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 by 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) **Intution**

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

(b) **Solution**

$$10 \times 9^4$$