MILESTONE 2 - TEST CASES

CIS 441/541 - PACEMAKER
GROUP 2

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The following test cases have been implemented in the function testMode_(). To enter into this mode, press ‘t’. The details of the test scenario will be printed on the serial monitor and on the LCD panel.

1. **To test a perfect heart :**

Objective : Here, the heart model sends Asignal and Vsignal such that the timing constraints are satisfied. In other words, we wish to model a perfectly functioning heart and test the same.
Expected result : The pair of LEDs that represent Asignal and Vsignal blink one after the other, depicting a beating heart.
Actual result : It was observed that the pair of LEDs that represent Asignal and Vsignal blinked one after the other, depicting a normally beating heart. The trace for this test was printed on the serial port.

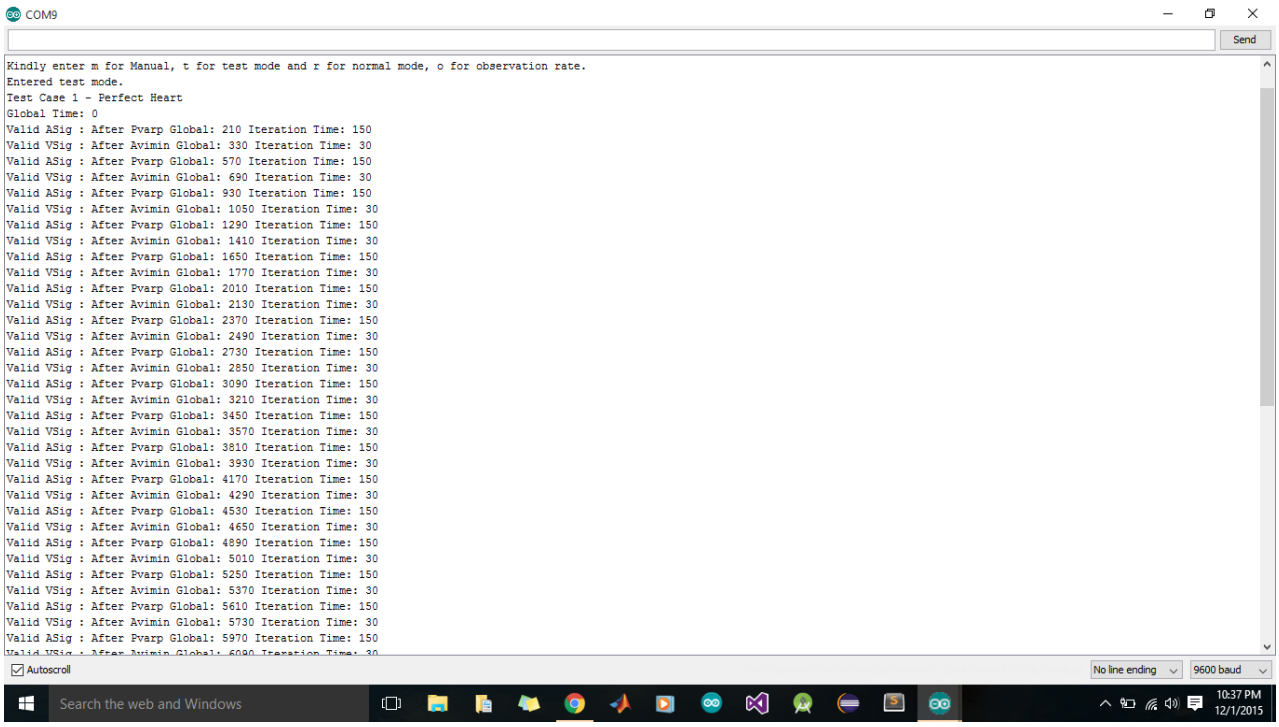

