FILE SYSTEMS ASSIGNMENT

1. The size of a file is 700MB in a file system that uses 8KB as the block size. How many index blocks are needed to store this file in indexed allocation? Assuming the *inode* structure, how many levels of indexing are needed? How many disk blocks, other than the *inode,* need to be read to access the 2081st block?

2. What are the various data structures that are maintained in file systems per volume? What is the purpose of each of them? What are the disadvantages of a linked list disk block allocation scheme?

3. This is a practical assignment which is designed to get the students familiar with the various file protection mechanisms in place in GNU/Linux and how to manipulate them and the differences in access based on the protections set. It is also about how to mount and unmount filesystems and understand the contents of the fstab. As part of this assignment, you are expected to do the following:

   - Use the command *chmod* to modify the permissions to files and directories for owner, group and others and try to understand how this affects access to that file and directory.
   - Use the command *chown* to change the ownership and group membership of the files and directories.
   - Use the commands *mount* and *umount* to mount and unmount the Windows partition on the GNU/Linux partition. Once it is mounted try and understand what types of accesses are possible for the files in the Windows file system. If you are unable to mount or unmount the file system, find why you are unable to do so. This differs from one GNU/Linux system to another. Please mention the version of GNU/Linux you have done your experiments with.
   - Look at the contents of the file */etc/fstab* and understand the format of the file. Explain some of the entries found in your */etc/fstab* file. Do the same on the *AI lab systems* and explain what is different in these systems from your own systems.

   - Use the *stat* command on files in your home directory and in /bin and /etc directories.

   - Use the *du* and *df* commands to understand the statistics of usage on disk.

   - Use the *iostat* command and report on the output by understanding the output using man pages. Write in your own words what you understand of the output of this command.