Problem Statement 1

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Problem Statement: <u>Display the contents of any directory in the form a tree.</u>

USAGE

- ./a.out na - Prints the directories of the tree in the ascending order of their names.
- ./a.out nd - Prints the directories of the tree in the descending order of their names.
- ./a.out ma - Prints the directories of the tree in the ascending order of their last modified time.
- ./a.out md - Prints the directories of the tree in the descending order of their last modified name.
- ./a.out - (Defaults as ma)

APPROACH

We have built a recursive solution that populates an n-ary tree based on the directory tree structure.

Functions used:

stat()- returns the stats of a file/directory, given the path to it.
opendir() - opens a directory given by the path and returns a DIR pointer
readdir() - reads the next entry in the directory , and returns a dirent pointer
strcmp(), strcpy(), strlen() - standard string functions were used to manipulate the paths.
malloc() - to dynamically allocate nodes to the virtual directory tree

Structure used:

```
typedef struct Node
{
char *name;
struct Node **children;
int numents;
int type;
struct timespec last_mod;
} Node;
```

Detailed method:

First, we create a root node, which represents the directory given by the path. We read the contents of the directory and insert child nodes appropriately. Next, we check if there is any directory within this directory. If it is present, we recursively populate the child node as well. Further, we have a "type" field in the structure, which is used to indicate symlinks, files and directories, which will be used to color-code the nodes while printing. Further, we have defined a comparator, based on which the entries of a directory can be ordered while printing.

```
.
.
|-------a.out
|-------IOS_2019_F_Hackathon_010
        |-------a.out
        |-------IOS_2019_F_Hackathon_010.c
|-------main
|-------a
        |------b1
               |-------d
                       |-------c

                               |-------asdas
        |-------a1
               |-------a3
                       |-------a4
               |-------a2
|-------test.c
|-------readme.txt
|-------main.c
|-------mm.cc
(base) pradyumna@pradyumna-GL553VD:~/ios-hackathon$ 
```