FIGURE 1(a) : TRACE OF THE HEART

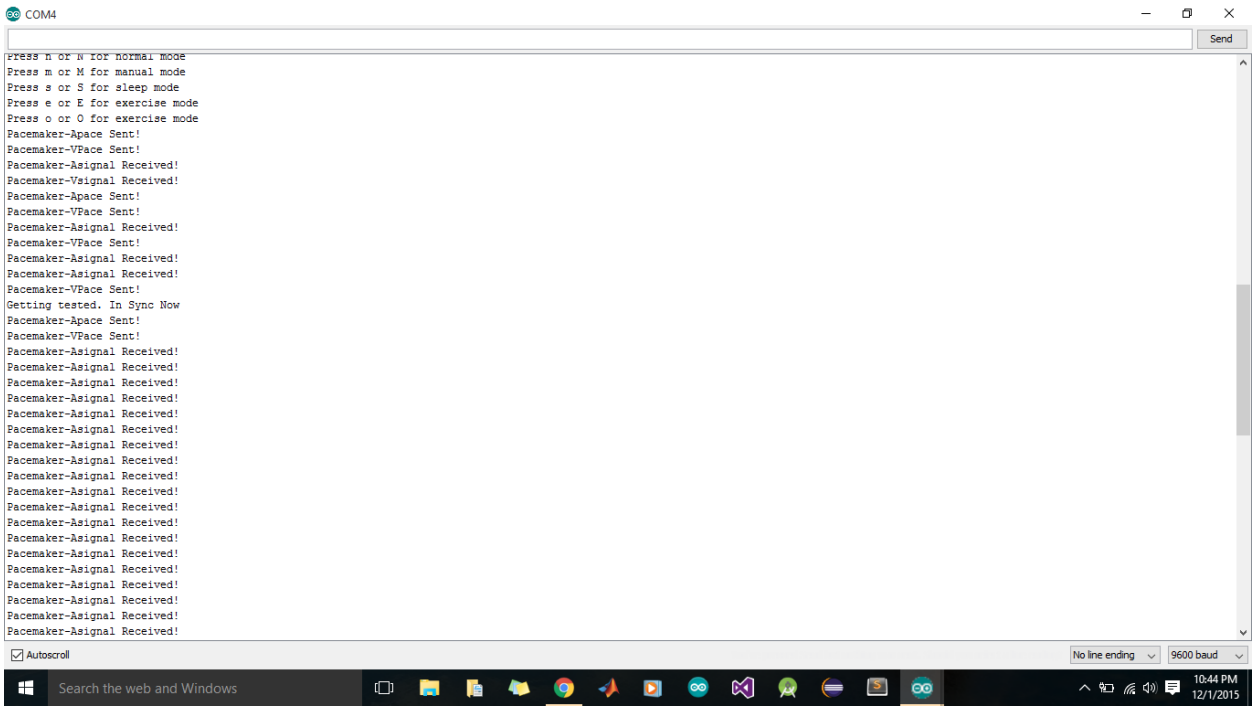

FIGURE 1(b) : TRACE OF THE PACEMAKER

2. **<u>To test a dysfunctional heart :</u>**

Objective : Here, the heart stops generating Asignal and Vsignal. In other words, this models a complete heart shutdown.
Expected result : The pacemaker takes over and generates Apace and Vpace to keep the heart beating. This can be seen when the pair of LEDs that represents the pacemaker signals keeps blinking and the pair of LEDs that represents the heart does not blink at all.
Actual result : It was observed that the pacemaker steps in to generate pacing signals when it detects that no signals have been generated by the heart itself.The pair of LEDs that represents the pacemaker signals kept blinking and the pair of LEDs that represents the heart did not blink at all.The trace for this test was printed on the serial port.

