(1)

I want Chinese food.

$$P(i \mid <s>) \times P(want \mid i) \times$$

$$P(Chinese \mid want) \times P(food \mid Chinese)$$

$$\times P(<s> \mid food)$$

$$= 0.19 \times 0.33 \times 0.0065 \times 0.52 \times 0.4$$

$$= 8.5 \times 10^{-5}$$

# Laplace Smoothing -

(2) Unsmoothed higher, because smoothed version gives unseen data some probabilities

(3)

$$P(\text{Sam}|\text{am}) = \frac{C(\text{am}, \text{Sam}) + 1}{C(\text{am}) + V}$$

$$= \frac{2 + 1}{3 + 11}$$

$$= \frac{3}{14} = 0.214$$

$$P(w_3 \mid w_1, w_2)$$

$$= \frac{C(w_1, w_2, w_3) + 1}{C(w_1, w_2) + V}$$

$$P(w_3 \mid$$