Introduction:
An altimeter is used to measuring altitude. It is widely used in flight control, hiking and climbing. In the market, there are different types of altimeters. Compared with radio or GPS altimeters, a barometric altimeter is more reliable and accurate. In this project, an altimeter based on a capacitive barometer is built. The principle is to build a system to measure the capacitance of sensor and finally show the altitude in the LCD.

Objective:
1. Enhance the accuracy of the altimeter
2. Increase the resolution of the altimeter down to 10 cm
3. Low power consumption and small size
4. Decrease the cost
5. Easy to build the altimeter

Hardware:
The capacitive barometer senses the air pressures. It then changes its capacitance based on the measurement. Capacitance-to-Digital converter is used to measure the capacitance in the sensor and then converts to digital in order to pass the data to the microcontroller. In this project, ATmega328 is used as the microcontroller because it is easy to program it. After receiving the data from the converter, the microcontroller calculates the altimeter and show the result on LCD.

Software:
The Capacitance-to-Digital converter uses I2C serial interface. If ATmega328 does not set to communicate with I2C device, it cannot receive any useful data from the converter. ATmega328 obtains the data and then converts back to air pressure. Based on the air pressure, altimeter can be calculated:

\[ \text{altimeter} \left( \text{meter} \right) = \left( \frac{101325 \times 209.3}{P} - 1 \right)^{0.19025} \]

where
- \( P \) = current pressure (Pascals)
- \( P_0 \) = sea level standard atmospheric pressure (101325 Pascals)

Conclusion:
The altimeter is designed to have low power consumption and be built in small size in order to be portable. Users can easily package it into bag and operate it by using batteries. The altimeter is precise if the measurement of capacitance is accurate. After testing some capacitors, the capacitance-to-Digital converter can measure the capacitance within their tolerances. It is believed that the measurement of capacitance is precise. It is concluded that the altimeter is accuracy.