Assignment 2 Document

Question 1: What is the purpose of init and sh processes in xv6?

Answer : init is the first user space process to run by the kernel after the system boot which is basically required for user environment setup and is crucial for any future user space processes to work and keeps on running until the system shuts down. sh process basically starts an interface which allows us to interact with the OS.

Question 2: What is the purpose of uvmalloc and loadseg during process creation?

Answer : The uvmalloc and loadseg are together responsible for providing memory space to the program which is required for any process to run or do anything useful. The uvmalloc allocates the physical page for the specific virtual addresses. Then the loadseg is used to load the corresponding segments into those allocated pages.

Question 3: Can you describe how the page swap area is reserved within the filesystem image by inspecting mkfs.c?

Answer : In mkfs.c the swap area size if defined by the nswap variable which is set to the value of PSASIZE. The number of swap blocks (sb.nswap) and the starting block of the swap area (sb.swapstart) are stored in the superblock. The swap area is included in the overall metadata calculation (nmeta), so that the swap blocks are reserved and do not overlap with other filesystem regions. After reserving space for the swap area, the first free block for data is set to nmeta, ensuring that the swap area is not overwritten.