simpleSmartLoader

OS Assignment-4, Prof- Vivek Kumar

**Prince Kumar and Prajil Bhagat**

Group 17

OS Sec- A

# ABOUT THE ASSIGNMENT

We were told to upgrade our simpleLoader made in assignment-1, making it a little smarter, technically optimizing the process by implementing lazy loading.

We needed to load segments only when needed, i.e when the segmentation fault shows up. The fault would actually be a page fault, as there was no memory and segment loaded in the first place. We needed to hear the segfaults, find the fault address, find out in which segment was the seg-fault coming from and load that segment. This way, we implemented the loader work lazily.

# HOW DID WE DO?

We modified our code from assignment-1 to meet the current needs. All the modularity helped as we only needed to change in certain areas:

Here, we directly typecasted the entryPointAddress from ehdr to the \_start( ), and called it for printing output. Since we had not yet loaded the segment, we found segmentation faults.

For that, a signal handler function was made, where the flow would go when the seg fault came, there using ‘siginfo’ found out the fault address, iterated over the program header table to find out in which segment was the fault address coming from. Used allocateVerMemory( ) for allocating memory, where we used the fault address as the parameter for address instead of null which we previously used to (as before we did not care where the allocated memory would be). Next used readfile( ) function to load the segment into that memory.

Everytime, whenever the segfault would arise, the signal handler would take care and thus get the program executed.

Values were calculated as:

1. Page fault was calculated counting the number of times signal handler got called.
2. Page allocations: summing up the number of page allocations in each segment loaded.
3. Internal Fragmentation: summing over the difference of (total page allocation size and segment mem\_size).

# CONTRIBUTIONS:

Prince Kumar: Found out the page fault, page allocation and internal fragmentation values. Modified the mmap functionality.

Prajil Bhagat: Made the signal handler and heard the seg faults.

Github : <https://github.com/Prince22378/OS-Assignments-2023/tree/main/Assignment-4>