# Problem Solving: Listener/Solver

## CS 70: Fall 2024

# 1 The Polya Method for Problem Solving

1. **Understand the Problem.**

   Ex: $\mathbb{P}[\text{two heads} \mid \geq 1 \text{ head}]$ in three tosses of a fair coin!

2. **Devise a Plan.**

   Ex: The sample space, assign probabilities (coin is fair), look at events.

3. **Carry out the plan.**

   Ex: Sample space is $TTT, \ldots, HHH$, $\mathbb{P}[A \mid B]$, $B$ has 7 outcomes, $A$ has 3. Answer is $\frac{3}{7}$.

4. **Look Back.**

   Ex: Can use definition of conditional probability. $\mathbb{P}[B] = \frac{7}{8}$.

   Ex: Non-uniform probability space?

## 1.1 Solver

1. Prepare: comfortable position, pencil, paper, etc.

2. Read problem aloud, hints, suggestions, discuss with partner.

3. Solve on own. You speak, you solve, partner listens.

4. Speak! No need to choose words.

5. Go back over problem; "I'm stuck. I better start over."

   "No that won't work", "Let's see...hmmm"

## 1.2 Listener

1. Role:

   (a) keep the PS talking but don't interrupt.

   (b) make sure that PS follows the strategy and doesn't skip any of the steps.

   (c) help PS improve his/her accuracy.

   (d) help reflect the mental process PS is following.

   (e) make sure you understand each step.

2. Do not let PS continue if:

   (a) You don't understand. "I don't understand" or "I don't follow that."

   (b) When there is a mistake. "Maybe check that", "Does that sound right"

3. No hints! Point out errors, but no correction.