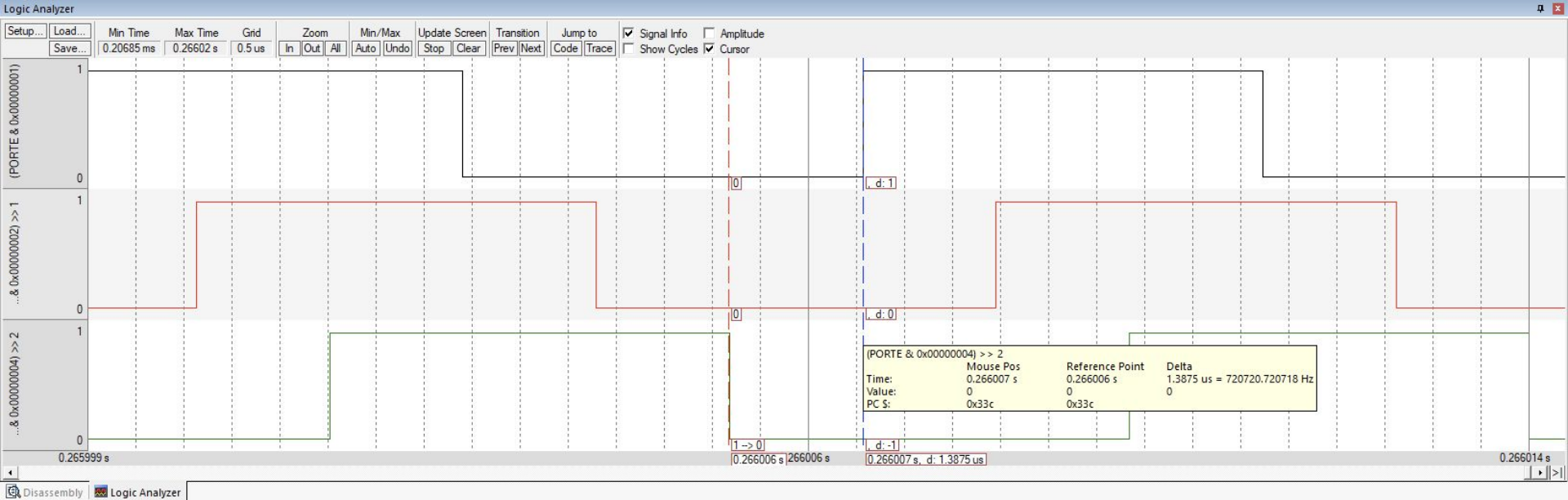# Mini Project 2

Yimin Gao
yg9bq@virginia.edu

Part 2a

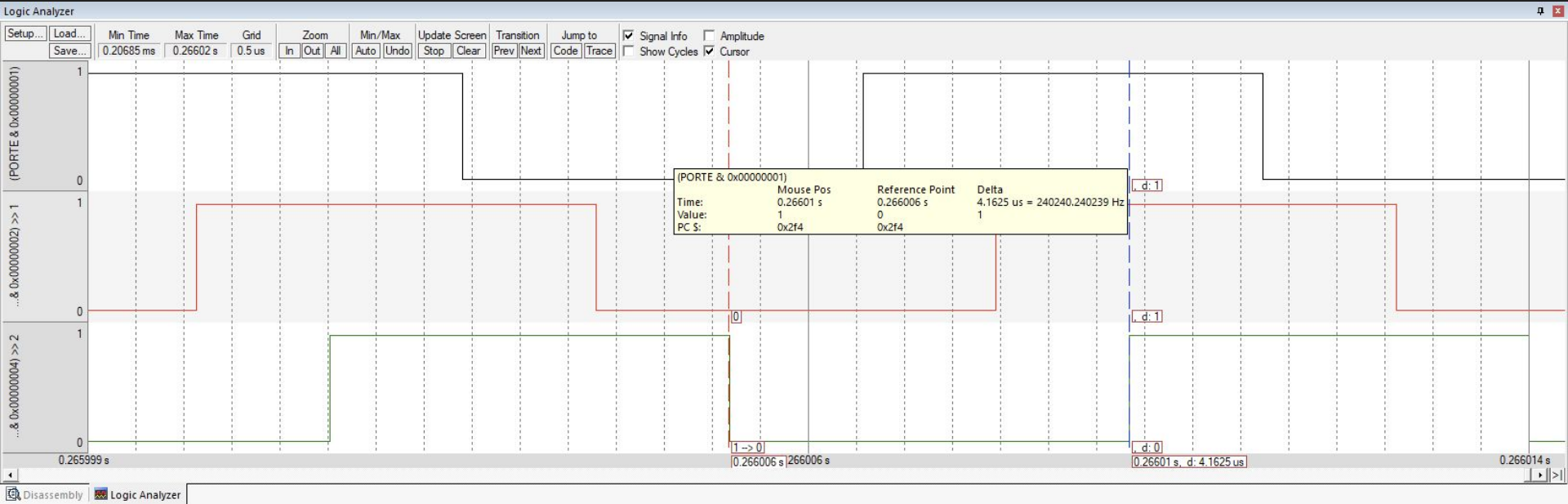Time slice + Context switching time = 1.3975 µs

