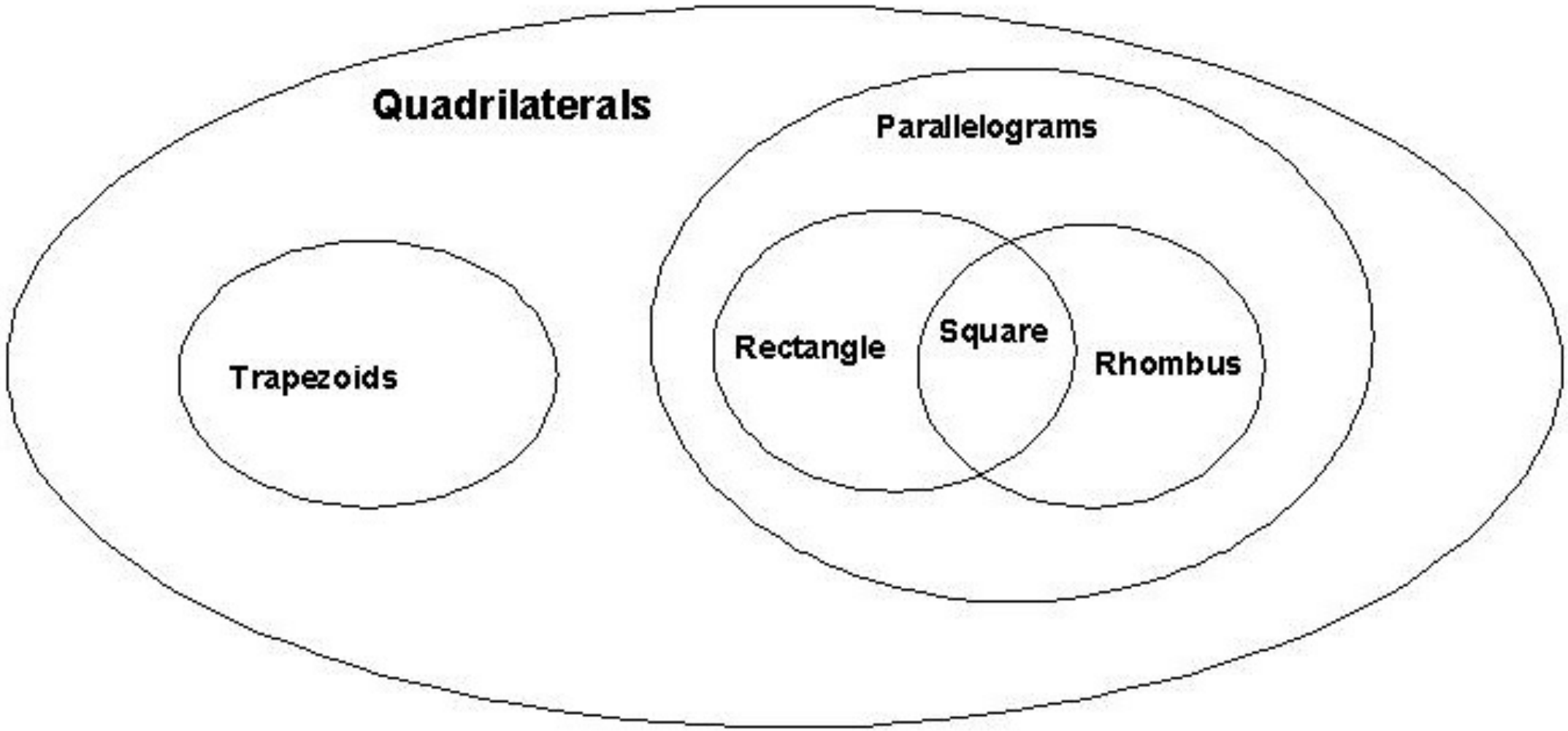
Lesson 15

Set . 2048

Sets and Venn Diagram



Set Operators

Set operator	Set A = {1,2,3} Set B = {3,4,5,6}		
membership	`1 in A`	True	*True if 1 is a member of set*
add	`A.add(4)`	{1,2,3,4}	*Adds new member to set*
remove	`A.remove(2)`	{1,3}	*Removes member from set*
union	`A | B`	{1,2,3,4,5,6}	*Set of elements in either set A or set B*
intersection	`A & B`	{3}	*Set of elements in both set A and set B*
difference	`A - B`	{1,2}	*Set of elements in set A, but not set B*
symmetric difference	`A ^ B`	{1,2,4,5,6}	*Set of elements in set A or set B, but not both*
size	`len(A)`	3	*Number of elements in set (general sequence operation)*

