CSE 536 Advanced Operating Systems

Name: Sri Rupin Potula

ASU ID: spotula1

Question-1:

a) What is the purpose of the init and sh processes in xv6?

Answer: init assists in creation of user processes. In the given assignment, the function userinit helps to create first user process by calling init and by allocating a page to load the data. So, init is the first user process that is being created and returns from kernel to user space. sh is the shell in xv6 which takes user inputs as arguments and executes them like namely ls, test8-cow1, etc., The sh does so by creating child process with the command provided in the shell.

b) What is the role of uvmalloc and loadseg during process creation?

Answer: The uvmalloc() function allocates memory for the user processes. It takes the pagetable, current size, new size and permissions. It then returns a value, if that value is zero, then there would be a panic situation. The loadseg picks up, after the uvmalloc() allocates memory. The loadseg loads the segments of the process namely data and code from the file system to the right virtual addresses.

Question-2: Can you describe how the page swap area is reserved within the filesystem image by inspecting mkfs.c?

Answer: In mkfs.c, the variables nswap, nmeta and nblocks are used for reserving memory on the disk. nswap is used in allocating blocks in fs.img for PSA, nmeta is used to store the number of metablocks and nblocks is used to store number of datablocks. Then, the nmeta variable was updated with the nswaps, nlog, ninodeblocks, and nbitmap which represents the total reserved blocks in filesystem. Post this, starting block for each reserved area is gathered. Freeblock is mapped to nmeta which represents the first free block available in disk. From

the above steps, we make sure that the page swap area is reserved within the file system.