LEARN CODING

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github.com/ale66/learn-coding

AUXILIARY VARIABLES

TOPICS

- counters
- accumulators
- trailers

COUNTERS

A variable, normally of type integer, that is incremented as we *parse* an iterable

Example: compute list size/lenght

```
1  l = 0
2
3  for f in fruits:
4
5    l = l +1
6
7  print(f'The lenght of list {fruits} is {l}')
```

Syntax: `l += 1` is shorthand for `l = l + 1`

ANONYMOUS VARIABLES

In fact, we are not operating on `f`

it can be omitted in favour of an *anonymous variable* `_`

```
1 l = 0
2
3 for _ in fruits:
4
5   l += 1
6
7 print(f'The lenght of list {fruits} is {l}')
```

ACCUMULATORS

A variable to record quantities seen during the iteration

Example: the average of an arbitrary list of positive numbers

```
 1  l = 0
 2  accumulator = 0
 3
 4  for val in mylist:
 5    l += 1
 6    accumulator += val
 7
 8  if l > 0:
 9    average =  accumulator / l # this will be a float
10
11  print(f'There are {l} values and their average is {average}')
```

TRAILING VARIABLES

A variable that *remembers* past values during an iteration

Example: find the biggest *temperature increase* in a list

```
maxincrease = 0

trailer = temperaturelist[0]

for temp in temperaturelist:

  current_increase = temp - trailer

  if current_increase > maxincrease:
    maxincrease = current_increase # a new max is found

  # we are finished with this value, assign it to the trailer
  trailer = temp

print(f'The maximum day-on-day increase has been {maxincrease} degrees')
```

PROGRAMME COMPREHENSION

To grasp how trailers work, put extra `print()` commands to see what the variables contain

Rename variables:

```
1  yesterday = temperaturelist[0]
2
3  for today in temperaturelist:
4
5    current_increase = today - yesterday
6
7    ...
8
9    yesterday =  today
```

A MORE COMPLETE ENCODING

```
 1  temperaturelist = [12, 16, 18, 16, 19, 18, 20, 21]
 2
 3  max_difference = 0
 4
 5  yesterday = temperaturelist[0]
 6
 7  for today in temperaturelist:
 8
 9    current_temp_difference = abs(today - yesterday)
10
11    if current_temp_difference > max_difference:
12        max_difference = current_temp_difference
13
14    yesterday =  today
15
16  print(max_difference)
```

Run it on Pythontutor

QUIZ

Complete code for searching a given number in a sequence

```
1  KEY = 22
2
3  mylist = [1, 6, 3, 9, 10]
4
5  ___ item ___ mylist:
6    if ___ == ___:
7      found = True
8    else:
9      found = False
```