

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 5η

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Περιεχόμενα

- 1 Python - Λίστες
- 2 Python - Λεξικά
- 3 Python functions

Λίστες

- Οι λίστες χρησιμοποιούνται για να αποθηκεύουν πολλαπλά αντικείμενα σε μία μεταβλητή.

```
1 # List objects
2
3 l = [obj1, obj2, ..., obj3]
```

- Οι λίστες έχουν *διάταξη*, μεταβάλλονται και τα στοιχεία τους δεν χρειάζεται να είναι μοναδικά.

```
1 # List examples
2 l = ["1", 1, 4.0]
3 print(l)
4
5 # Order
6 print(l[0], l[1], l[2])
7
8 # Changeable
9 l[1] = 2
10 print(l)
11
12 # Duplicate
13 l = ["1", 1, 4.0, "1"]
14 print(l)
```

Λίστες: Παραδείγματα

```
1 """
2 List example
3 """
4
5 original = ["Thomas", "Kamalakis"]
6 final = ["Tom", "Camalakis"]
7 str_input = "Thomas Kamalakis is teaching a course on automation"
8 str_output = str_input
9
10 for i in range( len(original) ):
11     str_output = str_output.replace( original[i], final[i] )
12
13 print('Original string: ', str_input)
14 print('Final string: ', str_output)
```

```
thomas@kirkllaptop:~/Documents/nscpython/code/lecture5$ python3 -i listsex2.py
Original string: Thomas Kamalakis is teaching a course on automation
Final string: Tom Camalakis is teaching a course on automation
```

Λίστες: enumerate

```
1 """
2 List example
3 """
4
5 original = ["Thomas", "Kamalakis"]
6 final = ["Tom", "Camalakis"]
7 str_input = "Thomas Kamalakis is teaching a course on automation"
8 str_output = str_input
9
10 for i, orig in enumerate(original):
11     str_output = str_output.replace( orig, final[i] )
12
13 print('Original string: ', str_input)
14 print('Final string: ', str_output)
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture5$ python3 listsex2b.py
Original string: Thomas Kamalakis is teaching a course on automation
Final string: Tom Camalakis is teaching a course on automation
```

Λίστες και αρχεία .csv

- Οι λίστες είναι ιδιαίτερα χρήσιμες για την επεξεργασία αρχείων .csv
- Πρόκειται για text αρχεία που παράγονται από το Excel, LibreOffice, κτλ
- Είναι μία προσπάθεια να αποθηκεύσουμε σε text μορφή τα δεδομένα

	A	B	C	D
1	givenName	surName	email	phone
2	Thomas	Kamalakis	thkam@hua.gr	2109549406
3	Giannis	Papadopoulos	gpapado@hua.gr	2019549333
4	Nikos	Gallis	ngallis@hua.gr	2109549111

```
givenName;surName;email;phone  
Thomas;Kamalakis;thkam@hua.gr;2109549406  
Giannis;Papadopoulos;gpapado@hua.gr;2019549333  
Nikos;Gallis;ngallis@hua.gr;2109549111
```

Λίστες και αρχεία .csv

- Η Python έχει μία δική της βιβλιοθήκη για την διαχείριση των αρχείων .csv
- Μπορεί κανείς να διαβάσει, να δημιουργήσει και να αλλάξει ένα αρχείο .csv
- Στη συνέχεια αυτό μπορεί να ανοίξει π.χ. στο Excel.

```
1 # Import Python's csv module
2 import csv
3
4 # Open the users csv file
5 csv_file = open('users.csv')
6
7 # Invoke the csv reader and use ";" as delimiter
8 csv_reader = csv.reader(csv_file, delimiter=';')
9
10 # Iterate through the rows of the file
11 for row in csv_reader:
12     print(row) # row is a LIST!
13
14 csv_file.close()
```

```
['givenName', 'surName', 'email', 'phone']
['Thomas', 'Kanalakis', 'thkam@hua.gr', '2109549406']
['Giannis', 'Papadopoulos', 'gpapado@hua.gr', '2019549333']
['Nikos', 'Gallis', 'ngallis@hua.gr', '2109549111']
```

Λίστες και αρχεία .csv

```
1 import csv
2
3 csv_input = open('users.csv')
4 csv_reader = csv.reader(csv_input, delimiter=';')
5
6 csv_output = open('users_out.csv' , 'w') # Open file to write
7 csv_writer = csv.writer(csv_output, delimiter = ';')
8
9 line_count = 0
10 for row in csv_reader:
11     print(row)
12     if line_count == 0: #Header line
13         write_row = ['givenName', 'surname', 'displayName', 'email', 'phone']
14     else:
15         display_name = row[0] + " " + row[1]
16         write_row = [row[0], row[1], display_name, row[2], row[3] ]
17         line_count = line_count + 1
18         csv_writer.writerow(write_row)
19
20 csv_input.close()
21 csv_output.close()
```

```
1 givenName;surname;displayName;email;phone
2 Thomas;Kamalakis;Thomas Kamalakis;thkam@hua.gr;2109549406
3 Giannis;Papadopoulos;Giannis Papadopoulos;gpapado@hua.gr;2019549333
4 Nikos;Gallis;Nikos Gallis;ngallis@hua.gr;2109549111
```

- Τα λεξικά (dict) είναι πολύ χρήσιμες δομές δεδομένων.
- Αντιστοιχούν λέξεις κλειδιά σε τιμές, κλειδί→τιμή
- Thomas→Kamalakis, age→15, κτλ

```
1 d = {'key1' : value1,  
2     'key2' : value2,  
3     ...  
4     }
```

- Κάθε κλειδί πρέπει να έχει μία και μόνο τιμή.
- Η αντιστοίχιση age→15 και age→25 δεν επιτρέπεται.

