**Analysis of delay in sonar-project 1.1**

Considering the time taken in our project to complete one round(anti-clock and clock-wise) of scanning a given area bounded by the init\_ang and final\_ang variables of the arduino code, we observe that apart from the time taken in execution of the code, there are time-delays introduced manually by us within the code for some purposes. We seek to minimise them in order to speed up its working.

The current state of the project incorporates the following time-delays during the course of its working:

(In arduino code)

1. DELAY #1 : *delay(30)* after *myservo.write* {MOTOR RELATED}**< ---- MAJOR DELAY**
   * + For time taken in motor rotation for one degree before calculating distance.
     + Operating speed of microservo motor is 0.1s/60 degree [<http://www.micropik.com/PDF/SG90Servo.pdf>]
     + We here, are giving 0.03s(=30ms) to the motor for rotating a degree, while the operating speed per degree is approx. 0.017s (0.016666666...) = 17ms.
     + Hence, **we can reduce Delay#1 from  *delay(30)*  to *delay(17)* or more precisely, *delayMicroseconds(16667).***
2. DELAY #2*:delayMicroseconds(2)* {SENSOR RELATED} <-- negligible
   * + Time for which low trig pulse is maintained before making it high.
     + A fresh trig (high) pulse needs to be generated for the sensor to transmit out 8 cycles of ultrasonic burst for echo detection. For that,we keep the trig low for a short while, say, 2us.
3. DELAY #3*:delayMicroseconds(10)* {SENSOR RELATED}  *<--* non-negotiatble
   * + Sets the trigPin on HIGH state for 10 micro seconds
     + This exact amount of delay is REQUIRED, because of the principle of working of the HC-SR04 sensor (To start measurement, Trig of SR04 must receive a pulse of high (5V) for at least 10us, this will initiate the sensor will transmit out 8 cycle of ultrasonic burst at 40kHz and wait for the reflected ultrasonic burst).