Lecture 11: More Sets and Maps

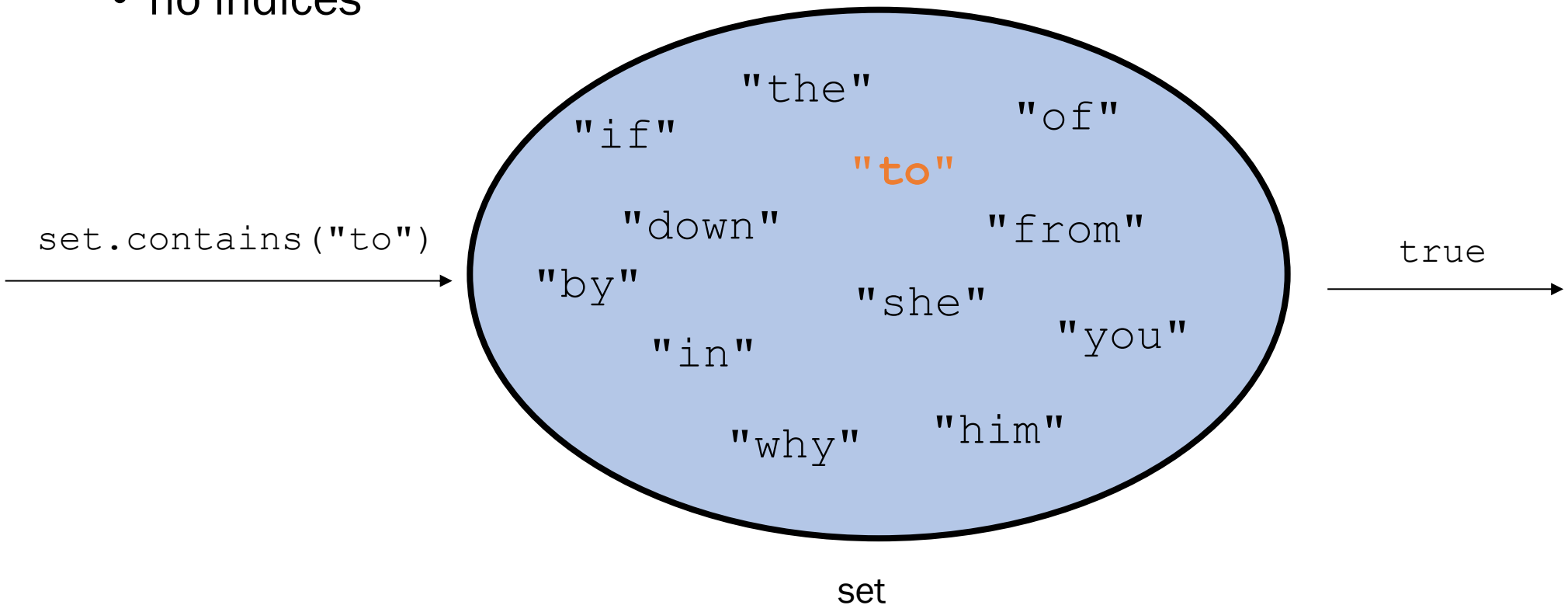
07/18/22

Reminders

- A2 Resubmission due Wednesday 7/20 @ 11:59pm
- Optional review session – Today @ 1:10pm in GUG 220 (here)
- Seat assignments posted on Exams page
- Midterm in lecture on Friday!

