

Main objectives

- Decomposition of a real bus cycle into its different components (driving / boarding and alighting / waiting)
- Optimization of the bus cycle time

Data to collect:

- Arrival and departure times at each bus stop;
- Number of passengers boarding and alighting at each bus stop;
- Lost time:
 - Waiting time to respect timetable;
 - Waiting time for other reasons (e.g., traffic disturbance);

Example: bus_705_stops.xlsx

Bus line: 705						
Stops	Time		Passengers		Lost time	
	Arrival	Departure	Boarding	Alighting	Duration	Reason
Direction: EPFL Piccard						
Lonay, parc						
Lonay, église						
Lonay, Carouge						
Lonay, collège sud						
Lonay, gare						
Préverenges, Capellan						
Préverenges, village						
Denges, Pierraz-Mur						

...

Print from Moodle beforehand

Bus stops



Bus lines (to be confirmed)

Bus line	1st stop	Direction	Departure time
705	EPFL, Piccard	Lonay, parc	16:23
705	EPFL, Piccard	Lonay, parc	16:43
705	EPFL, Piccard	Lonay, parc	17:03
31	Pâqueret	Renens, gare sud	16:17
31	Pâqueret	Renens, gare sud	16:27
31	Pâqueret	Renens, gare sud	16:37
31	Pâqueret	Renens, gare sud	16:47
31	Pâqueret	Venoge sud	16:24
31	Pâqueret	Venoge sud	16:35
31	Pâqueret	Venoge sud	16:45
31	Pâqueret	Venoge sud	16:55

Distribution of tasks:

- All students of a group will board a bus following the schedule provided on the week of the midterm exam;
- The students will travel an entire round trip of the designated line (start and end at the same stop);
- Passenger counting: **3 students** should position close to the doors (one student per bus door) and count the number of passengers boarding and exiting the bus (count separately the entrances and exits);
- Time keeping (precision to 1 second): **2(1) students** should record the:
 - Arriving time at each stop;
 - Departure time at each stop;
 - Extra time;

Important notes

- If the bus does not stop at a certain stop:
 - Mark the time the bus passed at that stop;
 - Set the stop time as 0 at that stop;
- Notes on the data:
 - Time keeping activities should have precision **in the order of seconds**;
 - Students involved in the data collection should not be counted as passengers;
- When first boarding the bus:
 - Groups boarding outside the terminus: count the number of passengers inside the bus as boarding passengers in the previous stop;
 - Groups boarding at the terminus: count the number of passengers as boarding;
 - For ease of data collection, do not count the number of alighting passengers at the bus stop;

Frequent question: Lost time

Lost time is the extra time the bus spends at a bus stop **besides** the time required for passengers to board and alight.

Examples: the bus is ready to depart but

- it has to wait for the traffic lights to turn green;
- it is waiting for other passing vehicles on the road;
- it has to wait for a queue of vehicles on another lane;
- the driver decides to hold and reopen the doors for a running passenger;
- ...

After data collection

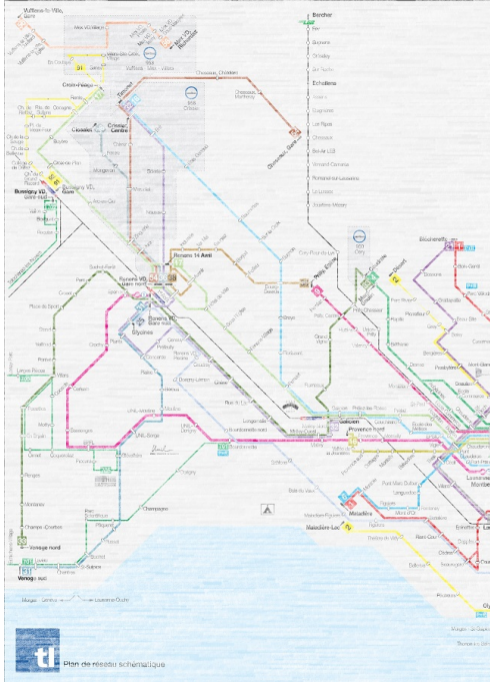
After the data collection, please transcribe your data into the provided excel spreadsheet. Rename the file as **groupX_busXX_XXhXX_stopname.xlsx** and upload your file on Moodle **by 23:59 on November 10** (one submission per group).

We will merge the data from all groups into a single file which will be used by all groups on the assignment.

The data collection is part of the final grade on the assignment. Therefore, data fabrication **WILL NOT BE TOLERATED**.

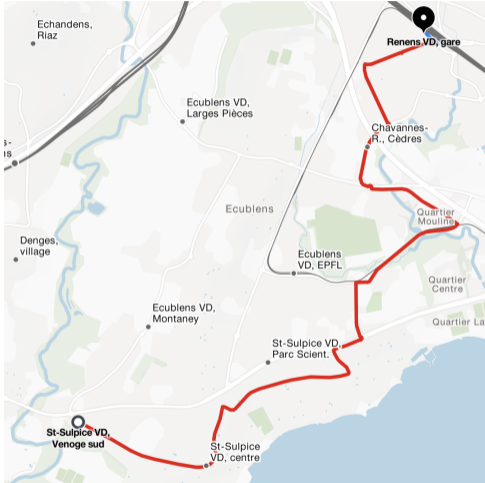
Output of the laboratory assignment

- Estimation of the travel time variability for buses.
- Estimation of correlation between waiting time and number of embarking and alighting at each stop and with the travel time.
- Estimation of correlations between events occurring at different stops.
- Estimation of potential improvements if buses did not have “round” cycle times.
- Other potential improvements of the service for people from and to EPFL.



Bus lines

Information on the studied lines for the assignment



Bus line 31

Boarding stop: St-Sulpice VD, Pâqueret

Directions:

- St. Sulpice, Venoge sud and
- Renens, gare sud



Bus line 705

Boarding stop: Ecublens VD, EPFL Piccard

Directions:

■ Lonay, parc

■ Ecublens VD, EPFL Piccard

- Each group will be assigned to a specific itinerary and task:
 - Bus line
 - Departing stop
 - Exact departure time
- Students will take their tickets from the TAs before getting on the bus
- Chronometers are needed (you can use your cell phones)
- Print the data collection forms (bus_XXX_stops.xlsx) to help you take notes
- Upload excel on Moodle before Nov. 10 at 23:59

Answer the following survey by **November 3, 2025**:

[Google link](#)

- Here, you will specify if you have any Mobilis subscriptions and the zones covered, so that we can assign the groups and distribute bus tickets on the day of data collection.