We can get context switching time from Testmain 0 later = 1.075 µs
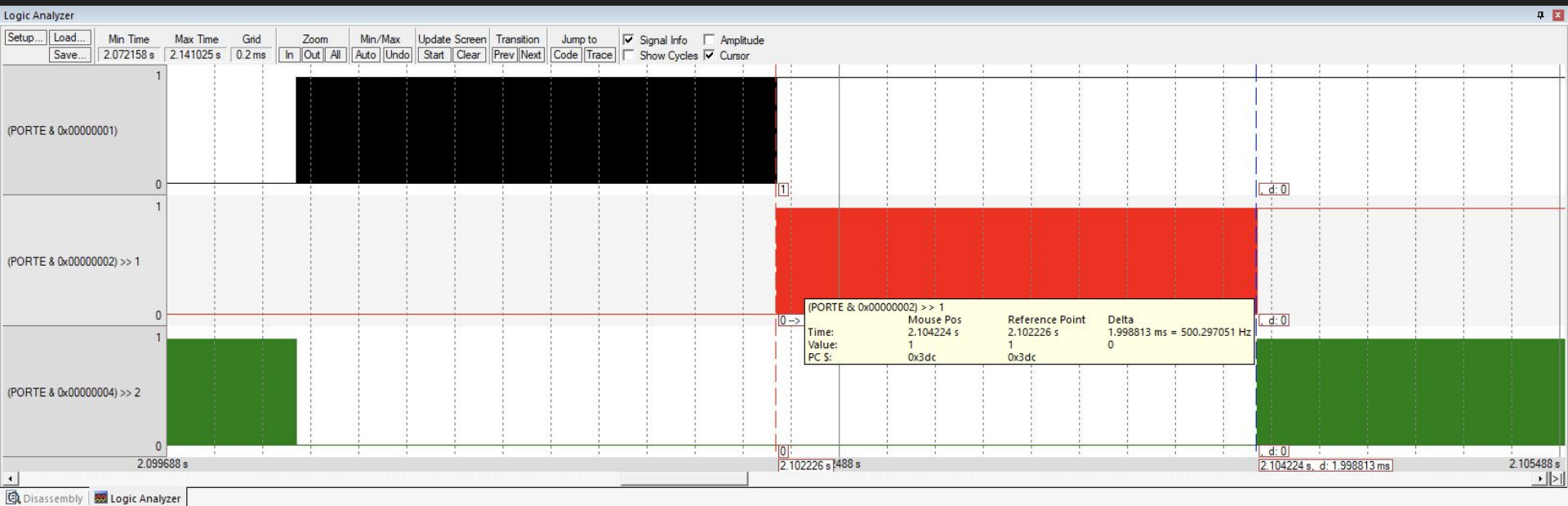
