Working with JSON in Python

INF 551

Wensheng Wu

Python primer

- String: 'abc' or "abc"
- List: x = ['abc', 25]
  - x[0] =?
  - x.append(True) // True is boolean
  - x.append(None) // None is NoneType = null
- Tuple: y = ('abc', 25)
  - y[0] =?
  - What about y.append(True)?

Python primer

- Dictionary: z = {'name': 'john', 25: 'age'}
  - Note key in Python can also be integer or tuple
  - z['name'] = ?
  - z[25]=?
  - What about z['age'] or z['25']?

- z['gender'] = 'male'
  - z = {25: 'age', 'name': 'john', 'gender': 'male'}

Working with JSON in Python

- import json
  - Loading json library module
- json.dumps()
  - JSON encoder
  - Python object => JSON document
- json.loads()
  - JSON decoder
  - JSON document => Python object

Python object => JSON document

- Python list => JSON array
  - json.dumps([1, 2]) => '[1, 2]'
  - json.dumps([3, 'abc', True, None]) => '[3, "abc", true, null]'
- Python tuple => JSON array
  - json.dumps((1, 'abc')) => '[1, "abc"]'

Python object => JSON document

- Python dictionary => JSON object
  - json.dumps({'name': 'john', 25: 'age'}) => '{"25": "age", "name": "john"}'

- Notes
  - None => null
  - True => true
  - 'abc' => "abc"

Python object => JSON document

- json.dumps(['foo', {'bar': ('baz', None, 1.0, 2)}])
  - '["foo", {"bar": ["baz", null, 1.0, 2]}]'

- json.dumps({(1,2): 5})
  - Error (key is a tuple, Ok in Python)
  - dumps() doesn't take tuple as key (but see below)
- json.dumps({(2): 5}) => '{"2": 5}'

JSON document => Python object

- JSON object => Python dictionary
  - json.loads('{"name": "john", "age": 5}') => {u'age': 5, u'name': u'john'}
  - Note: 'u' means "unicode"

- JSON array => Python list
  - json.loads('[25, "abc"]') => [25, u'abc']

JSON document => Python object

- json.loads('"abc"') => u'abc'
- json.loads('25.2') => 25.2
- json.loads('true') => True
- json.loads('null') => None

- json.loads('{"name": "john", "age": 25, "phone": [123, 456]}')

  => {u'phone': [123, 456], u'age': 25, u'name': u'john'}

Conversion summary

JSON	Python
Object	Dictionary
Array	List
Array	Tuple (from Python)
null	None
true	True
false	False

Python dictionary => JSON object

- Keys in Python can be number, string, or tuple.
- Number is also converted to string.
- But tuple (with two or more components) is not acceptable by dumps()/dump().

Working with files

- f = open('lax.json')
- lax= json.load(f)

- out_file = open('output.json', 'w')
- json.dump(lax, out_file)

LAX passenger traffic data

- Download data at:
  - https://data.lacity.org/A-Prosperous-City/Los-Angeles-International-Airport-Passenger-Traffi/g3qu-7q2u

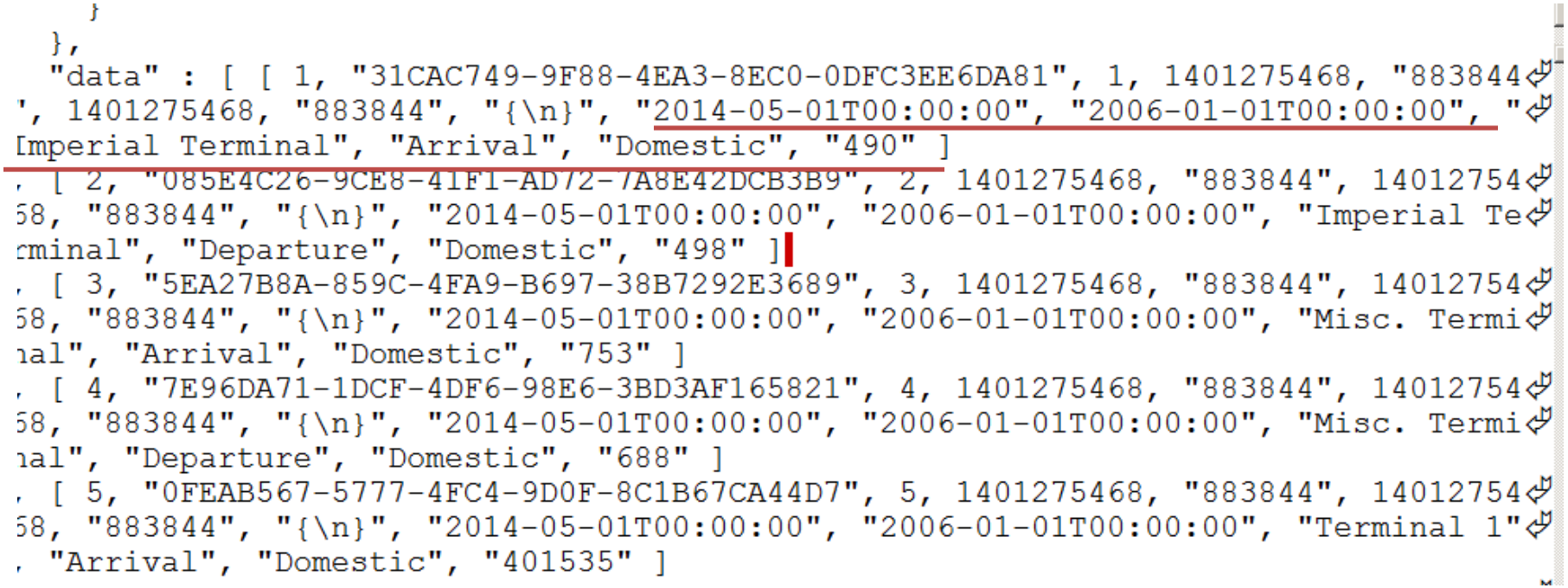
- A copy is available on Blackboard too
  - In the Resources folder

