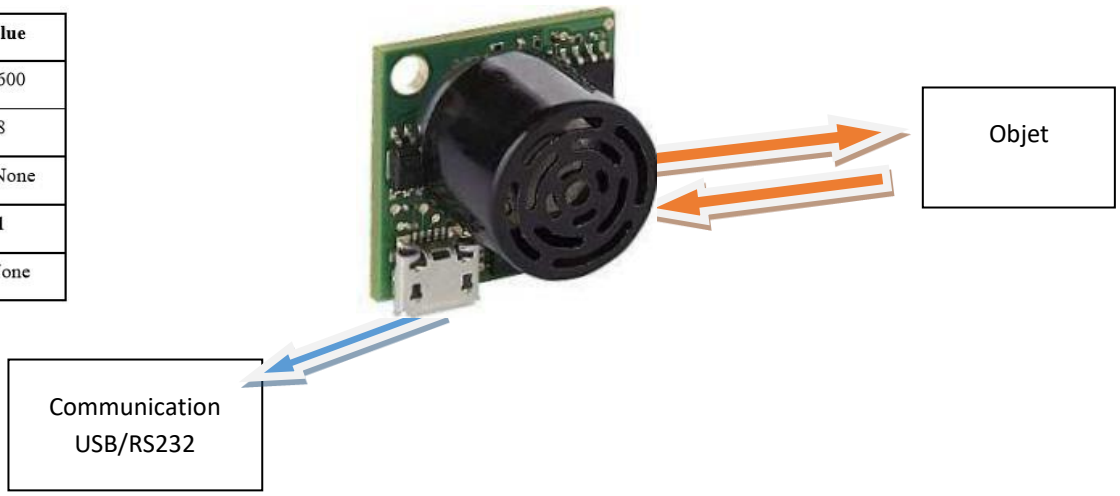
TP LIAISON SERIE CAPTEUR DE DISTANCE A ULTRASON

PRESENTATION / BUT DU TP :

Dans ce TP on vous demande d'écrire un logiciel qui permettra de mesurer des distances, à l'aide d'un capteur à ultrason USB MB1414

	Value
Baud	57600
Data bits	8
Parity	0 / None
Stop Bit	1
Flow Control	0/None



Serial Output Format

The sensor output is provided over the COM port (or equivalent) in an ASCII character format. If a target is detected at 8 inches the output appears as follows: "R008 P1<carriage return>". The output is an ASCII capital "R", followed by three ASCII character digits representing the range in inches up to a maximum of 125 inches. This is followed by an ASCII space and the ASCII character "P", followed by one ASCII digit "1 or 0" corresponding to the "True or False" proximity information, followed by a carriage return. A proximity value of "1" signifies that a target is present in the detection zone. A proximity value of "0" signifies that no target has been detected in the detection zone.

When an object is placed in the field of view the sensor will "acquire" the target ~2.5 seconds later by sending the appropriate proximity information.

If the detected object then leaves the field of view the sensor will "release" the target ~1.5 seconds later. Release time can be influenced by other nearby sensors and may appear to be longer in applications with many nearby sensors.

