

MOOC Python

Corrigés de la semaine 5

shipdict - Semaine 6 Séquence 4

```
1
2 # helpers - used for verbose mode only
3 # could have been implemented as static methods in Position
4 # but we had not seen that at the time
5 def d_m_s(f):
6     """
7     make a float readable; e.g. transform 2.5 into 2.30'00''
8     we avoid using the degree sign to keep things simple
9     input is assumed positive
10    """
11    d = int (f)
12    m = int((f-d)*60)
13    s = int( (f-d)*3600 - 60*m)
14    return "{:02d}.{:02d}'{:02d}''".format(d,m,s)
15
16 def lat_d_m_s(f):
17     """
18     degree-minute-second conversion on a latitude float
19    """
20    if f >= 0:
21        return "{} N".format(d_m_s(f))
22    else:
23        return "{} S".format(d_m_s(-f))
24
25 def lon_d_m_s(f):
26     """
27     degree-minute-second conversion on a longitude float
28    """
29    if f >= 0:
30        return "{} E".format(d_m_s(f))
31    else:
32        return "{} W".format(d_m_s(-f))
```

```

1 class Position(object):
2     "a position atom with timestamp attached"
3
4     def __init__(self, latitude, longitude, timestamp):
5         "constructor"
6         self.latitude = latitude
7         self.longitude = longitude
8         self.timestamp = timestamp
9
10    # all these methods are only used when merger.py runs in verbose mode
11    def lat_str(self):
12        return lat_d_m_s(self.latitude)
13    def lon_str(self):
14        return lon_d_m_s(self.longitude)
15
16    def __repr__(self):
17        """
18        only used when merger.py is run in verbose mode
19        """
20        return "<{} {} @ {}".format(self.lat_str(),
21                                       self.lon_str(), self.timestamp)

```

```

1 class Ship(object):
2     """
3     a ship object, that requires a ship id,
4     and optionnally a ship name and country
5     which can also be set later on
6
7     this object also manages a list of known positions
8     """
9     def __init__(self, id, name=None, country=None):
10         "constructor"
11         self.id = id
12         self.name = name
13         self.country = country
14         # this is where we remember the various positions over time
15         self.positions = []
16
17     def add_position(self, position):
18         """
19         insert a position relating to this ship
20         positions are not kept in order so you need
21         to call 'sort_positions' once you're done
22         """
23         self.positions.append(position)
24
25     def sort_positions(self):
26         """
27         sort list of positions by chronological order
28         """
29         self.positions.sort(key=lambda position: position.timestamp)

```

```

1 class ShipDict(dict):
2     """
3     a repository for storing all ships that we know about
4     indexed by their id
5     """
6     def __init__(self):
7         "constructor"
8         dict.__init__(self)
9
10    def __repr__(self):
11        return "<ShipDict instance with {} ships>".format(len(self))
12
13    def is_abbreviated(self, chunk):
14        """
15        depending on the size of the incoming data chunk,
16        guess if it is an abbreviated or extended data
17        """
18        return len(chunk) <= 7
19
20    def add_abbreviated(self, chunk):
21        """
22        adds an abbreviated data chunk to the repository
23        """
24        id, latitude, longitude, *_ , timestamp = chunk
25        if id not in self:
26            self[id] = Ship(id)
27        ship = self[id]
28        ship.add_position (Position (latitude, longitude, timestamp))
29
30    def add_extended(self, chunk):
31        """
32        adds an extended data chunk to the repository
33        """
34        id, latitude, longitude = chunk[:3]
35        timestamp, name = chunk[5:7]
36        country = chunk[10]
37        if id not in self:
38            self[id] = Ship(id)
39        ship = self[id]
40        if not ship.name:
41            ship.name = name
42            ship.country = country
43        self[id].add_position (Position (latitude, longitude, timestamp))

```

```

1  def add_chunk(self, chunk):
2      """
3      chunk is a plain list coming from the JSON data
4      and be either extended or abbreviated
5
6      based on the result of is_abbreviated(),
7      gets sent to add_extended or add_abbreviated
8      """
9      if self.is_abbreviated(chunk):
10         self.add_abbreviated(chunk)
11     else:
12         self.add_extended(chunk)
13
14     def sort(self):
15         """
16         makes sure all the ships have their positions
17         sorted in chronological order
18         """
19         for id, ship in self.items():
20             ship.sort_positions()
21
22     def clean_unnamed(self):
23         """
24         Because we enter abbreviated and extended data
25         in no particular order, and for any time period,
26         we might have ship instances with no name attached
27         This method removes such entries from the dict
28         """
29         # we cannot do all in a single loop as this would amount to
30         # changing the loop subject
31         # so let us collect the ids to remove first
32         unnamed_ids = { id for id, ship in self.items()
33                         if ship.name is None }
34         # and remove them next
35         for id in unnamed_ids:
36             del self[id]

```

```

1     def ships_by_name(self, name):
2         """
3         returns a list of all known ships with name <name>
4         """
5         return [ ship for ship in self.values() if ship.name == name ]
6
7     def all_ships(self):
8         """
9         returns a list of all ships known to us
10        """
11        # we need to create an actual list because it
12        # may need to be sorted later on, and so
13        # a raw dict_values object won't be good enough
14        return self.values()
15

```