D: Dictionaries and tuples

Gareth McCaughan   Revision 1.8, May 14, 2001

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Introduction

The worksheets that make up most of this course don't cover everything. Two important things they don't cover are "dictionaries" and "tuples". This sheet tells you a little about those.

Dictionaries

The easiest way to explain what a dictionary is is to give an example. So here is one.

```
>>> dict = {}                     An empty dictionary.
>>> dict[1] = 'boo!'              Add a piece of information to it.
>>> dict['ouch'] = 99             And another.
>>> dict                          Lets's see what's in there.
'ouch': 99, 1: 'boo!'            Two ''associations''.
>>> dict['ouch']                  What's associated with 'ouch' ?
99                                This is.
```

So, a dictionary is a little like a list, except that while an array has entries labelled by numbers (a[0], a[1], etc), the entries in a dictionary can be labelled by things other than numbers. (Most usefully, they can be labelled by numbers and by strings.)

It's sometimes helpful to think of a dictionary as being made up of "associations". An association is a piece of information like "'ouch' is associated with 99". So the dictionary we built above contains two associations.

You might use a dictionary to hold an address list, with each association pairing a person's name up with their address. Or it might hold information about all the players in a multi-player game, or about all the computers connected to a network.

The two parts of an association are sometimes called the *key* and the *value*: you find the value by looking up the key. So in the dictionary we made above, the keys are 1 and 'ouch', and the corresponding values are 'boo!' and 99.

As we've seen, you use dictionaries in the same sort of way as you use lists: if d is a dictionary then d[k] is the value associated with the key k.

To change an association in a dictionary, just say something like dict['ouch'] = 1000. To remove an association entirely, say del dict['ouch']. (del is short for "delete".)

To test whether a dictionary has any association with key k, do something like this:

```
>>> dict = {'a': 123, 'b': 987}        Set up a dictionary
>>> dict.has_key('a')                   Any association for 'a' ?
1                                       Yes.
>>> dict.has_key('z')                   Any association for 'z' ?
0                                       Nope.
```

Keys

Not all objects are allowed as keys for dictionaries. We've already seen that numbers and strings are OK. Unfortunately, lists aren't. However, there's a data type very similar to the list that you *can* use: the "tuple". Tuples are the other subject of this sheet. . .

Tuples

A tuple is like a list. There are only two differences you need to care about:

1. Tuples are "immutable". In other words, once you've got a tuple you aren't allowed to change its contents. If x is a list then you can say x[1]=99; if it's a tuple, you can't.

2. Tuples are written a little differently: instead of [1,2,3,4] you say (1,2,3,4).

You can use a tuple almost anywhere where you'd use a list. For instance, you can say for x in (1,2,3,4): instead of for x in [1,2,3,4] (see Sheet L (*Loops*) if you don't know what that's about).

If for some reason you want a tuple containing only one object, you can't write it as (x) (can you think why?). Instead, you say (x,). Weird, I'm afraid . . .