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

\[ \mathcal{P}({1, 2, 3}) = \{ \emptyset, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\} \} \]

\[= \mathcal{P}({2, 3}) \cup \{ \{1\} \cup X \mid X \in \mathcal{P}({2, 3}) \} \]

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:

\[
\begin{align*}
\text{Sentence} & \rightarrow \text{NounPhrase} \text{ Predicate} \text{ PrepPhrase}_{opt} \\
\text{NounPhrase} & \rightarrow \text{Article} \text{ Adjective}_{opt} \text{ Noun} \\
\text{Predicate} & \rightarrow \text{Adverb}_{opt} \text{ VerbPhrase}
\end{align*}
\]
Grammar, continued:

VerbPhrase $\rightarrow$ \{ TransitiveVerb NounPhrase \}

IntransitiveVerb

LinkingVerb Adjective

PrepPhrase $\rightarrow$ 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)