

CSE 20 Discussion

Week 1

TA

Yuanjun “Dastin” Huang

Logistics

- What is Discussion Session about?
- Have a question regarding homework/etc.?
- Today's agenda

Review of First 2 Lectures

Notations & Definitions

- Set
 - $\{\}$
 - Order/repetition doesn't matter
- n-tuple
 - $()$
 - Fixed length
 - Order/repetition matters!
- String
 - Order/repetition matters!
 - Arbitrary finite length
- Set Definition
 - Roster method
 - Set builder notation
 - Recursive definition
- Cartesian Product
 - $A \times B = \{(a, b) : a \in A, b \in B\}$
 - Creates set of tuples
- Set-wise Concatenation
 - $A \circ B = \{ab \mid a \in A \text{ and } b \in B\}$
 - Creates set of strings

Set

- Property
 - $\{\}$
 - Empty set denoted as ϕ
 - Order/repetition doesn't matter
- 3 Ways to define a set
 - Roster method
 - Set builder notation
 - Recursive definition
- Example
 - The set which contains all natural number from 1 to 5
 - The set which contains all even number from 1 to 5

n-tuple

- Property

- ()

- Order/repetition does matter

- Example

- (1, 1) (1)

- {1, 1} {1}

- (1, 2) (2, 1)

- {1, 2} {2, 1}

Cartesian Product

- Property

- $A \times B = \{(a, b) : a \in A, b \in B\}$

- Creates set of tuples

- Example

- $A = \{0,1\}, B = \{2,3\}$

- $A \times B =$

- Question: A and B both have 2 elements, how many tuples are there in $A \times B$?

- $A = \{0,1\}, B = \{0,1\}$

- $A \times B =$

Set-wise Concatenation

Definition: Let A and B be sets of strings over the same alphabet. The **set-wise concatenation** of A and B , denoted $A \circ B$, is the set of all results of string concatenation ab where $a \in A$ and $b \in B$

$$A \circ B = \{ab \mid a \in A \text{ and } b \in B\}$$

- String
 - Order/repetition matters!
 - Arbitrary finite length
 - Empty string denoted as λ
- Example
 - Alphabet = $\{x, y\}$
 - $A = \{x\}, B = \{y\}$
 - $A \circ B = ?$
 - 1st step: specify $\{a \mid a \in A\}, \{b \mid b \in B\}$
 - 2nd step: write down $A \circ B$ according to definition