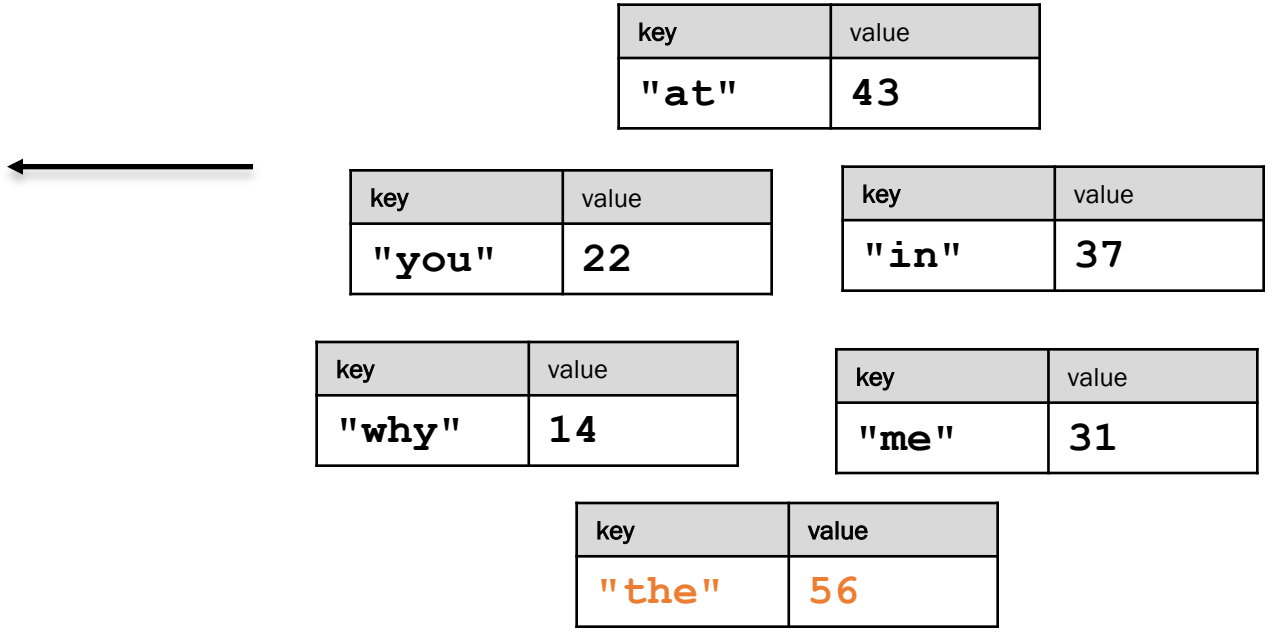
Set ADT

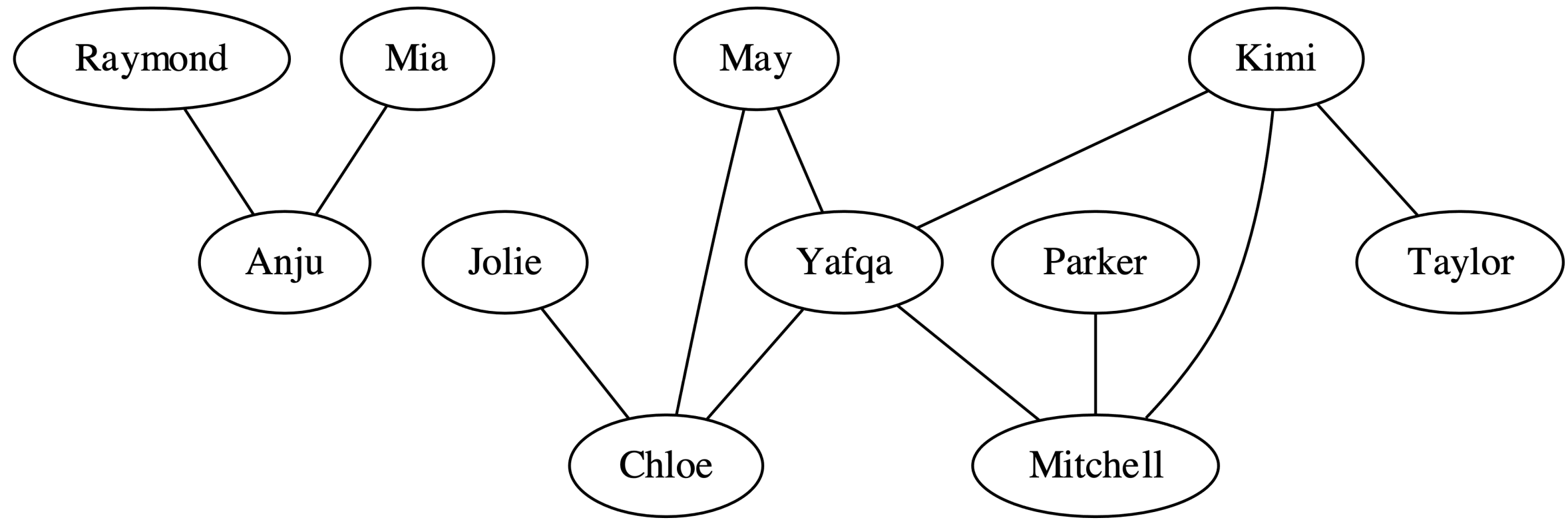
- **set**: A collection of unique values (no duplicates allowed)
  - add, remove, contains
  - no indices



Map ADT

- **map**: Holds a set of key-value pairs, where each key is unique
  - a.k.a. "dictionary"
- basic map operations:
  - **put**(*key*, *value*): Adds a mapping from a key to a value.
  - **get**(*key*): Retrieves the value mapped to the key.
  - **remove**(*key*): Removes the given key and its mapped value.




