Name_____**StudentID**_____

Level 1

A large corporate company has many offices. Different offices are sending packages to other offices.

Terminology
− The sender office = Office who sends out packages − The destination office = Office who receives packages

Write the object-defining classes: Package and Office

- Declare variables for attributes and define methods for behaviors.
- Attributes in each class are private variables.
- All the classes leave out accessor (get) methods. Your submitted class must have the needed accessor (get) methods and the needed mutator (set) methods.

Package (save your code as package.py)

This object represents information of packages.

Attributes

- package_id: id of package
- from_office: id of the sender office who sends the package
- to_office: id of the destination office who receives the package
- location: current location of package (identified by id of office). Default value is id of the sender office.
- status: status of package (int) [1 = package is ready "to mail", 2 = package is "on the way", 3 = package is "delivered" at the destination office]

Methods

- Package(package_id, from_office, to_office)
- str: return string of Package object. For example: `print(Package(1,101,102))`

```
packet id: 1, from: 101, to: 102, current: 101, status: to mail
```

Note that if package status is 1, the status will be reported "to mail". If package status is 2, the status will be reported "on the way". If package status is 3, the status will be reported "delivered".

Sample output of Package class

Program (see the first few lines in test_level1 program):

```
num_packages = 1
p1 = Package(num_packages,101,102)
num_packages += 1
p2 = Package(num_packages,101,102)
num_packages += 1
p3 = Package(num_packages,201,101)
num_packages += 1
p4 = Package(num_packages,201,101)
num_packages += 1
p5 = Package(num_packages,201,101)

print('### Printing some packages')
print(p1)
print(p2)
print(p5)
```

Output:

```
### Printing some packages
packet id: 1, from: 101, to: 102, current: 101, status: to mail
packet id: 2, from: 101, to: 102, current: 101, status: to mail
packet id: 5, from: 201, to: 101, current: 201, status: to mail
```

Office class

Office (save your code as office.py)
Do not forget to add the following at the beginning of office.py `from package import *`

This object represents one office.

Attributes

- office_id: id of office
- mailin_list: list of packages that are **sent to** this office. Default value is empty list.
- mailout_list: list of packages that are **sent from** this office. Default value is empty list.

Methods

- Office(office_id): Set office_id with the given parameter. Set mailin_list and mailout_list to empty lists.
- str: return string of Office object. For example

```
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: to mail
packet id: 2, from: 101, to: 102, current: 101, status: to mail
```

  - In the example above, the office with id 101 mails 2 packages to office 102 (seen from mail-out packages). In addition, there is no package sent from other offices to office 101 (seen from nothing is printed for mail-in packages).
  - For simplicity in level 1, it is assumed that all packages in mail-in or mail-out list will be from the same sender office (*In the example, all mail-out packages come from office 101*) and to the same destination office (*In the example, all mail-out packages are going to office 102*).
  - In level 3, you will work with packages in mail-in or mail-out list do not have to be from the same sender office and to the same destination office.

- add_package_to_mailout(package): Add package to mailout_list
- add_package_to_mailin(package): Add package to mailin_list
- transfer(dest_office):
  - The sender office transfers packages to the destination office (dest_office). Note that at this transfer stage, packages are *on the way* to the destination office but *not arrive at* the destination office yet.
  - This method sets statuses of packages sent to the destination office to 2 (“on the way”).
- deliver(dest_office):
  - At deliver stage, packages are *arrived and delivered* at the destination office (dest_office).
  - This method (1) sets statuses of packages sent to the destination office to 3 (“delivered”), (2) add the delivered packages to mailin_list of the destination office. (3) This method also removes the delivered packages from mailout_list of the sender office.
- clear: set mailin_list and mailout_list to empty lists.

