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CSE 2304 - Computer Architecture
QuickSort Lab
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This programming assignment has been one of the hardest assignments I've ever completed. There were many difficulties that I came across as I worked on this lab. The first problem was how I had forgotten how the quicksort algorithm worked. The next problem was implementing a recursive function in MIPS. The third and biggest problem was my simple misunderstanding of how the MIPS stack works. All three of these issues contributed greatly to the increased time it took for me to complete a rather straightforward lab.

Forgetting a rather important algorithm did not help. The Quicksort algorithm seems very fundamental to every computer science student during their academia and even their professional career. Yet, I had forgotten the recursive process. To solve this issue I started looking for resources that covered this material. Eventually I found several informative YouTube videos that explained and demonstrated the algorithm process. It was after reading from Wikipedia that I discovered that there are methods or schemes of the algorithm.

The next problem focused on implementing the pseudocode algorithm found on Wikipedia into assembly language. I remember the difficulties I had implementing simple recursive functions in high level languages like Java and Python. Doing this in MIPS almost gave me a heartattack. Because of this, I started with baby steps by implementing a simple recursive sum function in java, and then the quicksort algorithm in java.

There was one huge misunderstanding that consumed a lot of my time. I believed that the stack pointer needed a counter to be used when making recursive calls. Thus, I had initially used $s0 to keep track of the recursive depth and then calculate the offset based on that depth. It wasn't until later that I realized when I subtract from the $sp, I'm moving the offset and any direct numbers

(0, 4, 8…) is based on this offset. When I realized this, the source code became much cleaner and shorter. Additionally I left the older method commented out.