Python - Λεξικά

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 print( user )
11 print( user['phone'] )
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture5$ python3 dictex.py
{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone'
: '2109549406', 'displayName': 'Thomas Kamalakis'}
2109549406
```

Λεξικά και for

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 for key in user:
11     print(key, ': ', user[key])
```

```
thomas@klrklaptop:~/Documents/nscpython/code/lecture5$ python3 dictfor.py
givenName : Thomas
surname : Kamalakis
email : thkam@hua.gr
phone : 2109549406
displayName : Thomas Kamalakis
```

items()

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 for key, val in user.items():
11     print(key, ': ', val)
```

```
thomas@krklaptop:~/Documents/nscpython/code/lecture5$ python3 dictItems.py
givenName : Thomas
surname : Kamalakis
email : thkam@hua.gr
phone : 2109549406
displayName : Thomas Kamalakis
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []           # Initialize empty list
7 line_count = 0
8 for row in csv_reader:
9     if line_count == 0:
10         pass
11     else:
12         d = {
13             'givenName' : row[0],
14             'surname' : row[1],
15             'email' : row[2],
16             'phone' : row[3]
17         }
18         users.append( d ) # add to user list
19         line_count += 1
20 print(users)
21 csv_file.close()
```

```
thomas@kirkleptop:~/Documents/mscpython/code/lectures$ python3 -i dictcsv.py
[{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surname': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surname': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []           # Initialize empty list
7 line_count = 0
8 for row in csv_reader:
9     if line_count == 0:
10         keys = row
11     else:
12         d = {}        # Empty dictionary
13         for i, k in enumerate(keys):
14             d[k] = row[i]
15         users.append( d ) # add to user list
16         line_count += 1
17 print(users)
18
19 csv_file.close()
```

```
thomas@ktrklaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv2.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Glannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>> █
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []                # Initialize empty list
7 keys = next(csv_reader)  # Keys are located on the first row
8
9 for row in csv_reader:
10     d = {}                # Empty dictionary
11     for i, k in enumerate(keys):
12         d[k] = row[i]
13     users.append( d )    # add to user list
14 print(users)
15
16 csv_file.close()
```

```
thomas@kirkclaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv4.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2 users = [] # Initialize empty list
3
4 with open('users.csv', 'r') as csv_file:
5     csv_reader = csv.reader(csv_file, delimiter = ';')
6     keys = next(csv_reader) # Keys are located on the first row
7
8     for row in csv_reader:
9         d = {} # Empty dictionary
10        for i, k in enumerate(keys):
11            d[k] = row[i]
12        users.append( d ) # add to user list
13 print(users)
14 # No need to close csv_file !
```

```
thomas@kirkilaptop:~/Documents/mcspython/code/lecture5$ python3 -i dictcsv3.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549486'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2 users = []                # Initialize empty list
3
4 with open('users.csv', 'r') as csv_file:
5     csv_reader = csv.reader(csv_file, delimiter = ';')
6     keys = next(csv_reader) # Keys are located on the first row
7
8     for row in csv_reader:
9         d = {k : row[i] for i, k in enumerate(keys)}
10        d[k] = row[i]
11        users.append( d ) # add to user list
12 print(users)
13 # No need to close csv_file !
```

```
thomas@kirkilaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv5.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

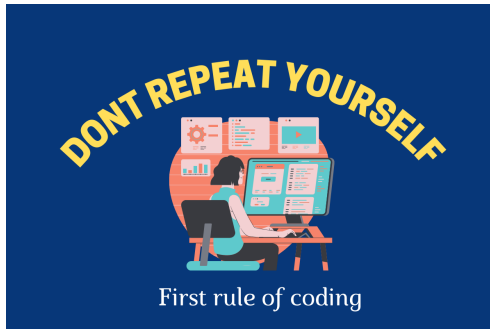
Παράδειγματα

```
1 import csv
2
3 with open('users.csv', 'r') as csv_file:
4     csv_reader = csv.reader(csv_file, delimiter = ';')
5     keys = next(csv_reader) # Keys are located on the first row
6
7     users = [ {k : row[i] for i, k in enumerate(keys) } for row in csv_reader ]
8 print(users)
9 # No need to close csv_file !
```

```
thomas@kirkclaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv6.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

DRY

- Μία βασική αρχή του coding είναι το DRY
- Do not Repeat Yourself
- Γράφουμε ένα τμήμα του κώδικα και το γράφουμε καλά
- Μετά προσπαθούμε να το χρησιμοποιήσουμε όσο το δυνατόν πιο συχνά



Pyhton functions

- Ένας από τους τρόπους να το κάνουμε αυτό είναι να χρησιμοποιήσουμε συναρτήσεις
- Μία συνάρτηση μπορεί να δέχεται ορίσματα εισόδου και να επιστρέφει κάποια αποτελέσματα

```
1 def function( input_variables ) :  
2     ...  
3     do staff here  
4     ...  
5  
6     return output_variables
```

Παραδείγματα

```
1 """
2 Function examples
3 """
4
5 def add(a, b):
6     return a + b
7
8 def user_dict(givenName, surname, email, phone):
9     displayName = givenName + surname
10    return {
11        'givenName' : givenName,
12        'surname' : surname,
13        'email' : email,
14        'phone' : phone,
15        'displayName' : displayName
16    }
17
18 c = add(1, 2)
19 print(c)
20 user = user_dict('Thomas', 'Kamalakis', 'thkam@hua.gr', '2109549406')
21 print( user )
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture3$ python3 -i funexamples.py
3
{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone':
: '2109549406', 'displayName': 'ThomasKamalakis'}
```