Creating a set

To define an initially empty set, or to initialize a set to the values of a particular sequence, the `set` constructor is used,

```
>>> set1 = set()
>>> len(set1)
0
```

```
>>> vegs = ['peas', 'corn']
>>> set(vegs)
{'corn', 'peas'}
```

```
>>>vowels = 'aeiou'
>>> set(vowels)
{'a', 'i', 'e', 'u', 'o'}
```

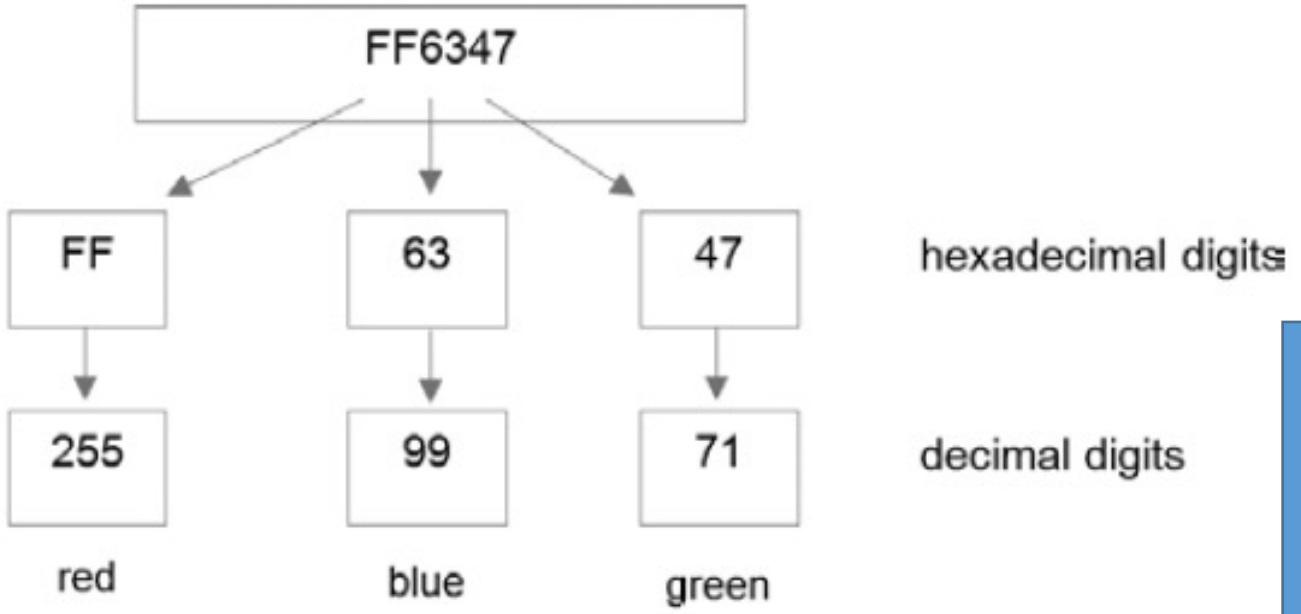
Note that `set()`, and not empty braces are not used to create an empty set, since that notation is used to create an empty dictionary. Because sets do not have duplicate elements, adding an already existing item to a set results in no change to the set.

Reverse Phone Spelling Program


```
{'0': ('0'), '1':('1'), '2': ('a','b','c'),
 '3': ('d','e','f'),'4': ('g','h','i'),
 '5': ('j','k','l'), '6': ('m','n','o'),
 '7': ('p','q','r','s'),'8': ('t','u','v'),
 '9': ('w','x','y','z')}
```

Write a function that takes in a spelled phone number for the last four digits (for example 8123 BOOK) and generates the phone number that produces that spelling

Colour Encoding Conversion - RGB



Refer to Slide (Lesson 3) for more details . . .

Quick Check

1. Indicate all of the following that are syntactically correct for creating a set.
   (a) `set([1, 2, 3])`
   (b) `set((1, 2, 3))`
   (c) `{1, 2, 3}`

2. For set `s` containing values `1`, `2`, `3`, and set `t` containing `3`, `4`, `5`, which of the following are the correct results for each given set operation?
   (a) `s | t` → `{3}`
   (b) `s & t` → `{1, 2, 3, 4, 5}`
   (c) `s - t` → `{1, 2}`
   (d) `s ^ t` → `{1, 2, 4, 5}`

Quick Check

3. For set `s` containing values `1`, `2`, `3` and set `w` of type `frozenset` containing values `'a','b','c'`, which of the following are valid set operations?