Level 1 Output:

test_level1 program:	Output of test_level1 program:
num_packages = 1 p1 = Package(num_packages,101,102) num_packages += 1 p2 = Package(num_packages,101,102) num_packages += 1 p3 = Package(num_packages,201,101) num_packages += 1 p4 = Package(num_packages,201,101) num_packages += 1 p5 = Package(num_packages,201,101)	
print('### Printing some packages') print(p1) print(p2) print(p5)	### Printing some packages packet id: 1, from: 101, to: 102, current: 101, status: to mail packet id: 2, from: 101, to: 102, current: 101, status: to mail packet id: 5, from: 201, to: 101, current: 201, status: to mail
print('----------')	----------
o101 = Office(101) o102 = Office(102) o201 = Office(201)	
print('### Office 101 wants to mail out 2 packages to Office 102') o101.add_package_to_mailout(p1) o101.add_package_to_mailout(p2) print(o101)	### Office 101 wants to mail out 2 packages to Office 102 Office id: 101 Mail-in Packages: Mail-out Packages: packet id: 1, from: 101, to: 102, current: 101, status: to mail packet id: 2, from: 101, to: 102, current: 101, status: to mail
print('----------')	----------
print('### Office 201 wants to mail out 3 packages to Office 101') o201.add_package_to_mailout(p3) o201.add_package_to_mailout(p4) o201.add_package_to_mailout(p5) print(o201)	### Office 201 wants to mail out 3 packages to Office 101 Office id: 201 Mail-in Packages: Mail-out Packages: packet id: 3, from: 201, to: 101, current: 201, status: to mail packet id: 4, from: 201, to: 101, current: 201, status: to mail packet id: 5, from: 201, to: 101, current: 201, status: to mail
print('----------')	----------
print('### 2 packages from Office 101 are traveling to Office 102') o101.transfer(o102) print(o101)	### 2 packages from Office 101 are traveling to Office 102 Office id: 101 Mail-in Packages:

```
                                    Mail-out Packages:
                                    packet id: 1, from: 101, to: 102, current: 101, status: on the way
                                    packet id: 2, from: 101, to: 102, current: 101, status: on the way
print('----------------------')     ----------------------
print('### 2 packages from Office  ### 2 packages from Office 101 are delivered at Office 102
101 are delivered at Office 102')
o101.deliver(o102)
print(o102)                         Office id: 102
                                    Mail-in Packages:
                                    packet id: 1, from: 101, to: 102, current: 102, status: delivered
                                    packet id: 2, from: 101, to: 102, current: 102, status: delivered
                                    Mail-out Packages:
print(o101)                         Office id: 101
                                    Mail-in Packages:
                                    Mail-out Packages:
print('----------------------')     ----------------------
print('### 3 packages from Office  ### 3 packages from Office 201 are traveling to Office 101
201 are traveling to Office 101')
o201.transfer(o101)
print(o201)                         Office id: 201
                                    Mail-in Packages:
                                    Mail-out Packages:
                                    packet id: 3, from: 201, to: 101, current: 201, status: on the way
                                    packet id: 4, from: 201, to: 101, current: 201, status: on the way
                                    packet id: 5, from: 201, to: 101, current: 201, status: on the way
print('----------------------')     ----------------------
print('### 3 packages from Office  ### 3 packages from Office 201 are delivered at Office 101
201 are delivered at Office 101')
o201.deliver(o101)
print(o101)                         Office id: 101
                                    Mail-in Packages:
                                    packet id: 3, from: 201, to: 101, current: 101, status: delivered
                                    packet id: 4, from: 201, to: 101, current: 101, status: delivered
                                    packet id: 5, from: 201, to: 101, current: 101, status: delivered
                                    Mail-out Packages:
print(o201)                         Office id: 201
                                    Mail-in Packages:
                                    Mail-out Packages:
print('----------------------')     ----------------------
print('### After mail delivery')   ### After mail delivery
print(o101)                         Office id: 101
                                    Mail-in Packages:
                                    packet id: 3, from: 201, to: 101, current: 101, status: delivered
                                    packet id: 4, from: 201, to: 101, current: 101, status: delivered
                                    packet id: 5, from: 201, to: 101, current: 101, status: delivered
                                    Mail-out Packages:
print(o102)                         Office id: 102
                                    Mail-in Packages:
                                    packet id: 1, from: 101, to: 102, current: 102, status: delivered
                                    packet id: 2, from: 101, to: 102, current: 102, status: delivered
                                    Mail-out Packages:
print(o201)                         Office id: 201
                                    Mail-in Packages:
                                    Mail-out Packages:
print('----------------------')     ----------------------
```

```
print('### Clear delivered packages')
o101.clear()
o102.clear()
print(o101)

print(o102)

print('----------------------')
```

```
### Clear delivered packages

Office id: 101
Mail-in Packages:
Mail-out Packages:

Office id: 102
Mail-in Packages:
Mail-out Packages:

----------------------
```

