

# Bus

This bus has a passenger entry and exit control system to monitor the number of occupants it carries and thus detect when there is too high a capacity.

At each stop the entry and exit of passengers is represented by a tuple consisting of two integer numbers.

```
bus_stop = (in, out)
```

The succession of stops is represented by a list of these tuples.

```
stops = [(in1, out1), (in2, out2), (in3, out3), (in4, out4)]
```

## Goals:

- lists, tuples
- while/for loops
- minimum, maximum, length
- average, standard deviation

## Tasks

1. Calculate the number of stops.
2. Assign to a variable a list whose elements are the number of passengers at each stop (in-out),
3. Find the maximum occupation of the bus.
4. Calculate the average occupation. And the standard deviation.

In [2]:

```
# variables

stops = [(10, 0), (4, 1), (3, 5), (3, 4), (5, 1), (1, 5), (5, 8), (4, 6), (2, 3)]
```

In [3]:

```
# 1. Calculate the number of stops.

print(len(stops))
```

9

**Expected output:**

9

In [4]:

```
# 2. Assign a variable a list whose elements are the number of passengers in each stop:
# Each item depends on the previous item in the list + in - out.

number_passengers_stop = []

for x in stops:
    change_in_passengers = x[0] - x[1]
    if number_passengers_stop == []:
        number_passengers_stop.append(change_in_passengers)
    else:
        total_passengers = number_passengers_stop[-1] + change_in_passengers
        number_passengers_stop.append(total_passengers)

print(number_passengers_stop)
```

```
[10, 13, 11, 10, 14, 10, 7, 5, 4]
```

**Expected output:**

```
[10, 13, 11, 10, 14, 10, 7, 5, 4]
```

In [5]:

```
# 3. Find the maximum occupation of the bus.

print(max(number_passengers_stop))
```

```
14
```

**Expected output:**

```
14
```

In [10]:

```
# 4. Calculate the average occupation. And the standard deviation.

average_occupation = sum(number_passengers_stop) / len(number_passengers_stop)
print(average_occupation)

import statistics

standard_deviation_occupation = statistics.stdev(number_passengers_stop, average_occupation)

print(standard_deviation_occupation)
```

```
9.333333333333334
```

```
3.391164991562634
```

**Expected output:**

9.333333333333334

3.197221015541813