

# 2010 CVMCMC Problems

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## Post Office

With the rise of the Internet and the ease of distant communication, the volume of mail sent through the US Post Office has dropped dramatically. The cost of sending regular First-Class mail has increased from 25 cents in 1988 to 44 cents in 2009, with plans to increase rates to 46 cents in 2011. Recently, the US Post Office proposed an end to Saturday mail delivery in an attempt to close a multi-billion dollar budget deficit.

What does the future hold in store for the US Post Office? Will the proposed changes resolve the budget issues? Model the revenue and costs of the Post Office over the next ten, twenty and fifty years. What additional changes, if any, should be implemented?

## Elevator

Elevators play an important role in the functionality of tall buildings.

A development company is preparing designs for a new skyscraper to be built in a large city. Plans call for the building to be 81 stories tall and to house retail stores, business offices, and private residences. While architects and engineers debate structural and aesthetic design issues, your team has been asked to create a plan for moving people up and down a building that has space allocated for exactly 40 elevator shafts. Floor-by-floor occupancy details are as follows:

### Building Details

Floor 81	Observation Deck
Floor 63-80	"High-end" Residential
Floor 61-62	Mechanical
Floor 43-60	Offices
Floor 41-42	Mechanical
Floor 23-40	Residential
Floor 21-22	Mechanical
Floor 7-20	Offices
Floor 1-6	Retail

**Retail floors** house common mall tenants, including shops, restaurants, etc.

**Residential floors** are composed of 10 condominiums per level in the upper levels and 20 on the lowers.

**Office floors** hold on average 80 people.

**Mechanical floors** are needed to house elevator and building equipment, but are not accessible to the general public.

By law, all levels are connected by stairs. Devise and analyze a transportation plan using a combination of escalators, local and express elevators, to efficiently move people throughout the building.