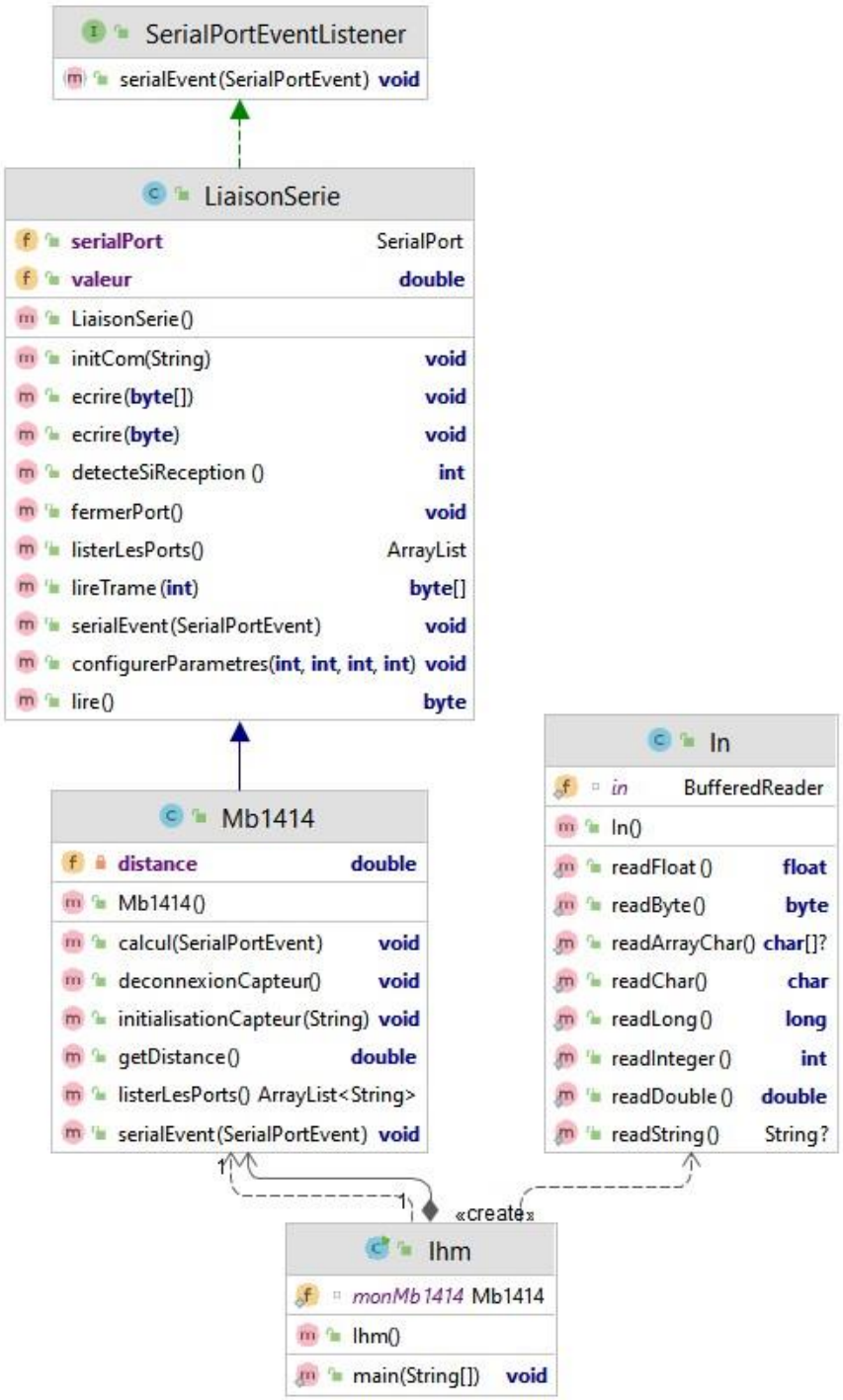
The USB-ProxSonar-EZ also double as an ultrasonic range finder. Range information is provided for reference and may experience noise when a large number of sensors (5+ depending on sensor mounting) are running in the same environment. The range reading will report the range to an object to the maximum range of the sensor of 124 inches. When no object is able to be detected by the sensor, the sensor will report R125.

Sensor Trigger Distance for USB-ProxSonar®-EZ™

Each of the USB-ProxSonar-EZ models has a set trigger distance. Objects closer than this distance that fall within the sensor detection zone can be detected and reported to the end user. Each USB-ProxSonar-EZ is tolerant of a different number of nearby sensors, this data is provided in the chart below for easy comparison.

Part #	Set Distance	# of Sensors that can run in the same space
MB1414	~5 feet (Value of RO59 or lower will cause object detection)	8+ Sensors Simultaneously

I) TRAVAIL MODE CONSOLE : MESURE DE DISTANCE



Ecrire un logiciel respectant le diagramme des classes ci-dessous , la sortie console devra ressembler à celle donnée ci-contre.

```
COM1
COM18
COM19
Quel port com?:
com1
R008 P1
20,80cm
```

II) TRAVAIL MODE CONSOLE : ACCÉLÉROMÈTRE

Afin d'éviter le mélange de produit en mouvement, il faut contrôler les accélérations et décélérations. Dans ce but vous devez en utilisant le capteur de distance le « transformer » à l'aide de votre code en capteur d'accélération ! (méthode dire de mesures indirectes)

- Expliquez votre approche théorique du problème
- Réalisez un logiciel en mode console qui affiche l'accélération ou la décélération en cm/s²
- En tenant compte des limites de l'électronique de votre capteur validez votre code.

Remarque : pour vous aider dans notre cas vous considérerez les relations suivantes :

- $\frac{dy}{dx} = \frac{\Delta y}{\Delta x}$;
- $\text{vitesse} = \frac{d[AB]}{dt}$;
- $\text{accélération} = \frac{d(vitesse)}{dt} = \frac{d^2[AB]}{dt^2}$

```
0 cm
-------------------------
Delta d= 0 cm
Delta t= 1,08 s
Vitesse= 0 cm/s
Accélération= 0 cm/s²

26 cm
-------------------------
Delta d= 26 cm
Delta t= 9,44 s
Vitesse= 2,75 cm/s
Accélération= 0,29 cm/s²

130 cm
-------------------------
Delta d= 104 cm
Delta t= 12,77 s
Vitesse= 8,14 cm/s
Accélération= 0,42 cm/s²

67,6 cm
-------------------------
Delta d= -62,4 cm
Delta t= 9,09 s
Vitesse= -6,87 cm/s
Accélération= -1,65 cm/s²
```