Time slice = 1.3975 - 1.075 = 0.3225 µs
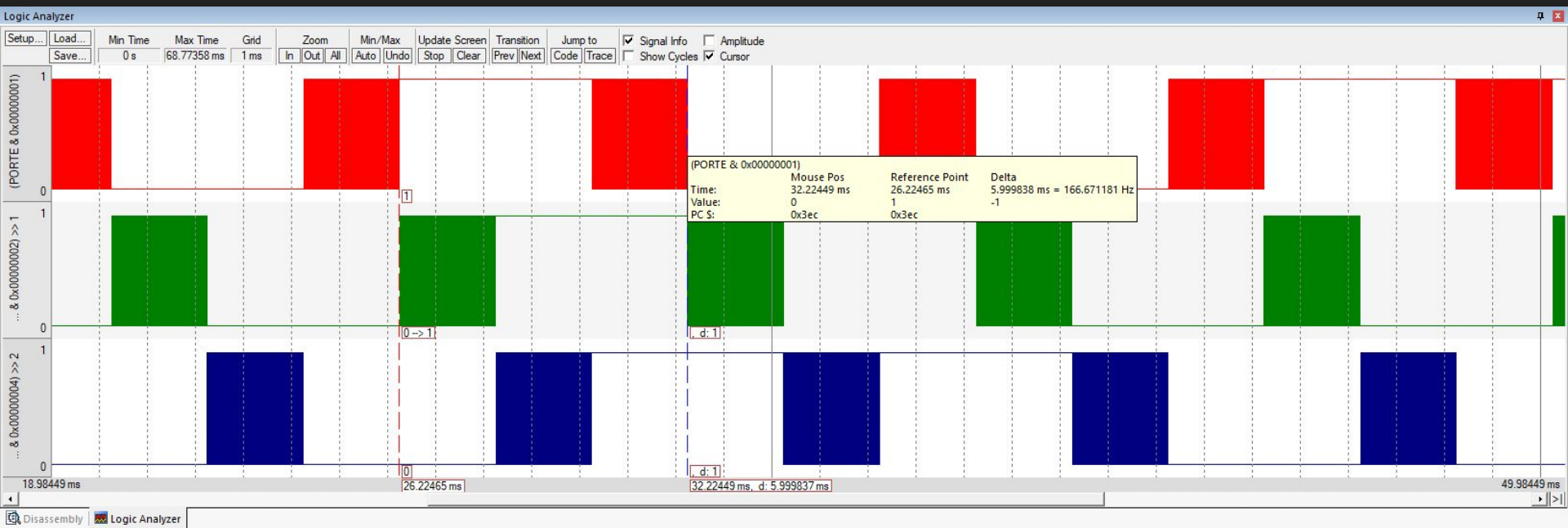
Part 2a

