Verkefni 1

CDO

Your friend suffers from a rare form of OCD, called CDO, which is like OCD except in alphabetical order, **as it should be**! As a consequence your friend can only read sentences if their words are in alphabetical order.

Write a function `cdo` which takes as a parameter a single string containing a number of words. The function returns a string containing the same words, in alphabetical order.

Example

```
>>> cdo('in theory there is no difference between theory and practice')
'and between difference in is no practice theory theory there'
```

Find duplicate elements

Write a function `duplicates(s)` that takes a list of numbers or strings and returns a list containing all the elements that appear more than once in the list (duplicates).

Example

```
>>> duplicates([1337, 42, 5318008, 1337, 5318008, 5885522])
[1337, 5318008]
```

Flatten list

A list of integers of length n is called *flat* if it contains all the integers from 0 to n - *1*. Given a list L of unique integers, we define the *flattened* list, written *fl(L)*, as the list containing the integers from 0 to n - *1* with the same relative order as L. For example if L = *[8,4,1,3]* then *fl(L) = [3,2,0,1]*.

Write a function `flatten` that takes a list of unique integers and returns the flattened list.

Example

```
>>> flatten([100, 42, 4, 1337])
[2, 1, 0, 3]
```

Remove Duplicates

Write a function `rm_duplicates` which takes a list of integers as a parameter. The function returns a list containing the integers of the list provided as a parameter in increasing order, where duplicate elements have been removed.

Example

```
>>> rm_duplicates([18, 7, 1, 15, 15, 1, 19])
[1, 7, 15, 18, 19]
```

Scrambling

Write a function `scramble` that takes two lists of integers, $L = [l_0, l_1, ..., l_n]$ and $I = [i_0, i_1, ..., i_n]$, as arguments. The list I contains all the integers from 0 to n -1 (in some order). The function returns the list $M = [m_0, m_1, ..., m_n]$, where $m_k = l_{i_k}$.

Example

```
>>> scramble([100, 42, 4, 1337], [1,3,2,0])
[42, 1337, 4, 100]
```

Excel indices

In Excel indices of columns are represented by letters. The first column is column A, the second is column B and the 26th column is column Z. Since Excel allows more than 26 columns, the next columns are represented by two letters. The 27th column is represented by AA, the 28th by AB, and so forth until we reach column ZZ. After that columns are represented by three letters, then four letters, etc.

Write a function `excel_index(s)` that takes a string, containing an Excel column index, i.e. a sequence of the letters from A to Z in upper case. The function returns the numerical index of that column.

Example

```
>>> excel_index('A')
1
>>> excel_index('C')
3
>>> excel_index('AA')
27
>>> excel_index('LOL')
8514
```

Shared birthdays

In this exercise you are given a list of Icelandic identity numbers (kennitala). Encoded in each of the ID numbers is the date of birth of the person it identifies. In this problem your aim is to find the ID numbers of all the people who share a birthday.

Write a function `birthdays(s)` that takes a string, containing multiple lines. Each line of the string contains a ten digit (personal) ID number. The function returns a list of tuples. For each shared birthday, the list should contain a tuple containing all the kennitalas of the people who have that birthday. Note that the order in which the tuples appear in the list does not matter, and neither does the order of the ID numbers within each tuple.

Example

```
>>> birthdays('''0212862149
0407792319
0212849289
1112792819
0407992939
0212970299''')
[('0212849289', '0212862149', '0212970299'), ('0407792319', '0407992939')]
```

Process ls

Unix based systems provide a command `ls` to list the contents of a directory. By default it displays the contents in multiple columns (the number of columns is determined by the width of the console window). The space between entries in adjacent columns is at least two spaces. An example of the output is as follows.

```
acpid.pid     console-kit-daemon.pid  lock        pm-utils      sdp                       upstart-socket-br
acpid.socket  crond.pid               mdm.pid     postgresql    sendsigs.omit.d           upstart-udev-brid
apache2       crond.reboot            mdm_socket  pppconfig     shm                       user
apache2.pid   cups                    motd        resolvconf    udev                      utmp
avahi-daemon  dbus                    mount       rsyslogd.pid  udisks                    wicd
console       dhclient.pid            network     samba         udisks2                   wpa_supplicant
ConsoleKit    initramfs               plymouth    screen        upstart-file-bridge.pid
```

Write a function `process_ls` that takes a string, containing the output from a call to `ls`. The function returns a list containing the contents of the directory. The order of the contents should be the same as specified in the string, i.e. the contents in the first column from top to bottom, then the second column, etc.

Note that the contents of the directory will not contain two adjacent spaces, and will not start or end with a space.

Example

```
>>> process_ls("""acpid.pid     console-kit-daemon.pid  lock        pm-utils      sdp
acpid.socket  crond.pid               mdm.pid     postgresql    sendsigs.omit.d           upstart-udev-brid
apache2       crond.reboot            mdm_socket  pppconfig     shm                       user
apache2.pid   cups                    motd        resolvconf    udev                      utmp
avahi-daemon  dbus                    mount       rsyslogd.pid  udisks                    wicd
console       dhclient.pid            network     samba         udisks2                   wpa_supplicant
ConsoleKit    initramfs               plymouth    screen        upstart-file-bridge.pid""")
['acpid.pid', 'acpid.socket', 'apache2', 'apache2.pid', 'avahi-daemon', 'console', 'ConsoleKit',
 'console-kit-daemon.pid', 'crond.pid', 'crond.reboot', 'cups', 'dbus', 'dhclient.pid', 'initramfs',
 'lock', 'mdm.pid', 'mdm_socket', 'motd', 'mount', 'network', 'plymouth', 'pm-utils', 'postgresql',
 'pppconfig', 'resolvconf', 'rsyslogd.pid', 'samba', 'screen', 'sdp', 'sendsigs.omit.d', 'shm', 'udev',
 'udisks', 'udisks2', 'upstart-file-bridge.pid', 'upstart-socket-bridge.pid', 'upstart-udev-bridge.pid',
 'user', 'utmp', 'wicd', 'wpa_supplicant']
```