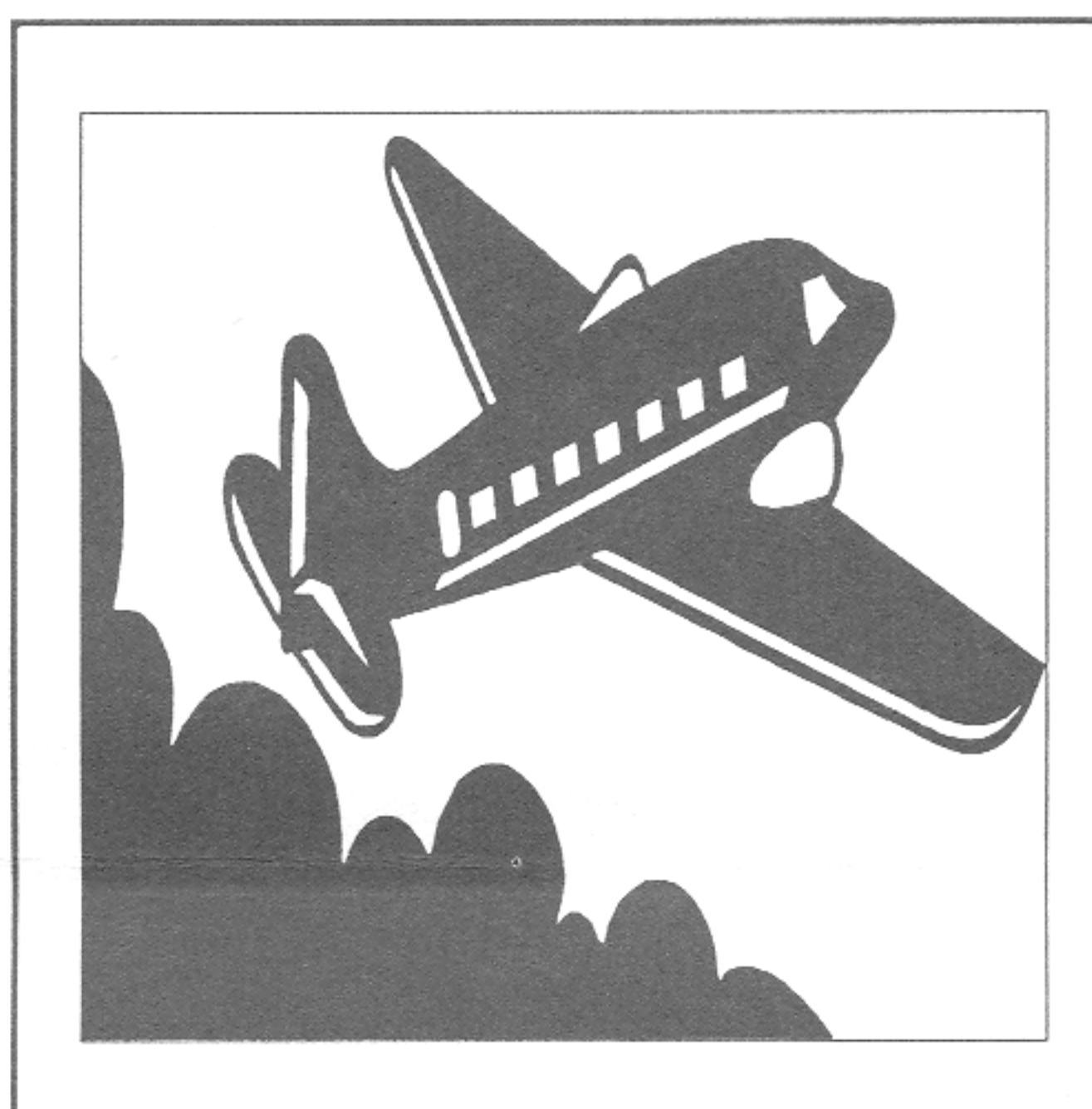
by Joseph Malkevitch

For many years Denver has been looking forward to the opening of a new international airport, which would not only expand operations, but would feature a state-of-the-art baggage system with unprecedentedly fast and accurate handling of baggage. Unfortunately, "there is often a slip twixt the cup and the lip..." After several postponements, the opening of the airport has once more been delayed: in the most recent test of the baggage handling system, pieces of baggage were not only ripped, cut in half, and tossed in the air, but they often arrived at places other than those intended [1].

Contrast this with what happened in Los Angeles after the recent earthquake. That earthquake knocked out of commission the largest and most heavily used freeways in the city, including the legendary Santa Monica Freeway, one of the highest-volume roads in the world. Yet despite predictions that the road would not be returned to service quickly, it was reopened earlier than scheduled, with people tripping over each other to receive credit [2].

Efficient scheduling is often critical in modern-day life. For example, if surgical operations at hospitals can be scheduled more efficiently, millions of dollars for the construction, maintenance and staffing of additional operating theaters can be avoided. If the production of new cars can be organized and carried out more efficiently, then the cost of cars can be cut and the United States can become more competitive with other car producers.

Scheduling used to be a trial-and-error procedure. Someone tried out a schedule and tinkered with it to see if it got better. If no improvement occurred, someone else would tinker in a different way. The advent of computers has vastly increased our ability to search for improved schedules. In addition, computers have created a



In This Issue

Articles

Is It On Time?.....	1
Scheduling and Graph Coloring.....	4
The Last Shall Be First.....	5

Teaching Briefs

A Musical Packing Problem.....	2
Finding the Fractal Complexity of a Coastline.....	3
An Election Followup Activity.....	4
Pre-Thanksgiving Project.....	7

(Continued on page 9)