# Sets

# Another New Data Type: Sets

- Our familiar data types:
  - **int**eger: 1, 13, 42
  - **float**ing point: 3.1415, 0.25, 7502.34
  - **str**ing: “a”, “abc”, “Fred”, “Now is the time\n”
  - **list**: [1, 2, 3],  [“Fred”, “John”, “Mary”, “Sue”]
  - **tuple**: (1,2,3), (“Fred”, “John”, “Mary”, “Sue”)
  - **dictionary**: {“Fred”: 3, “Judy”: 6, “Elaine”: 9, “Mark”: 2}
- Another data-type
  - **set**: {“Fred”, ”Judy”, “Elaine”, “Mark”}

# Set Properties

- **Set: object that stores a collection of data in same way as mathematical set**
  - All items must be unique
  - Set is unordered
  - Elements can be of different data types

# Creating Sets

- Create empty set

```
mySet = set()
```

- mySet = {<item1>, <item2>, <item3>, …}

- Or can use set() function with any sequence

```
mySet = set(<list>)            #duplicate items are discarded
mySet = set(<tuple>)
mySet = set(<string>)
mySet = set(<dictionary>)  #gives keys only
```

# Working with Sets

- ***in*** tests if item is in a set
  - e.g., “John” ***in*** mySet     #True if “John” is in set
  - ***not in*** tests if item is not in set
- No way to index into sets
  - No need; just need to know if items in or not
- Get number of items:
  - len(<set name>)

# Sets are Mutable (via methods)

- **<set name>.<method>()**
- add(<item>): adds item (unless duplicate)
- update(<sequence>): adds items
- remove(<item>): deletes item
- discard(<item>): deletes item (no KeyError)
- pop(): returns random item and deletes it
  - Note: not ***popitem()*** (which is for dictionaries)
- clear(): empties set

# Looping through Set

```
for <item> in <set>:
    <do something with item>
```

Only 1 way to use ***while*** loop with set

```
while len(s) > 0:
   item = s.pop()
   <do something with item>
```

# Combining Sets

- set1 | set2:  union
  - Or set1.union(set2)
- set1 & set2:  intersection
  - Or set1.intersection(set2)

# Comparing Sets

- set1 > set2: superset?
- set1 >= set2: equal or superset?
  - Or set1.issuperset(set2)
- set1 < set2: subset?
- set1 <= set2: equal or subset?
  - Or set1.issubset(set2)