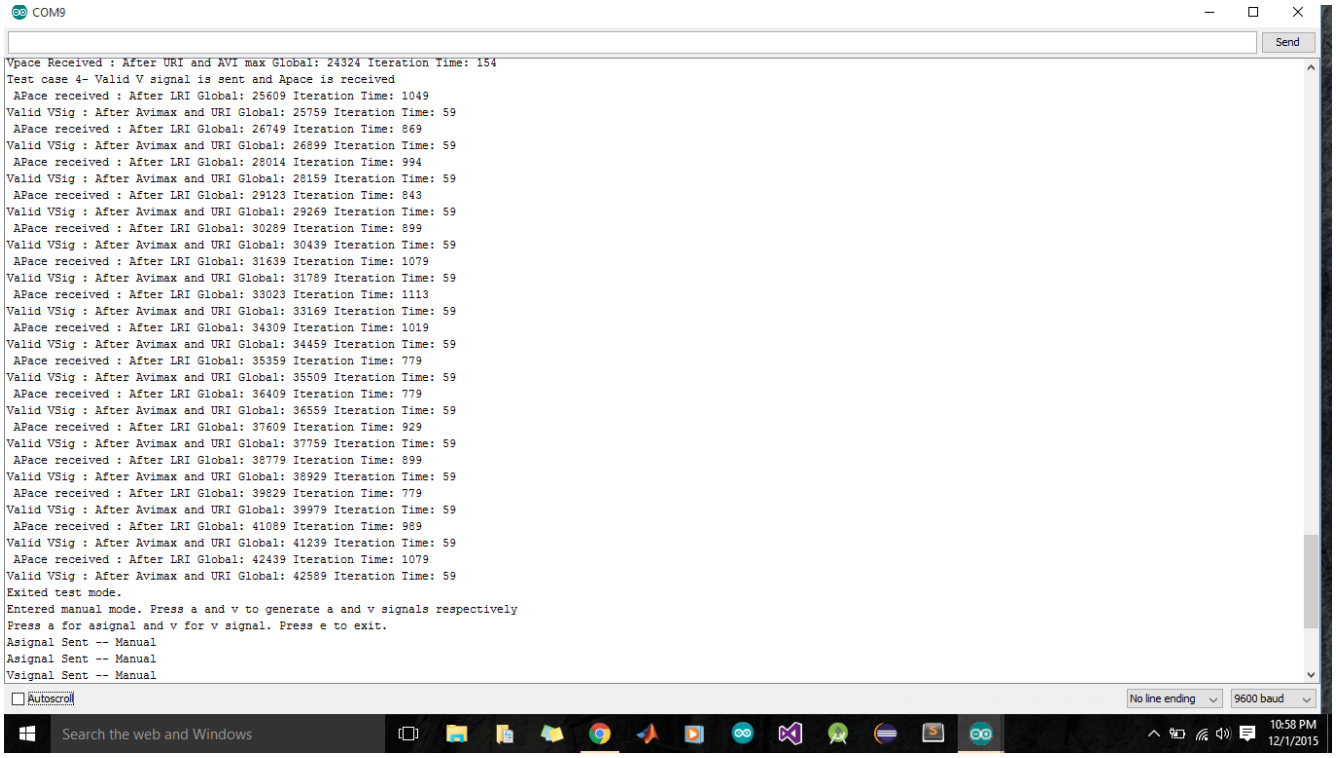

FIGURE 2(a) : TRACE OF THE HEART

3. **To test that Vpace arrives correctly :**

Objective : Under this testing scenario, we ensure that the heart model generates only Asignal. We test whether the pacemaker sends Vpace signal whenever it detects that Vsignal has not been generated.
Expected result : The red LED that depicts Asignal blinks alternately with the green LED that represents Vpace. Apart from these two LEDs, no other LED blinks as Vsignal and Apace are not generated.
Actual result : It was observed that the red LED (Asignal) and the green LED (Vpace) blink alternately. The trace for this test was printed on the serial port.

