

## ECE-231 Lab Assignment #2

Assigned Thursday 2/22/24

Due: 11:59 pm Thursday 2/29/24

### References:

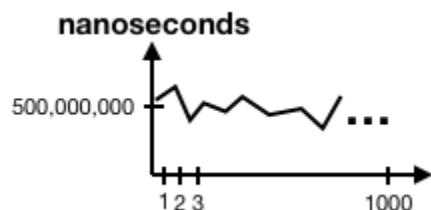
- Lecture 6 in Week 3 provides details of signing in and programming for Beaglebone
- Lecture 5 in Week 3 covers the file operations

### A. Develop a C program that meets the following requirements:

1. Your program is going to blink one beaglebone led at a fixed rate i.e it toggles the led on and off every 500 milliseconds (half a second). You can pick any led of your choice
2. Use `usleep(...)` function to wait for 500 milliseconds before you toggle the led
3. Take a timestamp before and after the `usleep(...)` function using `clock_gettime(CLOCK_MONOTONIC, ...)`, and measure the time duration in nanoseconds between the two timestamps
4. Create a new file named, "time\_diff\_file.txt". Open this file using `fopen(...)` and write these nanoseconds time durations in that file using `fprintf(...)`. Make sure you write every new nanoseconds value to a new row in the file. Don't forget to close the file using `fclose(...)` once you are done
5. Repeat the steps above until you have 1000 time duration measurements
6. Exit the C program once you have these 1000 entries in your file

### B. Write a makefile and use it to compile your C program

C. Run the program binary and wait for it to write 1000 entries to your "time\_diff\_file.txt" file. It should take around 8 minutes. Plot the nanosecond values using the data in your "time\_diff\_file.txt" file. Use any tool (excel, python etc.) to create the plot, and it should look like the following:



### Notes:

- You have to use your beaglebone for this assignment. Follow the instructions covered in lecture 6 on how to program and compile for beaglebone

- This is an individual assignment: you must write your own code and do not share it
- Read the instructions carefully multiple times to understand the program requirements and to produce the desired outcome
- The lecture material supporting this assignment has already been covered in the class
- The TAs will support you during lab hours

What to turn in:

- By the deadline, upload to Moodle the following list of files:
  - C source code file
  - makefile
  - "time\_diff\_file.txt" file
  - Image of the distribution plot in jpeg format