

Where we are:

- ▶ Functions on lists; powersets (Monday)
- ▶ Application: A language processor (**Today**)
- ▶ Propositional forms, logical equivalence [Start Chapter 3] (Friday)

Today:

- ▶ Finishing up powersets
- ▶ Case expressions and option types
- ▶ Big example: A language processor
- ▶ Introducing the semester project

Note that

- ▶ $a \in A$ iff $\{a\} \in \mathcal{P}(A)$
- ▶ $A \subseteq B$ iff $A \in \mathcal{P}(B)$
- ▶ $A \subseteq B$ iff $\mathcal{P}(A) \subseteq \mathcal{P}(B)$
- ▶ $\mathcal{P}(\emptyset) = \{\emptyset\} \neq \emptyset$

Observe

$$\begin{aligned}\mathcal{P}(\{1, 2, 3\}) &= \{ \emptyset \\ &\quad \{1\}, \{2\}, \{3\} \\ &\quad \{1, 2\}, \{1, 3\}, \{2, 3\} \\ &\quad \{1, 2, 3\} \} \\ &= \{ \{1\}, \{1, 2\}, \{1, 3\}, \{1, 2, 3\} \\ &\quad \emptyset, \{2\}, \{3\}, \{2, 3\} \} \\ &= \mathcal{P}(\{2, 3\}) \cup \left[\begin{array}{l} \text{1 added to each set} \\ \text{of } \mathcal{P}(\{2, 3\}) \end{array} \right] = \mathcal{P}(\{2, 3\}) \cup \\ &\quad \{ \{1\} \cup X \mid X \in \mathcal{P}(\{2, 3\}) \}\end{aligned}$$

If $a \in A$, then $\mathcal{P}(A) = \mathcal{P}(A - \{a\}) \cup \{ \{a\} \cup X \mid X \in \mathcal{P}(A - \{a\}) \}$

What is $|\mathcal{P}(X)|$ in terms of $|X|$?

Grammar:

Sentence → *NounPhrase Predicate PrepPhrase_{opt}*

NounPhrase → *Article Adjective_{opt} Noun*

Predicate → *Adverb_{opt} VerbPhrase*

Grammar, continued:

VerbPhrase → { *TransitiveVerb NounPhrase*
IntransitiveVerb
LinkingVerb Adjective

PrepPhrase → *Preposition NounPhrase*

Vocabulary:

Articles: a the

Adjectives: big bright fast beautiful smart red smelly

Nouns: man woman dog unicorn ball field flea tree

Adverbs: quickly slowly happily dreamily

Transitive verbs: chased saw greeted bit loved

Intransitive verbs: ran slept sang

Linking verbs: was felt seemed

Prepositions: in on through with

For next time:

Pg 82: 2.4.(8-12, 14 & 15)

Extra credit: *Pg 91: 2.B*

Note that “projects” in the book are labeled as chapter-letter, as in “2.B.” Find starter code on Schoology, and also pay attention to the assignment notes. See also the code from class for “starter code.”

Read 3.(1-4)