Lab 1.2 (Deadline Friday 21 January 23:59)

- Upload your code to Einstein to have it verified.

Password security

- Password security is a problem when users choose passwords that can be easily guessed. Write a Python program that assesses the security of a password by counting the number of character classes it contains. For our purposes there are four character classes: digits, lower case characters, upper case characters and special characters (i.e. everything else).
- Write a program called *`password_012.py`* that reads passwords from `stdin`. For each password read the program should print out the number of character classes it contains. For example:

```
$ cat password_stdin_00_012.txt
256
abc
aBc
1aBc2
^@())($$$
^@a1())B($43$$
```

```
$ python3 password_012.py < password_stdin_00_012.txt
1
1
2
3
1
4
```

- Hint: Use `pydoc` or `help` to have a look at the `str` class documentation. You will find described therein various methods that will be useful in determining the class of each character in the string.

Plural

- Write a program called *`plural_012.py`* that reads nouns from `stdin`. For each noun read the program should print its plural according to the following rules:
  - Add *es* if the noun ends in *ch*, *sh*, *x*, *s* or *z*.
  - If a noun ends in a consonant + *y* drop the *y* and add *ies*.
  - If a noun ends in *f* (or *fe*) drop the *f* (or *fe*) and add *ves*.
  - If a noun ends in *o* add *es*.
  - Otherwise add *s*.

  For example:

```
$ cat plural_stdin_00_012.txt
peach
```

```
wife
bay
dish
box
fuss
fuzz
banjo
dainty
toy
self
nut
```

```
$ python3 plural_012.py < plural_stdin_00_012.txt
peaches
wives
bays
dishes
boxes
fusses
fuzzes
banjoes
dainties
toys
selves
nuts
```

Poetry

- Write a program called *poetry_012.py* that reads in the lines of a poem from `stdin` and uses f-strings to output a centred version. For example:

```
$ cat poetry_stdin_00_012.txt
Sonnet 98
by William Shakespeare

From you have I been absent in the spring,
When proud-pied April dress’d in all his trim
Hath put a spirit of youth in every thing,
That heavy Saturn laugh’d and leap’d with him.
Yet nor the lays of birds nor the sweet smell
Of different flowers in odour and in hue
Could make me any summer’s story tell,
Or from their proud lap pluck them where they grew;
Nor did I wonder at the lily’s white,
Nor praise the deep vermilion in the rose;
They were but sweet, but figures of delight,
Drawn after you, you pattern of all those.
Yet seem’d it winter still, and, you away,
As with your shadow I with these did play.
```

```
$ python3 poetry_012.py < poetry_stdin_00_012.txt
                    Sonnet 98
              by William Shakespeare

    From you have I been absent in the spring,
   When proud-pied April dress’d in all his trim
    Hath put a spirit of youth in every thing,
  That heavy Saturn laugh’d and leap’d with him.
   Yet nor the lays of birds nor the sweet smell
```

```
     Of different flowers in odour and in hue
      Could make me any summer's story tell,
Or from their proud lap pluck them where they grew;
       Nor did I wonder at the lily's white,
    Nor praise the deep vermilion in the rose;
   They were but sweet, but figures of delight,
    Drawn after you, you pattern of all those.
    Yet seem'd it winter still, and, you away,
    As with your shadow I with these did play.
```

Pi

- Write a program called *`pi_012.py`* that reads integers from `stdin` and, for each integer read, uses an f-string to print pi to that number of decimal places.
- Note you will have to import the `math` module to get access to the `math.pi` constant. For example:

```
$ cat pi_stdin_00_012.txt
1
2
3
4
10
```

```
$ python3 pi_012.py < pi_stdin_00_012.txt
3.1
3.14
3.142
3.1416
3.1415926536
```

League table

- Write a program called *`league_012.py`* that reads in the lines of a league table from `stdin` and uses f-strings to display them in neatly tabulated columns. For example:

```
$ cat league_stdin_00_012.txt
1 Spurs 11 7 3 1 23 9 14 24
2 Liverpool 11 7 3 1 26 17 9 24
3 Chelsea 11 6 4 1 25 11 14 22
4 Leicester 11 7 0 4 21 15 6 21
5 Man Utd 10 6 1 3 19 17 2 19
6 Man City 10 5 3 2 17 11 6 18
7 West Ham 11 5 2 4 18 14 4 17
8 Southampton 10 5 2 3 19 16 3 17
9 Everton 11 5 2 4 20 18 2 17
10 Wolves 11 5 2 4 11 15 -4 17
11 C Palace 11 5 1 5 17 16 1 16
12 Aston Villa 9 5 0 4 20 13 7 15
13 Newcastle 10 4 2 4 12 15 -3 14
14 Leeds 11 4 2 5 16 20 -4 14
15 Arsenal 11 4 1 6 10 14 -4 13
16 Brighton 10 2 4 4 14 16 -2 10
17 Fulham 11 2 1 8 11 21 -10 7
18 Burnley 10 1 3 6 5 18 -13 6
```

```
19 West Brom 11 1 3 7 8 23 -15 6
20 Sheff Utd 11 0 1 10 5 18 -13 1
```

```
$ python3 league_012.py < league_stdin_00_012.txt
POS CLUB         P   W   D   L  GF  GA  GD PTS
  1 Spurs       11   7   3   1  23   9  14  24
  2 Liverpool   11   7   3   1  26  17   9  24
  3 Chelsea     11   6   4   1  25  11  14  22
  4 Leicester   11   7   0   4  21  15   6  21
  5 Man Utd     10   6   1   3  19  17   2  19
  6 Man City    10   5   3   2  17  11   6  18
  7 West Ham    11   5   2   4  18  14   4  17
  8 Southampton 10   5   2   3  19  16   3  17
  9 Everton     11   5   2   4  20  18   2  17
 10 Wolves      11   5   2   4  11  15  -4  17
 11 C Palace    11   5   1   5  17  16   1  16
 12 Aston Villa  9   5   0   4  20  13   7  15
 13 Newcastle   10   4   2   4  12  15  -3  14
 14 Leeds       11   4   2   5  16  20  -4  14
 15 Arsenal     11   4   1   6  10  14  -4  13
 16 Brighton    10   2   4   4  14  16  -2  10
 17 Fulham      11   2   1   8  11  21 -10   7
 18 Burnley     10   1   3   6   5  18 -13   6
 19 West Brom   11   1   3   7   8  23 -15   6
 20 Sheff Utd   11   0   1  10   5  18 -13   1
```

- There is more work in this than might first appear:

    1. The width of the CLUB field depends on the list of clubs supplied to the program: it should be just wide enough to accommodate the longest club name (above that would be Southampton). This means you will have to do some preprocessing on the list read from `stdin` before you can print it.
    2. The P field is 2 characters wide. All other fields are 3 characters wide. (Not including the space between fields.)
    3. Extracting the club name will require some ingenuity. Hint: if each line is converted to a list of tokens then the first word in the club name is at a fixed index from the left while the last word in the club name is at a fixed index from the right. Thus a specially crafted slice over the tokens in each line should grab the club name.