1. Donner la valeur de la sensibilité

   la plage de mesure de ±16g.

AFS_SEL	Full Scale Range	LSB Sensitivity
0	±2*g*	16384 LSB/*g*
1	±4*g*	8192 LSB/*g*
2	±8*g*	4096 LSB/*g*
3	±16*g*	2048 LSB/*g*

Donc la sensibilité est de 2048LSB/g

2. Compléter le tableau ci-dessous, représentant les valeurs stockées dans l'accéléromètre en fonction de sa position pour la plage ±16g.

Valeurs d'accélération sur axe X	Vout	ACCEL_XOUT[15..8]	ACCEL_XOUT[7..0]
0,35g	0.35*2048 =716	OX02	OXCC
1g	2048	OX08	OX00
0.707g	0.707*2048 =1447	OX05	OXA7

3. Donner la valeur stockée dans le registre de configuration de l'accéléromètre permettant de configurer la plage de mesure ±16g.

   L'adresse du registre permettant la configuration est 1C

Register (Hex)	Register (Decimal)	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1C	28	XA_ST	YA_ST	ZA_ST	AFS_SEL[1:0]		-		
		0	0	0	1	1	0	0	0

Description:

This register is used to trigger accelerometer self test and configure the accelerometer full scale range. This register also configures the Digital High Pass Filter (DHPF).

Accelerometer self-test permits users to test the mechanical and electrical portions of the accelerometer. The self-test for each accelerometer axis can be activated by controlling the *XA_ST*, *YA_ST*, and *ZA_ST* bits of this register. Self-test for each axis may be performed independently or all at the same time.

When self-test is activated, the on-board electronics will actuate the appropriate sensor. This actuation simulates an external force. The actuated sensor, in turn, will produce a corresponding output signal. The output signal is used to observe the self-test response.

The self-test response is defined as follows:

Self-test response = Sensor output with self-test enabled – Sensor output without self-test enabled

The self-test limits for each accelerometer axis is provided in the electrical characteristics tables of the MPU-6000/MPU-6050 Product Specification document. When the value of the self-test response is within the min/max limits of the product specification, the part has passed self test. When the self-test response exceeds the min/max values specified in the document, the part is deemed to have failed self-test.

AFS_SEL selects the full scale range of the accelerometer outputs according to the following table.

AFS_SEL	Full Scale Range
0	± 2g
1	± 4g
2	± 8g
3	± 16g

$3 = 1x2^1 + 1x2^0$

4. Ecrire un programme qui permet d'indiquer à la carte que l'on communique en I2C, de visualiser les 3 accélérations et de faire le réglage de la gamme de mesure (et de la sensibilité)

```
#include<Wire.h>
const int MPU=0x68;  // I2C address of the MPU-6050
float AcX,AcY,AcZ;
void setup(){
Wire.begin();
Wire.beginTransmission(MPU); / Start communication with MPU6050
Wire.write(0x6B);  // talk with register 6B
Wire.write(0);     // set to zero (wakes up the MPU-6050)
Wire.endTransmission(true); // end transmission
Wire.beginTransmission(MPU);//Start communication with MPU6050
Wire.write(0x1C);  // Talk to the ACCEL_CONFIG register
Wire.write(0X18);     // set configuration ±16g
Wire.endTransmission(true);// end transmission
Serial.begin(9600);
}
    void loop(){
Wire.beginTransmission(MPU); //Start communication with MPU6050
Wire.write(0x3B);  // starting with register (ACCEL_XOUT_H)
Wire.endTransmission(false); // end transmission
Wire.requestFrom(MPU,6,true);  // request a total of 6
  registers
AcX=Wire.read()<<8|Wire.read()/2048;// (ACCEL_XOUT_H)&
  (ACCEL_XOUT_L)
AcY=Wire.read()<<8|Wire.read()/2048;//(ACCEL_YOUT_H) &
  (ACCEL_YOUT_L)
AcZ=Wire.read()<<8|Wire.read()/2048;// (ACCEL_ZOUT_H) &
  (ACCEL_ZOUT_L)
Serial.print("AcX = "); Serial.print(AcX);
Serial.print(" | AcY = "); Serial.print(AcY);
Serial.print(" | AcZ = "); Serial.println(AcZ);
delay(333);
    }
```