Level 2 (This level does not depend from Level 1)

The offices of the large corporate company are located in different zones. Number of packages each office sends out to other offices is recorded.

Write the object class to record number of packages from different offices.

Write the object-defining classes: Numpack

- Declare variables for attributes and define methods for behaviors.
- Attributes in each class are private variables.
- All the classes leave out accessor (get) methods. Your submitted class must have the needed accessor (get) methods and needed mutator (set) methods.

Numpack (save your code as numpack.py)

This object represents number of packages that each office sends.

Attributes

- day: day of the week (string). It can represent a single day. For example, '1' = Monday, '2'=Tuesday, and so on. If Numpack object is used to store number of packages sent *for multiple days*, assign value 'NA' to this day attribute)
- num_days : number of days
- table: number of packages from different offices in different zones. For example: [[3,1,2], [0,2,5]] represents number of packages sent out from 2 zones where each zone has 3 offices, like this:

Number of packages	Office 1	Office 2	Office3
Zone 1	3	1	2
Zone 2	0	2	5

  - Your program should work with varied number of zones and number of offices. For example,
    - In test_level2_1 program, there are 2 zones, and each zone has 3 offices.
    - In test_level2_2 program, there are 5 zones, and each zone had 4 offices.

Methods

- Numpack (day, num_days, table)
- str: return string of Numpack object. For example,

```
day1 = Numpack('1',1,[ [3,1,2],[0,2,5] ])
print(day1)
```

  Printing result:

```
Day = 1
Num days = 1
Zone 1: 3, 1, 2,
Zone 2: 0, 2, 5,
```

- add (other): Add number of packages from two Numpack objects together. Return a new Numpack object that contain the added number of packages from these two Numpack objects. For example:

```
day1 = Numpack('1',1,[ [3,1,2],[0,2,5] ])
day2 = Numpack('2',1,[ [2,5,1],[1,3,3] ])
result = day1.add(day2)
print(result)
```

  In the above example, day1 (Numpack object) is added to day2 (Numpack object) and returns result object (Numpack object).

  Printing result (is on next page):

```
Day = NA
Num days = 2
Zone 1: 5, 6, 3,
Zone 2: 1, 5, 8,
```

- get_zone_average(): Compute and return a list of average number of packages from each zone. Note that length of returned list = number of zones.

```
day1 = Numpack('1',1,[ [3,1,2],[0,2,5] ])
print(day1.get_zone_average())
```

Printing result:

```
[2.0, 2.3333333333333335]
```

Note that in zone 1, there are 6 total packages (3+1+2) sent among 3 offices. In zone 2, there are 7 total packages (0+2+5) sent among 3 offices. Thus, averages for zones 1 and 2 respectively are 2 and 2.3333 packages.

- In addition*, make addition be the overloading operation* such that when we use '+' with two Numpack objects, the program adds number of packages and return a new Numpack object with the added number of packages. For example:

Partial program	**Printing result:**

`day1 = Numpack('1',1,[ [3,1,2],[0,2,5] ])`
`day2 = Numpack('2',1,[ [2,5,1],[1,3,3] ])`
`result3 = day1 + day2`
`print(result3)`
	`Day = NA`
	`Num days = 2`
	`Zone 1: 5, 6, 3,`
	`Zone 2: 1, 5, 8,`

Output of test_level2_1 and test_level2_2 programs

test_level2_1 program	**Output of test_level2_1**

`day1 = Numpack('1',1,[ [3,1,2],`
`  [0,2,5] ])`
`day2 = Numpack('2',1,[ [2,5,1],`
`  [1,3,3] ])`
`day3 = Numpack('3',1,[ [1,0,0],`
`  [0,3,1]])`
 	
