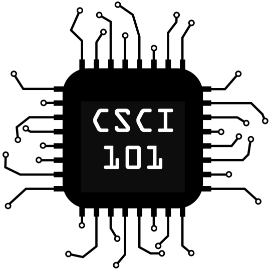
Sets



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Sets are like lists in that they are a container for multiple objects, however, they are **unordered** and cannot contain multiple copies of the same object. We can specify set literals in Python using squirly braces.

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We can check if an item exists in a set using the `in` operator.

- What will `"cheese" in my_set` evaluate to?
- What will `42 in my_set` evaluate to?

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```python
food = set()        # this creates an empty set
while True:
    line = input('Give a tasty food, blank to end: ')
    if line == '':
        break       # exits the while loop
    food.add(line)
print('You think', len(food), 'foods are tasty')
```

Note: Code is on website for easy copy-paste.

Investigate: What types of data can a set store?

Sets may only store **hashable** data types.

Try to answer each of the following questions by attempting to create an example in the interactive interpreter and seeing if you get an error.

1. Can a set contain floating point numbers?
2. Can a set contain booleans?
3. Can a set contain lists?
4. Can a list contain sets?
5. Can a set contain sets?

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- You should choose a list if you have data in which **order matters**, and **you can have multiple copies of items in the structure**.

There are certainly plenty of exceptions to the rules presented above, however, for the scope of this class, you should be fine following these rules.

Set Operations

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- `a | b` is the **set union** of `a` and `b`. This is the set of elements that either `a` or `b` or both has.

Set Operations Example

```
a = {1, 2, 3, 4}
b = {3, 4, 5, 6}
diff1 = a - b   # {1, 2}
diff2 = b - a   # {5, 6}
diff3 = a - a   # empty set
inter = a & b   # {3, 4}
union = a | b   # {1, 2, 3, 4, 5, 6}
```

Practice: Set Operations

Suppose you have three children, all of them very picky eaters.

- Charlie says he won't eat fish or broccoli.
- Alice says she will only eat pasta, hot dogs, or fish.
- Mary says she won't eat pasta or salad.

Define the Python sets `charlie_wont`, `alice_will`, and `mary_wont`. See which of the following operations will compute what you can have for dinner tonight (`{"hot dogs"}`):

- `alice_will - charlie_wont - mary_wont`
- `alice_will - (charlie_wont & mary_wont)`
- `alice_will - charlie_wont | mary_wont`
- `alice_will - (charlie_wont | mary_wont)`

Lastly, see if you can come up with more of your own statements which compute what you can have for dinner tonight.