(a) `'a' in s`

(b) `'a' in w`

(c) `len(s) + len(w)`

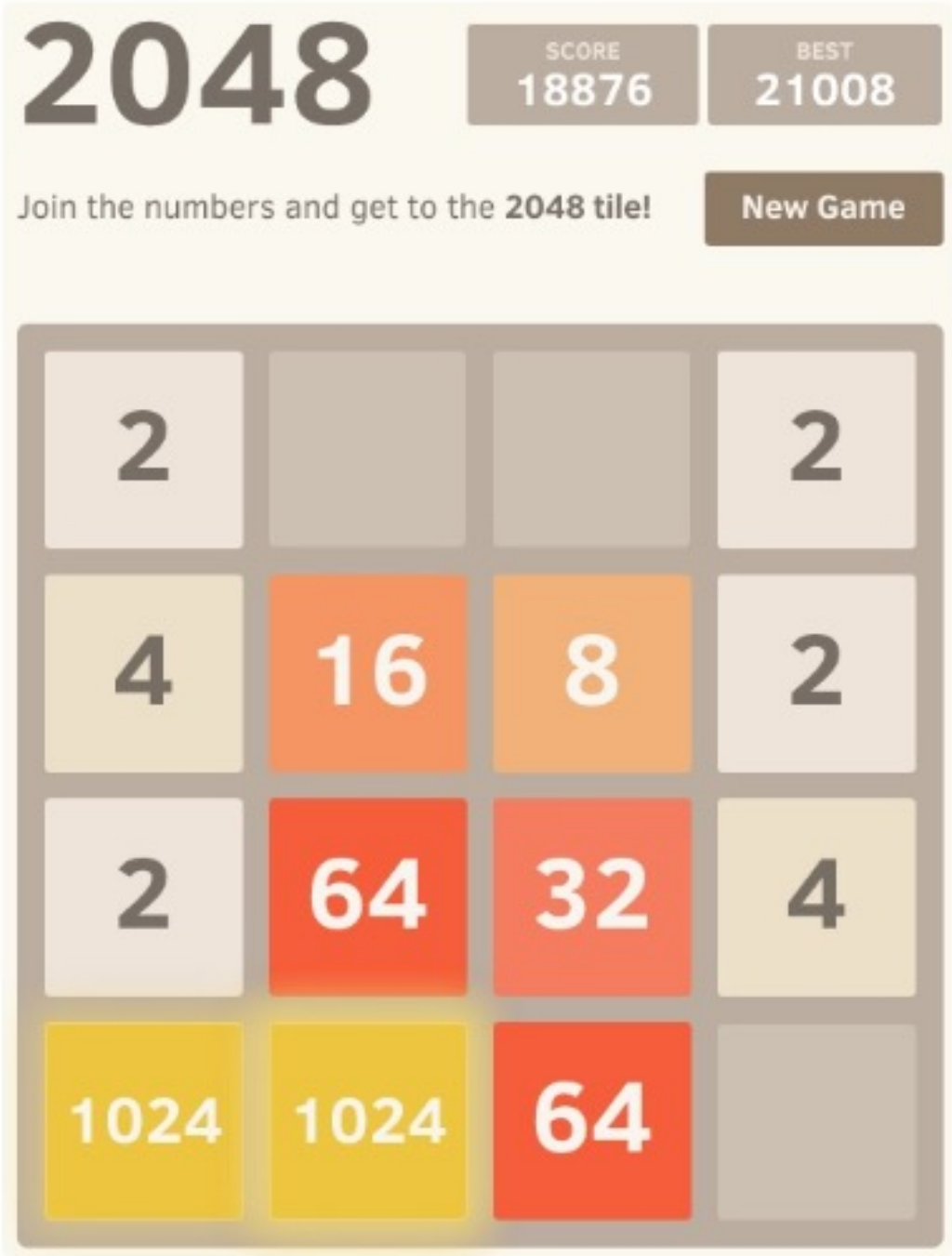
(d) `s.add(4)`

(e) `w.add('d')`

(f) `s | w`

(g) `s & w`

(h) `s - w`




```
2 0 0 2
4 16 8 2
2 64 32 4
1024 1024 64 0
```

https://play2048.co/

```
2 0 0 2
4 16 8 2
2 64 32 4
1024 1024 64 0
```

```
4 0 0 0
4 16 8 2
2 64 32 4
2048 64 0 0
```

```
2 16 8 4
4 64 32 4
2 1024 64 0
1024 0 0 0
```

Use a list in list to represent the state of the board

```
0 0 0 4
4 16 8 2
2 64 32 4
0 0 2048 64
```

```
2 0 0 0
4 16 8 0
2 64 32 4
1024 1024 64 4
```

Expectation of Solution

- printBoard(state) → display board
- move(state,direction) → return new state
- any other helper function
- main() → allow user to type in a list to represent initial state to start “game”

Work to do . . .

- 13 - Dictionary or Set (Training)
- Programming Assignment 12
- 2048