`print('### Day1')`
`print(day1)`
 	
`print('### Day2')`
`print(day2)`
 	
`print('### Day1 + Day2')`
`result = day1.add(day2)`
`print(result)`
 	
`####### for overloading #######`
`print('### Day1 + Day2 Overloading')`
`result3 = day1 + day2`
`print(result3)`
`################################`
 	
`print('### Day3')`
`print(day3)`
 	
`print('### Day1 + Day2 + Day3')`
`result2 = result.add(day3)`
`print(result2)`
 	
`print('### Average_Zone(Day1)')`
`print(day1.get_zone_average())`
`print()`
 	
`print('### Average_Zone(Day1 + Day2)')`
`print(result.get_zone_average())`
`print()`
	`### Day1`
	`Day = 1`
	`Num days = 1`
	`Zone 1: 3, 1, 2,`
	`Zone 2: 0, 2, 5,`
	
	`### Day2`
	`Day = 2`
	`Num days = 1`
	`Zone 1: 2, 5, 1,`
	`Zone 2: 1, 3, 3,`
	
	`### Day1 + Day2`
	`Day = NA`
	`Num days = 2`
	`Zone 1: 5, 6, 3,`
	`Zone 2: 1, 5, 8,`
	
	`### Day1 + Day2 Overloading`
	`Day = NA`
	`Num days = 2`
	`Zone 1: 5, 6, 3,`
	`Zone 2: 1, 5, 8,`
	
	`### Day3`
	`Day = 3`
	`Num days = 1`
	`Zone 1: 1, 0, 0,`
	`Zone 2: 0, 3, 1,`
	
	`### Day1 + Day2 + Day3`
	`Day = NA`
	`Num days = 3`
	`Zone 1: 6, 6, 3,`
	`Zone 2: 1, 8, 9,`
	
	`### Average_Zone(Day1)`
	`[2.0, 2.3333333333333335]`

```
print('### Average_Zone(Day1 + Day2 + Day3)')
print(result2.get_zone_average())
```

```
### Average_Zone(Day1 + Day2)
[4.666666666666667, 4.666666666666667]

### Average_Zone(Day1 + Day2 + Day3)
[5.0, 6.0]
```

test_level2_2 program

```
day1 = Numpack('1',1,[ [2,1,0,0],
                       [5,3,1,1],
                       [4,0,2,0],
                       [1,2,0,6]])
day2 = Numpack('2',1,[ [0,0,1,1],
                       [6,2,1,0],
                       [1,2,0,3],
                       [3,4,1,2]])
day3 = Numpack('3',1,[ [3,4,2,0],
                       [1,2,7,1],
                       [0,0,0,2],
                       [2,4,5,1]])

print('### Day1')
print(day1)

print('### Day2')
print(day2)

print('### Day1 + Day2')
result = day1.add(day2)
print(result)

####### for overloading #######
print('### Day1 + Day2 Overloading')
result3 = day1 + day2
print(result3)
###############################

print('### Day3')
print(day3)

print('### Day1 + Day2 + Day3')
result2 = result.add(day3)
print(result2)

print('### Average_Zone(Day1)')
print(day1.get_zone_average())
print()

print('### Average_Zone(Day1 + Day2)')
print(result.get_zone_average())
print()

print('### Average_Zone(Day1 + Day2 + Day3)')
print(result2.get_zone_average())
```

