Answers for Lab3 - Hongyu (Ray)

July 26, 2019

1 Zipping Lists

[1]:
```
ls_1 = ['hahaha', 1, 223, 'xixixi', 1234.45]
ls_2 = [21, '2333hhh', 'wooow', 1233]
print(list(zip(ls_1, ls_2)))
```

```
[('hahaha', 21), (1, '2333hhh'), (223, 'wooow'), ('xixixi', 1233)]
```

2 Age Difference

[2]:
```
records = [(16, 'Brian'), (12, 'Lucy'), (18, 'Harold')]

for i in range(len(records)-1):
    if records[i][0] > records[i+1][0]:
        print('{} is {} years older than {}'.format(records[i][1], \
                                                    records[i][0] -␣
 ↪records[i+1][0], records[i+1][1]))
```

```
Brian is 4 years older than Lucy
```

3 Remove the Duplicates

[3]:
```
ls = [1, 1, 2, 3, 3]
print(list(set(ls)))
```

```
[1, 2, 3]
```

4 Count the Duplicates

[4]:
```
ls = [1, 2, 2, 1, 4, 1, 3, 4]
dic = {}

for i in range(len(ls)):
```

```
    if ls[i] not in dic.keys():
        dic[ls[i]] = 1
    else:
        dic[ls[i]] += 1

print([[k,v] for k, v in dic.items()])
```

```
[[1, 3], [2, 2], [3, 1], [4, 2]]
```

5 Find the Largest Recombination

[5]:
```
def permutation(lst):
    if len(lst) == 0:
        return []
    if len(lst) == 1:
        return [lst]
    l = []
    for i in range(len(lst)):
        m = lst[i]
        remLst = lst[:i] + lst[i+1:]
        for p in permutation(remLst):
            l.append([m] + p)
    return l

# -------- drive function(s) ------- #
lst = [10, 5, 16, 8]
max = -1
for l in permutation(lst):
    num = ''
    for n in l:
        num += str(n)
    if int(num) > max:
        max = int(num)
print(max)
```

```
851610
```

6 Second Smallest

[6]:
```
ls = list(input('Please enter the numbers for your list:\n> ').split())

nums = []
for i in range(len(ls)):
    try:
        nums.append(float(ls[i]))
    except:
```

```
        is_char = True
        break

nums.sort()

if nums[0] != nums[len(nums)-1]:
    print('The second smallest number is: ', nums[1])
else:
    print('Error: There is no second smallest.')
```

```
Please enter the numbers for your list:
> 24.112 254 1 -5 -13.34 q 123.31 hd aas3
The second smallest number is:  -5.0
```

7 Calculator

[9]:
```
def plus(a, b):
    return a+b
def minus(a, b):
    return a-b
def mul(a, b):
    return a*b
def div(a, b):
    return a/b

calculater = {
    '+': plus,
    '-': minus,
    '*': mul,
    '/': div
}

while(True):
    exp = list(input('**********\nEnter an expression:\n> ').split())
    try:
        num_1 = float(exp[0])
        num_2 = float(exp[2])
    except:
        break
    print('The answer is:', calculater[exp[1]](num_1, num_2))
```

```
**********
Enter an expression:
> 2 + 3.3
```

```
The answer is: 5.3
**********
Enter an expression:
> 3.002 - 0.2
The answer is: 2.8019999999999996
**********
Enter an expression:
> 66 * 2
The answer is: 132.0
**********
Enter an expression:
> 66 / 2
The answer is: 33.0
**********
Enter an expression:
> q
```

8 Rotating a Matrix

[8]:
```
import copy
def print_matrix(msg, m):
    print(msg)
    for i in range(len(m)):
        print(m[i])

size = 9
matrix = [i[:] for i in [[0] * size] * size]
m_copy = copy.deepcopy(matrix)

num = 1
for i in range(size):
    for j in range(size):
        matrix[i][j] = num
        num += 1

print_matrix('Original: ', matrix)

for row in range(size-1, -1, -1):
    nums = matrix[row]
    col = size - 1 - row
    for i in range(size):
        m_copy[i][col] = nums[i]

print()
print_matrix('Rotated: ', m_copy)
```

```
Original:
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9]
[10, 11, 12, 13, 14, 15, 16, 17, 18]
[19, 20, 21, 22, 23, 24, 25, 26, 27]
[28, 29, 30, 31, 32, 33, 34, 35, 36]
[37, 38, 39, 40, 41, 42, 43, 44, 45]
[46, 47, 48, 49, 50, 51, 52, 53, 54]
[55, 56, 57, 58, 59, 60, 61, 62, 63]
[64, 65, 66, 67, 68, 69, 70, 71, 72]
[73, 74, 75, 76, 77, 78, 79, 80, 81]

Rotated:
[73, 64, 55, 46, 37, 28, 19, 10, 1]
[74, 65, 56, 47, 38, 29, 20, 11, 2]
[75, 66, 57, 48, 39, 30, 21, 12, 3]
[76, 67, 58, 49, 40, 31, 22, 13, 4]
[77, 68, 59, 50, 41, 32, 23, 14, 5]
[78, 69, 60, 51, 42, 33, 24, 15, 6]
[79, 70, 61, 52, 43, 34, 25, 16, 7]
[80, 71, 62, 53, 44, 35, 26, 17, 8]
[81, 72, 63, 54, 45, 36, 27, 18, 9]
```