COSC 350 System Software Lab#4
(submission due day: 3/3/21)
(submit by email to cosc350@gmail.com)

How to submit

- For each program, you need write detailed comments for each statement.
- You need demonstrate each task in front of instructor during the next lab hours.

Task #1. In Task#8 in Lab3, you wrote a program to encode a file with character to a file with ASCII code number. Write decoding program which covert output of Task#8 in Lab3 to original input file.

Task #2: Write a C main function that takes one command-line argument, the name of an input file. The input file contains exactly one integer spread out over a single line of up to 80 characters. For example, the integer 3579 is embedded in the line az3mqrm5t?7!z*&gqmzt9v. Your program uses system calls to do the following:

    a. open and read the input file, accumulating the discovered digit characters into a character array (string).

    b. Convert the string to an integer./taskdr (do not use atoi function).

    c. Add 10 to the integer

    d. convert the sum back to a string (using function convIntToStr)

    e. make a system call to write the string to standard output.

```
/***********************************************
  Convert integer to string
  Params: x is the int to be converted,
          str is the string into which to write
  Returns: length of the string
  **********************************************/

int convIntToStr(char * str, int x)
{
    sprintf(str, "%d", x);
    return (strlen(str));
}
```

/* Returns a non-zero value if character c is a digit, zero otherwise. */
        int isdigit(int c)
You need include five headers <unistd.h>, <fcntl.h>, <ctype.h>, <stdio.h> and <string.h> for read write open system calls and sprint return strlen library functions.

Task #3. A **palindrome** is a word, phrase, number or other sequence of units that can be read the same way in either direction. Write a C-function **int palind(int fd1, int fd2)** that takes two independent file descriptors fd1 and fd2 that are already opened to the same file. The function palind() uses lseek to scan the file and returns 1 if the file contains a palindrome (reads the same forward and reverse) and 0 if not. You may assume that the file is well-formed and contains just lower-case alphabetic characters on a single line. You also need write a main function to test your palind() function works properly. The main function accept a file name as a argument. The main() function open the file once and create duplicate file descriptor. And call the function palind() to check whether the file contains palindrome or not.

Task #4.1. Write a simple program called hello.c and compile it and create executable file named hello.
Write a C program for sequence of following task.
- By using system call, build following directory structure
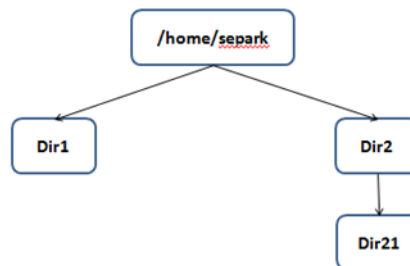
- By using system calls, copy hello file under ~/Dir2/Dir21/
- By using system calls, make a symbolic link named toDir21 to directory Dir21
- By using system calls, make a symbolic link named toHello to executable file ~/Dir21/hello

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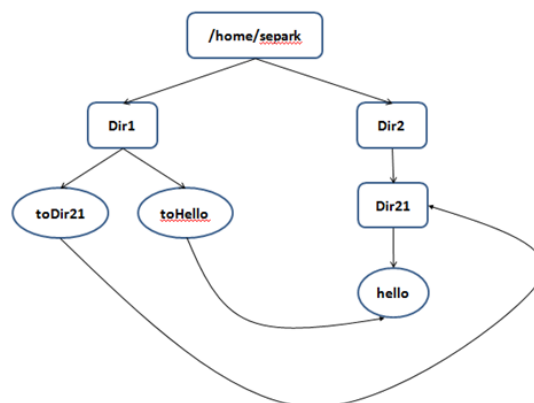
Task#4.2. (Test for Task #4.1) Execute hello by using symbolic link toHello. Try to delete a file, make directory by using symbolic link toDir21.

Task 5. <u>Write your own mv named MyMv</u>
By using bash command mv, you can move a file from current directory to another directory. Write your own mv called MyMv **<u>by using system calls link() and unlink()</u>**. Your program named **MyMv** can move a file from a current directory to a directory. Your program receives two arguments: **<u>file name and path to a directory where the file need to move</u>**, **<u>or file name and path to directory with a file name.</u>**
If the second argument is a directory, move a file to the directory. If the second argument is not a directory, move file to directory as a file name.

Ex)
- Move a file **foo** to under directory **~/separk/cosc350**
  - ./MyMv foo ~/separk/cosc350
- Move a file **foo** to under directory **~/separk/cosc350** named **abc** if there is no directory named abc
  - ./MyMv foo ~/separk/cosc350/abc
- Move a file foo to under directory **~/separk/cosc350** named **foo** if there is no directory named foo
  - ./MyMv foo ~/separk/cosc350/foo