Output of test_level2_2

```
### Day1
Day = 1
Num days = 1
Zone 1: 2, 1, 0, 0,
Zone 2: 5, 3, 1, 1,
Zone 3: 4, 0, 2, 0,
Zone 4: 1, 2, 0, 6,

### Day2
Day = 2
Num days = 1
Zone 1: 0, 0, 1, 1,
Zone 2: 6, 2, 1, 0,
Zone 3: 1, 2, 0, 3,
Zone 4: 3, 4, 1, 2,

### Day1 + Day2
Day = NA
Num days = 2
Zone 1: 2, 1, 1, 1,
Zone 2: 11, 5, 2, 1,
Zone 3: 5, 2, 2, 3,
Zone 4: 4, 6, 1, 8,

### Day1 + Day2 Overloading
Day = NA
Num days = 2
Zone 1: 2, 1, 1, 1,
Zone 2: 11, 5, 2, 1,
Zone 3: 5, 2, 2, 3,
Zone 4: 4, 6, 1, 8,

### Day3
Day = 3
Num days = 1
Zone 1: 3, 4, 2, 0,
Zone 2: 1, 2, 7, 1,
Zone 3: 0, 0, 0, 2,
Zone 4: 2, 4, 5, 1,

### Day1 + Day2 + Day3
Day = NA
Num days = 3
Zone 1: 5, 5, 3, 1,
Zone 2: 12, 7, 9, 2,
Zone 3: 5, 2, 2, 5,
Zone 4: 6, 10, 6, 9,

### Average_Zone(Day1)
[0.75, 2.5, 1.5, 2.25]

### Average_Zone(Day1 + Day2)
[1.25, 4.75, 3.0, 4.75]

### Average_Zone(Day1 + Day2 + Day3)
[3.5, 7.5, 3.5, 7.75]
```

Level 3 (continue from Level 1)

Edit office.py by adding deliver2 method

1. Now, packages in mail-in or mail-out list do not have to come from the same sender office and to the same destination office. For example:

```
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: to mail
packet id: 2, from: 101, to: 102, current: 101, status: to mail
packet id: 6, from: 101, to: 201, current: 101, status: to mail
```

   - In level 1, packages are assumed to be from the same sender office and to the same destination office. In this level 3, packages are sent to 2 destination offices (102 and 201).

2. Add method **deliver2** in office class to handle the case when all packages in mail-out or mail-in lists may not go to the same destination or come from the same sender office.
   [Hint: use method deliver in level 1 as a starting point]

test_level3 program:

```
num_packages = 1
p1 =
Package(num_packages,101,102)
num_packages += 1
p2 =
Package(num_packages,101,102)
num_packages += 1
p3 =
Package(num_packages,201,101)
num_packages += 1
p4 =
Package(num_packages,201,101)
num_packages += 1
p5 =
Package(num_packages,201,101)
num_packages += 1
p6 =
Package(num_packages,101,201)
num_packages += 1
p7 =
Package(num_packages,201,102)

print('----------------------')

o101 = Office(101)
o102 = Office(102)
o201 = Office(201)

print('----------------------')

print('### Office 101 wants to
mail out 2 packages to Office
102')
print('### Office 101 wants to
mail out 1 packages to Office
201')
o101.add_package_to_mailout(p1)
o101.add_package_to_mailout(p2)
o101.add_package_to_mailout(p6)
print(o101)

print('----------------------')
```

