

## Problem 1

This problem was asked by Quora.

You are given a list of `(website, user)` pairs that represent users visiting websites. Come up with a program that identifies the top `k` pairs of websites with the greatest similarity.

For example, suppose `k = 1`, and the list of tuples is:

```
[('a', 1), ('a', 3), ('a', 5),  
 ('b', 2), ('b', 6),  
 ('c', 1), ('c', 2), ('c', 3), ('c', 4), ('c', 5)  
 ('d', 4), ('d', 5), ('d', 6), ('d', 7),  
 ('e', 1), ('e', 3), ('e', 5), ('e', 6)]
```

Then a reasonable similarity metric would most likely conclude that `a` and `e` are the most similar, so your program should return `[('a', 'e')]`.

## Problem 2

This problem was asked by Stripe.

Write a function to flatten a nested dictionary. Namespace the keys with a period.

For example, given the following dictionary:

```
{  
  "key": 3,  
  "foo": {  
    "a": 5,  
    "bar": {  
      "baz": 8  
    }  
  }  
}
```

it should become:

```
{  
  "key": 3,  
  "foo.a": 5,  
  "foo.bar.baz": 8  
}
```

You can assume keys do not contain dots in them, i.e. no clobbering will occur.

### **Problem 3**

This problem was asked by Twitter.

Implement an autocomplete system. That is, given a query string `s` and a set of all possible query strings, return all strings in the set that have `s` as a prefix.

For example, given the query string `de` and the set of strings `[dog, deer, deal]`, return `[deer, deal]`.