# Discrete Mathematics
# Drill-counting

Moshe Rosenfeld

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`moishe@u.washington.edu`

## 1 Drill

### 1.1 counting

1. List all bit strings of length 5 that do not contain 00 as a substring.

2. Six persons are standing in line to buy a ticket to a movie. A ticket costs $50,000$ VND. The cashier starts with no money. Some persons have $50,000$ VND and some have $100,000$ VND. If a person has $100,000$ VND and the cashier can not give change, that is he does not have a $50,000$ VND note, the line gets "stuck". In how many ways can we form a line of six persons that will not get stuck?

3. How many integers $< 5000$ are relatively prime to 15 and to 17?

4. Find the longest increasing subsequence and the longest decreasing subsequence in: $22, 6, 17, 5, 23, 10, 15, 21, 3, 19, 9, 20$.

5. Let Let $n$ be a three digit number satisfying:
   $n \bmod 3 = 2$, $n \bmod 5 = 4$, $n \bmod 7 = 0, n \bmod 11 = 5$. Find $n$