Output of test_level3 program:

```
----------------------
### Office 101 wants to mail out 2 packages to Office 102
### Office 101 wants to mail out 1 packages to Office 201
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: to mail
packet id: 2, from: 101, to: 102, current: 101, status: to mail
packet id: 6, from: 101, to: 201, current: 101, status: to mail

----------------------
### Office 201 wants to mail out 3 packages to Office 101
### Office 201 wants to mail out 1 packages to Office 102
Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: to mail
packet id: 4, from: 201, to: 101, current: 201, status: to mail
packet id: 5, from: 201, to: 101, current: 201, status: to mail
packet id: 7, from: 201, to: 102, current: 201, status: to mail

----------------------
### 2 packages from Office 101 are traveling to Office 102
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: on the way
packet id: 2, from: 101, to: 102, current: 101, status: on the way
packet id: 6, from: 101, to: 201, current: 101, status: to mail

----------------------
### 2 packages from Office 101 are delivered at Office 102
Office id: 102
Mail-in Packages:
packet id: 1, from: 101, to: 102, current: 102, status: delivered
packet id: 2, from: 101, to: 102, current: 102, status: delivered
packet id: 6, from: 101, to: 201, current: 102, status: delivered
Mail-out Packages:

Office id: 101
Mail-in Packages:
Mail-out Packages:

----------------------
```

```
print('### Office 201 wants to
mail out 3 packages to Office
101')
print('### Office 201 wants to
mail out 1 packages to Office
102')
o201.add_package_to_mailout(p3)
o201.add_package_to_mailout(p4)
o201.add_package_to_mailout(p5)
o201.add_package_to_mailout(p7)
print(o201)

print('----------------------')

print('### 2 packages from Office
101 are traveling to Office 102')
o101.transfer(o102)
print(o101)

print('----------------------')

print('### 2 packages from Office
101 are delivered at Office 102')
o101.deliver2(o102)
print(o102)
print(o101)

print('----------------------')

print('### 1 package from Office
101 are traveling to Office 201')
o101.transfer(o201)
print(o101)

print('----------------------')


print('### 1 package from Office
101 is delivered at Office 201')
o101.deliver2(o201)
print(o201)
print(o101)

print('----------------------')

print('### 3 packages from Office
201 are traveling to Office 101')
o201.transfer(o101)
print(o201)

print('----------------------')

print('### 3 packages from Office
201 are delivered at Office 101')
o201.deliver2(o101)
print(o101)
print(o201)

print('----------------------')

print('### 1 package from Office
201 are traveling to Office 102')
o201.transfer(o102)
print(o201)

print('----------------------')
```

```
### 1 package from Office 101 are traveling to Office 201
Office id: 101
Mail-in Packages:
Mail-out Packages:

----------------------
### 1 package from Office 101 is delivered at Office 201
Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: to mail
packet id: 4, from: 201, to: 101, current: 201, status: to mail
packet id: 5, from: 201, to: 101, current: 201, status: to mail
packet id: 7, from: 201, to: 102, current: 201, status: to mail

Office id: 101
Mail-in Packages:
Mail-out Packages:

----------------------
### 3 packages from Office 201 are traveling to Office 101
Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: on the way
packet id: 4, from: 201, to: 101, current: 201, status: on the way
packet id: 5, from: 201, to: 101, current: 201, status: on the way
packet id: 7, from: 201, to: 102, current: 201, status: to mail

----------------------
### 3 packages from Office 201 are delivered at Office 101
Office id: 101
Mail-in Packages:
packet id: 3, from: 201, to: 101, current: 101, status: delivered
packet id: 4, from: 201, to: 101, current: 101, status: delivered
packet id: 5, from: 201, to: 101, current: 101, status: delivered
Mail-out Packages:

Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 7, from: 201, to: 102, current: 201, status: to mail

----------------------
### 1 package from Office 201 are traveling to Office 102
Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 7, from: 201, to: 102, current: 201, status: on the way

----------------------
### 1 package from Office 201 is delivered at Office 102
Office id: 102
Mail-in Packages:
packet id: 1, from: 101, to: 102, current: 102, status: delivered
packet id: 2, from: 101, to: 102, current: 102, status: delivered
packet id: 6, from: 101, to: 201, current: 102, status: delivered
packet id: 7, from: 201, to: 102, current: 102, status: delivered
Mail-out Packages:

Office id: 201
Mail-in Packages:
Mail-out Packages:

----------------------
### After mail delivery
Office id: 101
Mail-in Packages:
```

```
print('### 1 package from Office
201 is delivered at Office 102')
o201.deliver2(o102)
print(o102)
print(o201)

print('----------------------')

print('### After mail delivery')
print(o101)
print(o102)
print(o201)

print('----------------------')

print('### Clear delivered
packages')
o101.clear()
o102.clear()
o201.clear()
print(o101)
print(o102)
print(o201)

print('----------------------')
```

```
packet id: 3, from: 201, to: 101, current: 101, status: delivered
packet id: 4, from: 201, to: 101, current: 101, status: delivered
packet id: 5, from: 201, to: 101, current: 101, status: delivered
Mail-out Packages:

Office id: 102
Mail-in Packages:
packet id: 1, from: 101, to: 102, current: 102, status: delivered
packet id: 2, from: 101, to: 102, current: 102, status: delivered
packet id: 6, from: 101, to: 201, current: 102, status: delivered
packet id: 7, from: 201, to: 102, current: 102, status: delivered
Mail-out Packages:

Office id: 201
Mail-in Packages:
Mail-out Packages:

----------------------
### Clear delivered packages
Office id: 101
Mail-in Packages:
Mail-out Packages:

Office id: 102
Mail-in Packages:
Mail-out Packages:

Office id: 201
Mail-in Packages:
Mail-out Packages:

----------------------
```