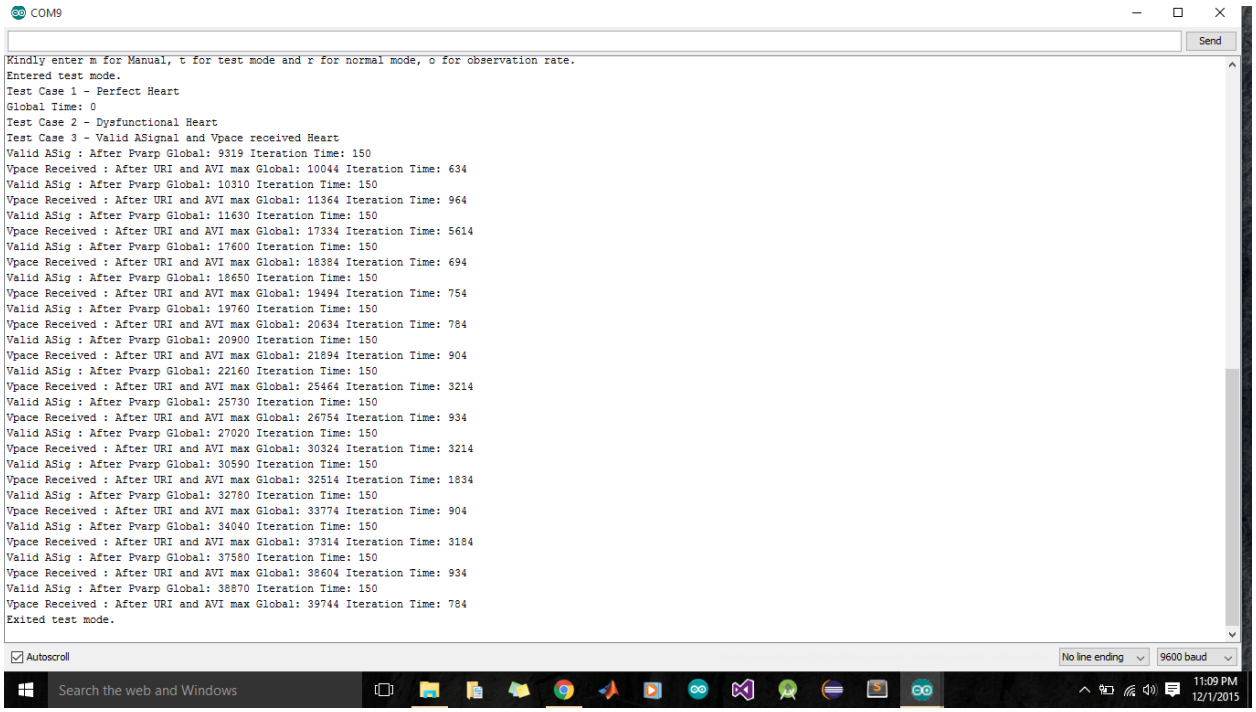

FIGURE 3(a) : TRACE OF THE HEART

4. **To test that Apace arrives correctly :**

Objective : Under this testing scenario, we ensure that the heart model generates only Vsignal. We test whether the pacemaker sends Apace signal whenever it detects that Asignal has not been generated.

Expected result : The green LED that depicts Vsignal blinks alternately with the red LED that represents Apace. Apart from these two LEDs, no other LED blinks as Asignal and Vpace are not generated.
Actual result : It was observed that the red LED (Apace) and the green LED (Vsignal) blink alternately.The trace for this test was printed on the serial port.

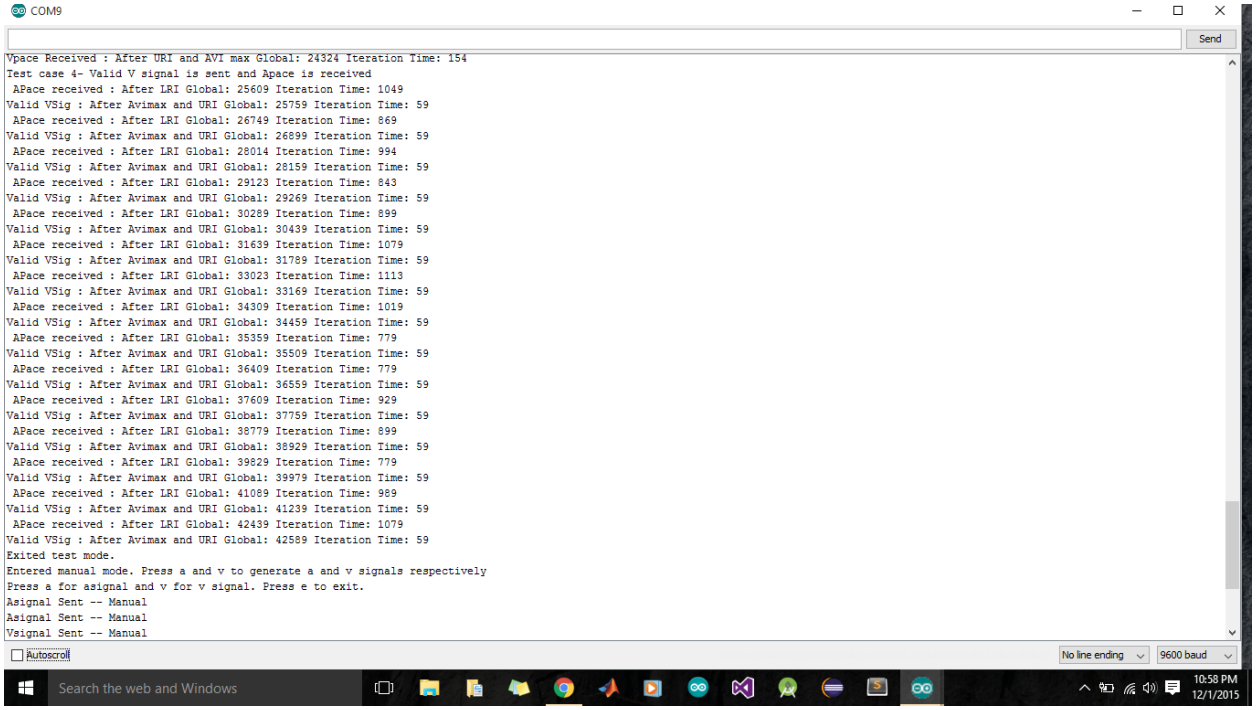

FIGURE 4(a) : TRACE OF THE HEART

5. **<u>To test for alarm functionalities :</u>**

Objective : When the heart rate falls dangerously low and the pacemaker is unable to pace the heart, then the system needs to sound an alarm. This test case works with the assumption that the pacemaker has failed and is unable to save the slowing heart. An alarm is needed for this extreme situation.
Expected Result : The buzzer starts to ring when the heart starts to fail.
Actual Result : It was observed that the buzzer connected to the pacemaker mbed starts to sound an alarm when the heart failed and the pacemaker was unable to revive the heart.