Discussion 12: Python II

Planning Your Phase I

1. In the table below, write out Python code to execute the following commands on `my_dict`.

```
my_dict = {'Math':'1A', 'English':'R1A'}
```

Add the key 'CS' with the value '10'	`my_dict['CS'] = '10'`
Access the value of 'Math'	`my_dict['Math']`
Change the value of 'Math' to '1B'	`my_dict['Math'] = '1B'`
Check if 'UGBA' is a key in my_dict	`'UGBA' in my_dict` (can also say `'UGBA' in my_dict.keys()`)
Check if '10' is a value in my_dict	`'10' in my_dict.values()`
Get a list of the keys in my_dict	`list(my_dict.keys())`

2. Can you access a key, value pair in a dictionary by its index? No, dictionaries do not have indices.

3. Are keys or values in a dictionary returned in a predictable order? No.

4. Can dictionaries have duplicate keys? No.

Dictionary Practice

```
fav_numbers = {'Schuyler': 120, 'Matthew': 12, 'Mansi': 7}
```

1. Increment each person's favorite number by the length of their name.

```
for person in fav_numbers:
    fav_numbers[person] += len(person)
```

2. Print a list of all people from `fav_numbers` whose favorite numbers are even.

```
names = []
for person in fav_numbers:
    if fav_numbers[person] % 2 == 0:
        names.append(person)
print(names)
```

3. Write a function that merges two dictionaries. Both dictionaries will have strings as keys and numbers as values. If you come across a key that's present in both dictionaries, add together its values in the merged dictionary.

```
>>> dict1 = {'Schuyler': 10, 'Matthew': 15}
>>> dict2 = {'Matthew': 5, 'Mansi': 4}
>>> merge_dicts(dict1, dict2)
{'Schuyler': 10, 'Matthew': 20, 'Mansi': 4}

def merge_dicts(d1, d2):
      new_dict = {}
      for key in d1:
            new_dict[key] = d1[key]
      for key in d2:
            if key in new_dict:
                  new_dict[key] += d2[key]
            else:
                  new_dict[key] = d2[key]
      return new_dict
```

4. Assume we have executed the code below in the Python interpreter. What will be displayed after each of the following code snippets executes? If the result is an error message, just write "Error." Assume that these lines are executed independently, NOT sequentially. (Continued on the next page)

```
>>> food_dict = {"fruit": "apple", "veggie": "carrot", "beverage": "water",
"grain": "rice"}
>>> len(food_dict)
4
>>> list(food_dict)
['beverage', 'fruit', 'grain', 'veggie']
# you are not expected to return them in the correct order

>>> food_dict[0]
Error

>>> ('fruit' in food_dict) and ('apple' in food_dict)
False

>>> ("fruit" in food_dict.keys()) and ("apple" in food_dict.values())
True

>>> for food in food_dict:
...     food += "s"
```

```
>>> food_dict
{'beverage': 'water', 'fruit': 'apple', 'grain': 'rice', 'veggie': 'carrot'}
# you are not expected to get the correct order

# Explanation:
# You are only adding ‘s’ to the food variable, not the actual key in the
# dictionary. Strings, which the keys are, are not mutable.

>>> def recursion_is_fun(dict1, dict2):
...     if dict2 == {}:
...         return dict1
...      dict2.pop(list(dict2)[0])
...      return recursion_is_fun(dict1, dict2)
>>> copy = food_dict
>>> recursion_is_fun(food_dict, copy)
{}
# Explanation:
# To make a copy of a dictionary in Python, you must say dict_name.copy()

>>> more_food = {"protein" : "chicken"}
>>> food_dict["more food"] = more_food
>>> food_dict

{'beverage': 'water', 'more food': {'protein': 'chicken'}, 'fruit': 'apple',
'grain': 'rice', 'veggie': 'carrot'}
# you are not expected to get the correct order
```

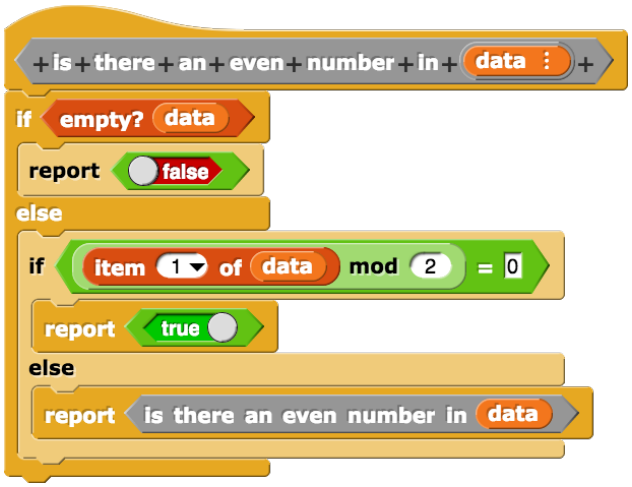
Recursion in Python

1. In the table below, translate the Snap! code to Python. This Python code will be useful in writing recursive functions in Python.

	`my_list[1:]`
 Note: This block doesn’t actually exist in Snap!	`my_list[:-1]`
	`my_list[1:-1]`
	`[5] + my_list`
	`my_list + your_list`

Note: The Python syntax for the first three rows would be the same whether your variable is a list or a string.

2. Translate the following code from Snap! to Python:




```
is_even_in(lst):
      if len(lst) == 0:
            return False
      elif lst[0] % 2 == 0:
            return True
      return is_even_in(lst[1:])
```

3. Write a recursive function in Python that removes certain items from a list, as described below. It should create a new list, not mutate the input list.

```
>>> delete_elements(4, [4, 5, 6])
[5, 6]
>>> delete_elements(7, [4, 5, 6])
[4, 5, 6]
>>> delete_elements(4, [4, 5, 6, 4])
[5, 6]
```

```
def delete_elements(x, lst):
      if len(lst) == 0:
            return lst
      if lst[0] == x:
            return delete_elements(x, lst[1:])
      else:
            return [lst[0]] + delete_elements(x, lst[1:])
```