Level 4 (continue from Level 3 or 1)

Edit test_level4.py

1. Fill in code for `find_package(office_list, package_id)` method to search for package with given `package_id` in list of offices. If package with such `package_id` is found, return such package. Otherwise, return None.
2. Fill in code for `print_found_package(package)` method to print out the given `package` object. If package is not found, display that 'Package is not found').

- If you continue from level 1 (not from level 3), in **test_level4** program**,** use method **deliver** and packages **p1-p5 only** (in the given test_level4 program, it uses method deliver2 and packages p1-p7**.)**
- Below, test_level4 program is partially shown. See complete program in test_level4.py

Partial test_level4 program:

```
####### Level 4 ########

def find_package(office_list,
package_id):
    ## fill in your code
    pass

def print_found_package(package):
    ## fill in your code
    pass

########################

num_packages = 1
p1 =
Package(num_packages,101,102)
num_packages += 1
p2 =
Package(num_packages,101,102)
num_packages += 1
p3 =
Package(num_packages,201,101)
num_packages += 1
p4 =
Package(num_packages,201,101)
num_packages += 1
p5 =
Package(num_packages,201,101)
num_packages += 1
p6 =
Package(num_packages,101,201)
num_packages += 1
p7 =
Package(num_packages,201,102)

o101 = Office(101)
o102 = Office(102)
o201 = Office(201)

####### Level 4 ########

office_list = []
office_list.append(o101)
office_list.append(o102)
office_list.append(o201)

########################

print('----------------------')
```