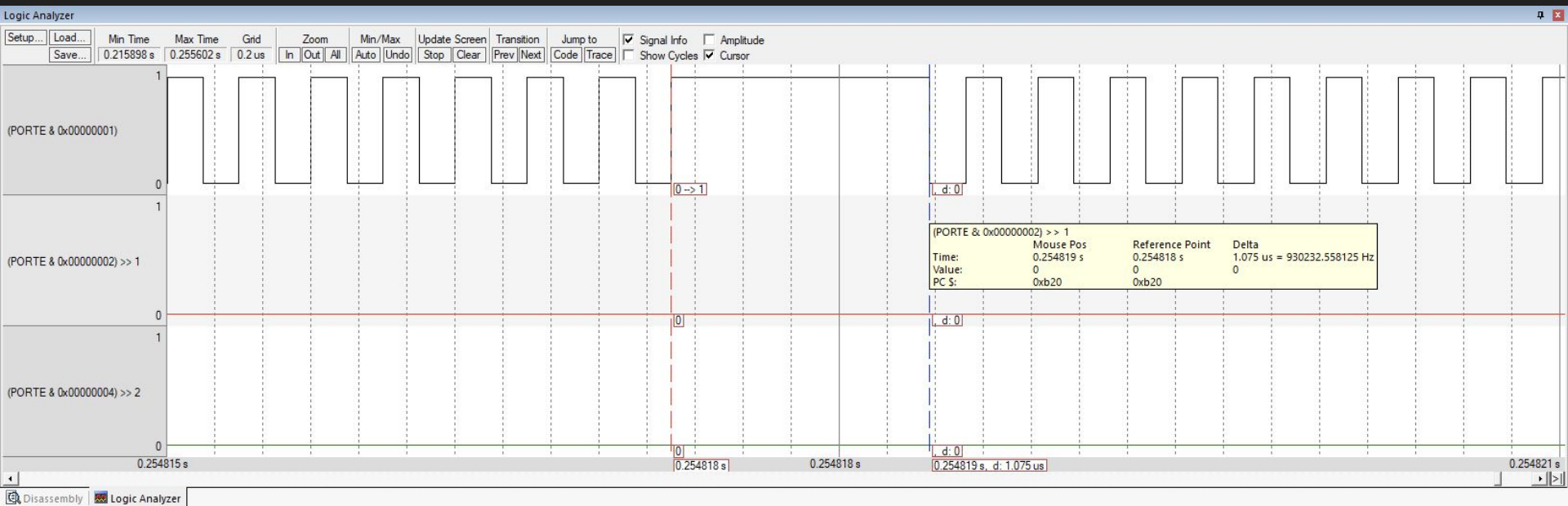Frequency = 1/(4.1625 μs) = 240.24 kHz

Part 2b

Time slice = 1.998813 ms

Context switching time is not included in preemptive thread scheduling.

Part 2b

Frequency = 1/(5.9998357 ms) = 166.67 Hz

Part 2c

Context switching time = 1.075 μs

Part 2d

The counter values are higher in Testmain2 because context switching is triggered by interrupt. So each threads were allowed to run multiple times until interrupt happened. However, in Testmain1 each thread was only allowed to be runned once and then switch to the next thread.

Part 4

TestMain 1

Context Switch Time = 106 * 12.5 ns = 1.325 µs

Time Slice = 37 * 12.5 ns = 462.5 ns

TestMain 2

Context Switch Time = 111 * 12.5 ns = 1.3875 µs

Time Slice = 159856 * 12.5 ns = 1.9982 ms

Part 4 Question 1

Are there any differences between the values you measured using logic analyzer versus the measurements using OS_Time functions? Explain why.

There is slight difference between the measured values from logic analyzer and from calling OS_Time functions because the functions themselves(OS_Time and OS_TimeDifference) consume time. So with more instructions the measured values using the functions are a little greater than the values from logic analyzer.

Part 4 Question 2

Are there any differences between the values you measured in Testmain1 versus Testmain2 function? Explain why.

The measured context switch time of TestMain2 is slightly greater than the value in TestMain1 because we don't know which line of code we are at when interrupt happens, there might be more code operated after the start time is recorded. The interrupt triggered switching consumes more time than directly calling the function OS_Suspend().

The time slice of TestMain 2 is a lot greater than the value of TestMain 1 because each thread in TestMain2 is allowed to keep running until interrupt happens. However, TestMain 1 is only allowed to run once and then OS_Suspend

Part 4 Question 3

Explain the purpose of using Timer1A, Timer2A, Timer3A, and Timer4A in this mini project.

Timer1A could be used to run periodic tasks in the background(). I haven't used it in this project.

Timer2A could be used to get the system time in milliseconds. I haven't used it in this project.

I used Timer3A to get the system time in the unit of 12.5 ns and then get the time difference using the received values.

Timer4A could be used to run periodic tasks in the background(). I haven't used it in this project.

Thank you for your feedback on Mini Project 2.