

*Introduction to Probability, Second Edition*

Fifthist

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# Preface

This book is an unofficial solution manual for the exercises in *Introduction to Probability, Second Edition* by Joseph Blitzstein and Jessica Hwang.



# Chapter 1

## Probability and Counting

### 1.1 Counting

#### 1.1.1

##### **Intuition**

There are 11 slots to put letters into. We have one  $M$ , four  $I$ , four  $S$ , and two  $P$ . Then, there are  $\binom{11}{1}$  ways to place the  $M$ ,  $\binom{10}{4}$  ways to place  $I$ ,  $\binom{6}{4}$  ways to place the  $S$ , and  $\binom{2}{2}$  ways to place the  $P$ .

##### **Solution**

$$\binom{11}{1} \times \binom{10}{4} \times \binom{6}{4} \times \binom{2}{2}$$

#### 1.1.2

##### (a) **Intuition**

If the first digit can't be 0 or 1, we are left with 8 choices for the first digit. The remaining six digits can be any digits.

##### (a) **Solution**

$$8 \times 10^6$$

##### (b) **Intuition**

We can subtract the number of seven digits phone numbers that start with 911 from the total number of phone numbers we found in the previous part.

If a phone number starts with 911, it has ten choices for each of the remaining four digits.

(b) **Solution**

$$8 \times 10^6 - 10^4$$

### 1.1.3

(a) **Intuition**

Fred has 10 choices for Monday, 9 choices for Tuesday, 8 choices for Wednesday, 7 choices for Thursday and 6 choices for Friday.

(a) **Solution**

$$10 \times 9 \times 8 \times 7 \times 6$$

(b) **Intuition**

For the first restaurant, Fred has 10 choices. For all subsequent days, Fred has 9 choices, since he doesn't want to eat at the restaurant he ate at the previous day.

(b) **Solution**

$$10 \times 9^4$$