Raymond
Mia
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Kimi
Anju
Jolie
Yafqa
Parker
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Chloe
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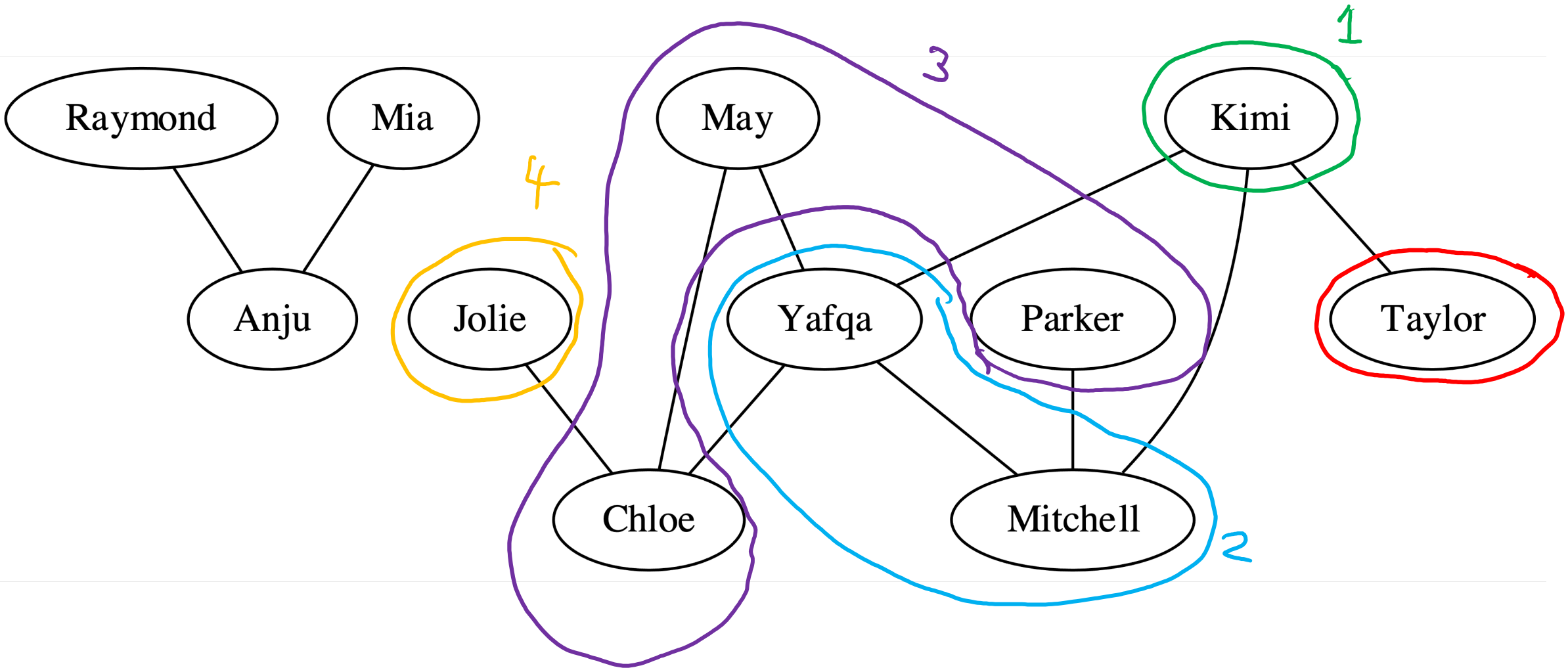
Raymond
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Anju
Jolie
May
Chloe
Yafqa
Parker
Mitchell
Kimi
Taylor
1
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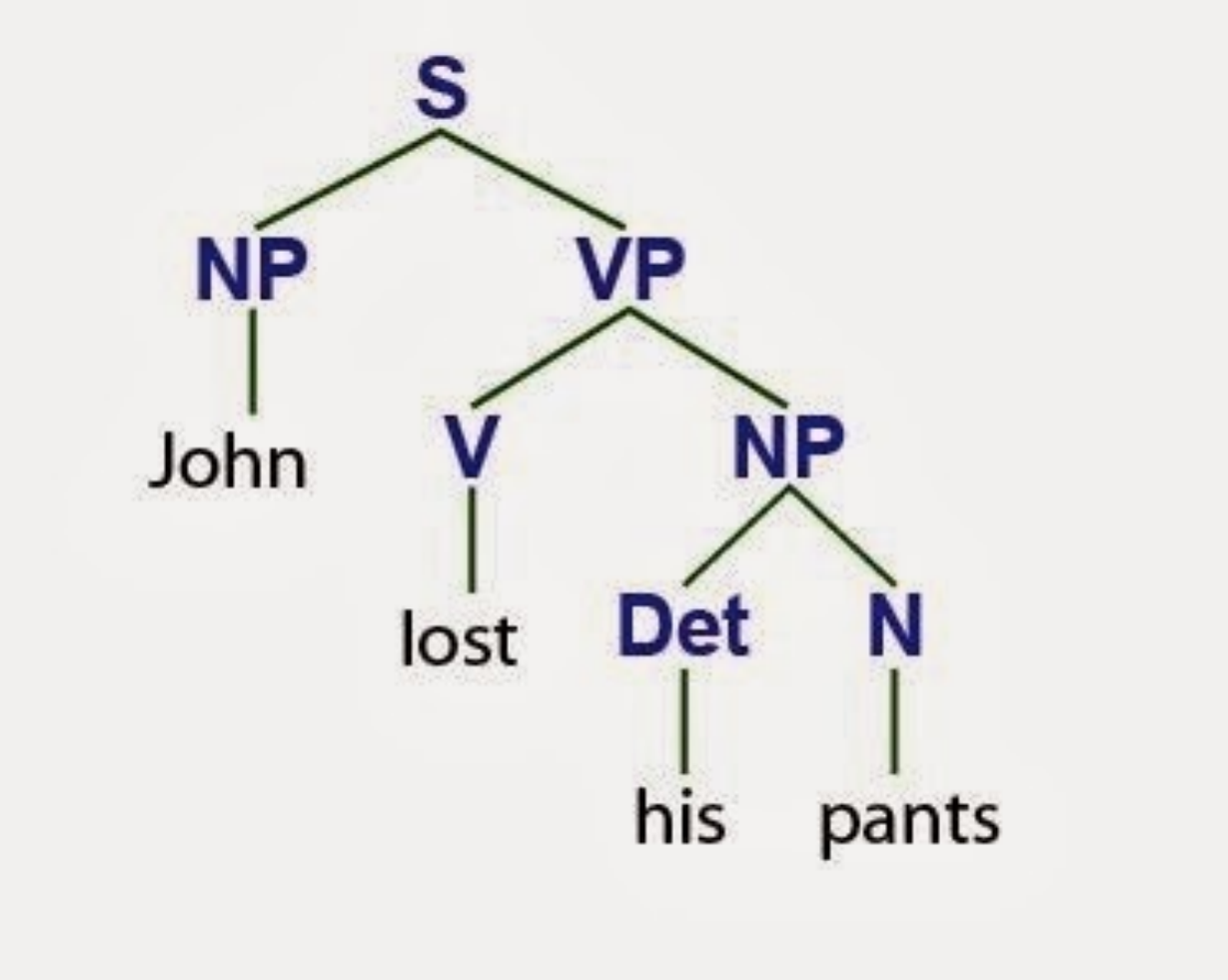
Which of these options will add the friendship to the map?

```
// Option A
if (!friendNetwork.containsKey(name1)) {
    ...
} else {
    Set<String> friendGroup = friendNetwork.get(name1);
    friendGroup.add(name2);
    friendNetwork.put(name1, friendGroup);
}
```

```
// Option B
if (!friendNetwork.containsKey(name1)) {
    ...
} else {
    Set<String> friendGroup = friendNetwork.get(name1);
    friendNetwork.put(name1, friendGroup);
    friendGroup.add(name2);
}
```

```
// Option C
if (!friendNetwork.containsKey(name1)) {
    ...
} else {
    Set<String> friendGroup = friendNetwork.get(name1);
    friendGroup.add(name2);
}
```

Grammars



Languages and Grammars

- (formal) **language**: A set of words or symbols.

- **grammar**: A description of a language that describes which sequences of symbols are allowed in that language.
  - describes language *syntax* (rules) but not *semantics* (meaning)
  - can be used to generate strings from a language, or to determine whether a given string belongs to a given language

Backus-Naur Form (BNF)

- **Backus-Naur Form (BNF)**: A syntax for describing language grammars in terms of transformation *rule*s, of the form:

  <symbol> : := <expression> | <expression> ... | <expression>

  - **terminal**: A fundamental symbol of the language.
  - **non-terminal**: A high-level symbol describing language syntax, which can be transformed into other non-terminal or terminal symbol(s) based on the rules of the grammar.

  - developed by two Turing-award-winning computer scientists in 1960 to describe their new ALGOL programming language