Data spreadsheet

	ReportPeriod	Terminal	Arrival_Departure	Domestic_International	Passenger_Count
4650	07/01/2016 12:00:00 AM	Terminal 3	Arrival	Domestic	402,452
4651	07/01/2016 12:00:00 AM	Terminal 3	Departure	Domestic	390,418
4652	07/01/2016 12:00:00 AM	Terminal 3	Departure	International	4,365
4653	07/01/2016 12:00:00 AM	Terminal 4	Arrival	Domestic	422,257
4654	07/01/2016 12:00:00 AM	Terminal 4	Arrival	International	35,800
4655	07/01/2016 12:00:00 AM	Terminal 4	Departure	Domestic	384,861
4656	07/01/2016 12:00:00 AM	Terminal 4	Departure	International	64,590
4657	07/01/2016 12:00:00 AM	Terminal 5	Arrival	Domestic	456,188
4658	07/01/2016 12:00:00 AM	Terminal 5	Arrival	International	78,781
4659	07/01/2016 12:00:00 AM	Terminal 5	Departure	Domestic	478,348
4660	07/01/2016 12:00:00 AM	Terminal 5	Departure	International	71,021
4661	07/01/2016 12:00:00 AM	Terminal 6	Arrival	Domestic	374,394

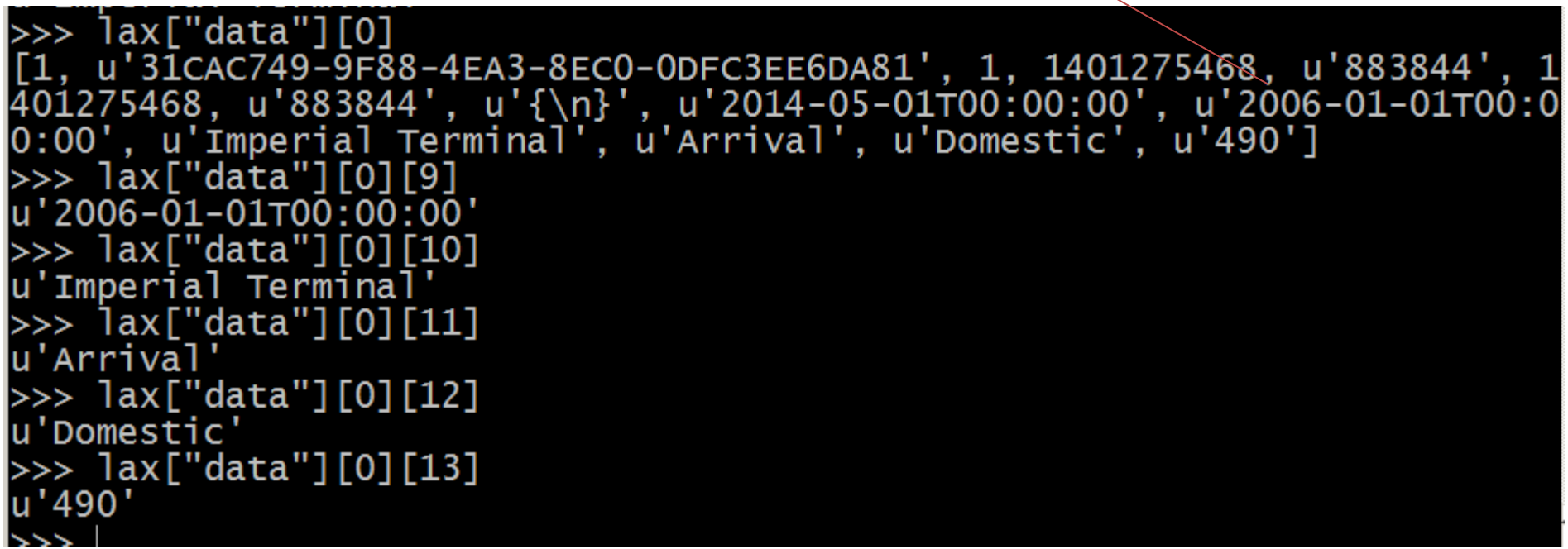
JSON file (lax.json)

- Ignore "meta" info (in the beginning of file)
- Records are in the value of "data"



Querying it in Python

ReportPeriod



Resources

- JSON
  - https://en.wikipedia.org/wiki/JSON
  - Syntax: http://www.json.org/
- JSON encoder and decoder
  - https://docs.python.org/2/library/json.html