CS2610: Computer Organization and Architecture Lab

Lab Assignment - 7

Due Date: 5-4-2022

- Objective: To understand the working of system calls.
- Team Size: 2
- Problem Statement: On modern operating systems, it is possible to `mmap` a file to a region of memory. When it is done, the file can be accessed just like an array in the program. Given an integer n, write a program in assembly to create a file `input.txt` and store n (integer) numbers in it. Then your program should `mmap` the created file into your memory using the `mmap()` system call, perform the following tasks by reading the numbers from the file:
  - Compute the sum of all numbers.
  - Sort the numbers in ascending order using *Insertion Sort*.

  `fork()` system call allows you to create child processes. Use `fork()` system call to create a child process. The child process should do the first sub-task while the parent process should do the second sub-task. You must issue the system calls using `int` instruction. Note that the usage of `mmap()` and `fork()` system calls is must in this assignment. If there is an issue with `mmap`, use `mmap2`.
- Sample Input:

  3
  10
  5
  8
- Child Output:

  23
- Parent Output:

  5
  8
  10
- Submission Guidelines:
  - Write the code with proper comments wherever necessary and maintain proper indentation.
  - Name the program with your roll no. Ex: If your roll no is CS20B151, your file name should be CS20B151.asm. If there are multiple files, use CS20B151_1.asm, CS20B151_2.asm etc.
  - Place all the required files in a folder and compress the folder using zip compression. Name your folder in the following format. If your roll no is CS20B151, name it as CS20B151_A$.zip, where '$' denotes the assignment number.