Output of test_level4 program:

```
----------------------
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: to mail
packet id: 2, from: 101, to: 102, current: 101, status: to mail
packet id: 6, from: 101, to: 201, current: 101, status: to mail

----------------------
Office id: 201
Mail-in Packages:
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: to mail
packet id: 4, from: 201, to: 101, current: 201, status: to mail
packet id: 5, from: 201, to: 101, current: 201, status: to mail
packet id: 7, from: 201, to: 102, current: 201, status: to mail

======== Level 4 ==========
@@ Look for package id 2
packet id: 2, from: 101, to: 102, current: 101, status: to mail

@@ Look for package id 10
Package is not found
==========================
----------------------
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 1, from: 101, to: 102, current: 101, status: on the way
packet id: 2, from: 101, to: 102, current: 101, status: on the way
packet id: 6, from: 101, to: 201, current: 101, status: to mail

----------------------
======== Level 4 ==========
@@@ Look for package id 2
packet id: 2, from: 101, to: 102, current: 101, status: on the way
==========================
Office id: 102
Mail-in Packages:
packet id: 1, from: 101, to: 102, current: 102, status: delivered
packet id: 2, from: 101, to: 102, current: 102, status: delivered
Mail-out Packages:

Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 6, from: 101, to: 201, current: 101, status: to mail

----------------------
```

```
#print('### Office 101 wants to
mail out 2 packages to Office
102')
#print('### Office 101 wants to
mail out 1 packages to Office
201')
o101.add_package_to_mailout(p1)
o101.add_package_to_mailout(p2)
o101.add_package_to_mailout(p6)
print(o101)

print('----------------------')

#print('### Office 201 wants to
mail out 3 packages to Office
101')
#print('### Office 201 wants to
mail out 1 packages to Office
102')
o201.add_package_to_mailout(p3)
o201.add_package_to_mailout(p4)
o201.add_package_to_mailout(p5)
o201.add_package_to_mailout(p7)
print(o201)

####### Level 4 ########

print('====== Level 4 =======')

print('@@ Look for package id 2')
found_package =
find_package(office_list, 2)
print_found_package(found_package
)
print()
print('@@ Look for package id
10')
found_package =
find_package(office_list, 10)
print_found_package(found_package
)

print('======================')

######################

# the rest of program continues
# see test_level4 program
```

```
======== Level 4 ==========
@@@ Look for package id 2
packet id: 2, from: 101, to: 102, current: 102, status: delivered
==========================
----------------------
Office id: 101
Mail-in Packages:
Mail-out Packages:
packet id: 6, from: 101, to: 201, current: 101, status: on the way

----------------------
Office id: 201
Mail-in Packages:
packet id: 6, from: 101, to: 201, current: 201, status: delivered
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: to mail
packet id: 4, from: 201, to: 101, current: 201, status: to mail
packet id: 5, from: 201, to: 101, current: 201, status: to mail
packet id: 7, from: 201, to: 102, current: 201, status: to mail

Office id: 101
Mail-in Packages:
Mail-out Packages:

======== Level 4 ==========
@@@ Look for package id 4
packet id: 4, from: 201, to: 101, current: 201, status: to mail
==========================
----------------------
Office id: 201
Mail-in Packages:
packet id: 6, from: 101, to: 201, current: 201, status: delivered
Mail-out Packages:
packet id: 3, from: 201, to: 101, current: 201, status: on the way
packet id: 4, from: 201, to: 101, current: 201, status: on the way
packet id: 5, from: 201, to: 101, current: 201, status: on the way
packet id: 7, from: 201, to: 102, current: 201, status: to mail

======== Level 4 ==========
@@@ Look for package id 4
packet id: 4, from: 201, to: 101, current: 201, status: on the way
==========================
----------------------
Office id: 101
Mail-in Packages:
packet id: 3, from: 201, to: 101, current: 101, status: delivered
packet id: 4, from: 201, to: 101, current: 101, status: delivered
packet id: 5, from: 201, to: 101, current: 101, status: delivered
Mail-out Packages:

Office id: 201
Mail-in Packages:
packet id: 6, from: 101, to: 201, current: 201, status: delivered
Mail-out Packages:
packet id: 7, from: 201, to: 102, current: 201, status: to mail

======== Level 4 ==========
@@@ Look for package id 4
packet id: 4, from: 201, to: 101, current: 101, status: delivered
==========================
----------------------
Office id: 201
Mail-in Packages:
packet id: 6, from: 101, to: 201, current: 201, status: delivered
Mail-out Packages:
packet id: 7, from: 201, to: 102, current: 201, status: on the way

----------------------
```

	Office id: 102 Mail-in Packages: packet id: 1, from: 101, to: 102, current: 102, status: delivered packet id: 2, from: 101, to: 102, current: 102, status: delivered packet id: 7, from: 201, to: 102, current: 102, status: delivered Mail-out Packages: Office id: 201 Mail-in Packages: packet id: 6, from: 101, to: 201, current: 201, status: delivered Mail-out Packages: ---------- ### After mail delivery Office id: 101 Mail-in Packages: packet id: 3, from: 201, to: 101, current: 101, status: delivered packet id: 4, from: 201, to: 101, current: 101, status: delivered packet id: 5, from: 201, to: 101, current: 101, status: delivered Mail-out Packages: Office id: 102 Mail-in Packages: packet id: 1, from: 101, to: 102, current: 102, status: delivered packet id: 2, from: 101, to: 102, current: 102, status: delivered packet id: 7, from: 201, to: 102, current: 102, status: delivered Mail-out Packages: Office id: 201 Mail-in Packages: packet id: 6, from: 101, to: 201, current: 201, status: delivered Mail-out Packages: ======== Level 4 ========== @@@ Look for package id 5 packet id: 5, from: 201, to: 101, current: 101, status: delivered ========== ---------- ### Clear delivered packages Office id: 101 Mail-in Packages: Mail-out Packages: Office id: 102 Mail-in Packages: Mail-out Packages: Office id: 201 Mail-in Packages: Mail-out Packages: ======== Level 4 ========== @@@ Look for package id 5 Package is not found ========== ----------