Shell Scripting

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1 BASH PROGRAM

1.1 PROBLEM STATEMENT

1. Compulsory Problems:
   The inputs are name of the folder to be opened and the extension type of the files and these are to be passed through commandline.

   sh <scriptname><foldername><extension type>

   Open the user given folder and search for the subfolders with names having only small letters and without spaces.

   In these subfolders, write the names of files that have the user given extension into match.txt in the following format.
   <subfolder matching pattern>
   <Files in that subfolder matching extension >
   <next sufolder matching pattern>...and so on.

   If the given extension is a c or sh, execute the files assuming the files require no runtime or compile time arguments

2. Optional Problems
   - PROBLEM 2:(Difficulty level:** :bonus 5 marks)

     Convert all the capital letters to small case and remove blank spaces in the names of all the subfolders of the given folder.
   - PROBLEM 3:(Difficulty level:*** :bonus 5 marks)

Convert gif files into png in the subfolders which match pattern when the extension type is given gif

1.2 ABSTRACT

Bash is a Unix shell written by Brian Fox for the GNU Project as a free software replacement for the Bourne shell (sh). It has been distributed widely as the shell for the GNU operating system and as a default shell on Linux and Mac OS X. It has been ported to Microsoft Windows and distributed with Cygwin and MinGW, to DOS by the DJGPP project, to Novell NetWare and to Android via various terminal emulation applications.

Bash is a command processor, typically run in a text window, allowing the user to type commands which cause actions. Bash can also read commands from a file, called a script. Like all Unix shells, it supports filename wildcarding, piping, here documents, command substitution, variables and control structures for condition-testing and iteration. The keywords, syntax and other basic features of the language were all copied from sh. Other features, e.g., history, were copied from csh and ksh. Bash is a POSIX shell but with a number of extensions.

Regular expression (abbreviated regex or regexp) is a sequence of characters that forms a search pattern, mainly for use in pattern matching with strings, or string matching, i.e. "find and replace"-like operations.

ls is a command to list files in Unix and Unix-like operating systems. ls is specified by POSIX and the Single UNIX Specification.

Find command is used to search a folder hierarchy for filename(s) that meet a desired criteria: Name, Size, File Type.

Grep is a command-line utility for searching plain-text data sets for lines matching a regular expression. Grep was originally developed for the Unix operating system, but is available today for all Unix-like systems. Its name comes from the ed command g/re/p (globally search a regular expression and print), which has the same effect: doing a global search with the regular expression and printing all matching lines.

We use a combination of these with output redirecting to solve the problem statements.

1.3 Specification And Assumptions

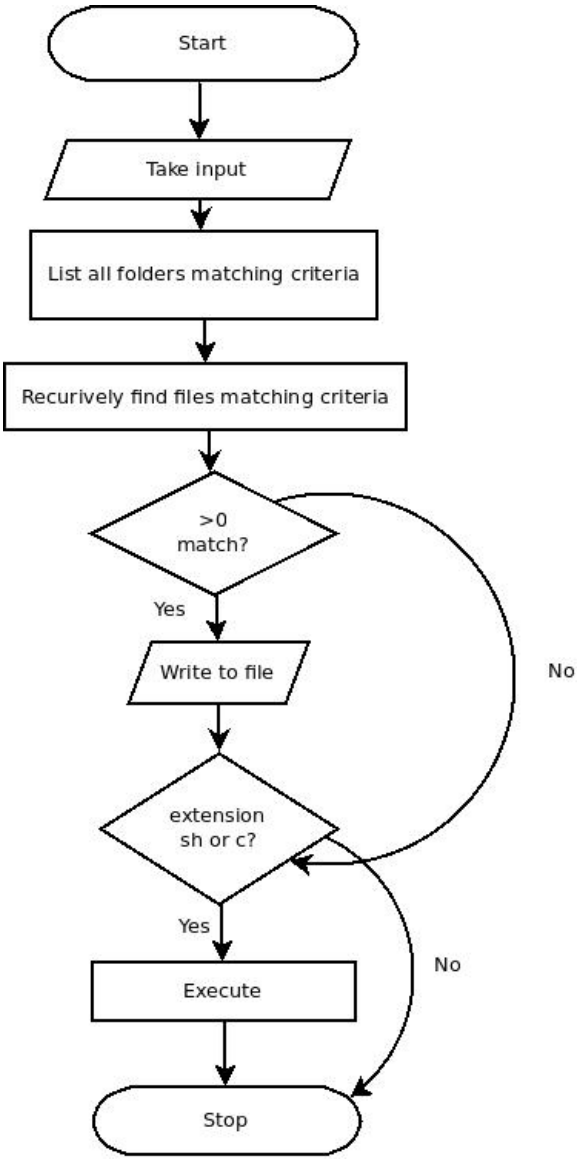
Tool Specifications:
Language used: Bash
Platform: Ubuntu 12.04
Additional tools used: awk, csh
Bash Version: GNU bash, version 4.2.25(1)-release (x86_64-pc-linux-gnu)

Problem specifications: Assume the following utilities are present on the system
ls
sed
grep

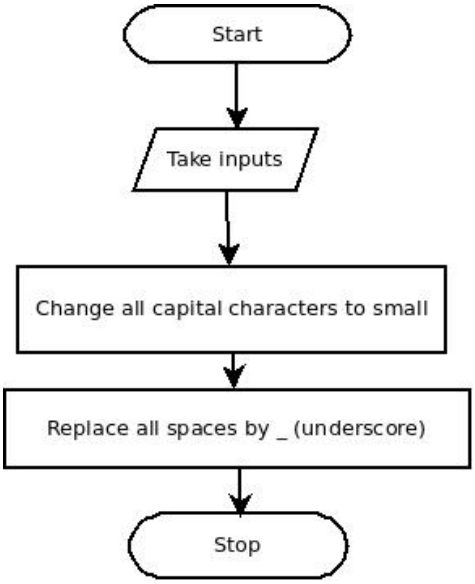
Assumptions
User has read and write prividlges to run the program, create files and directories

1.4 FLOW CHART

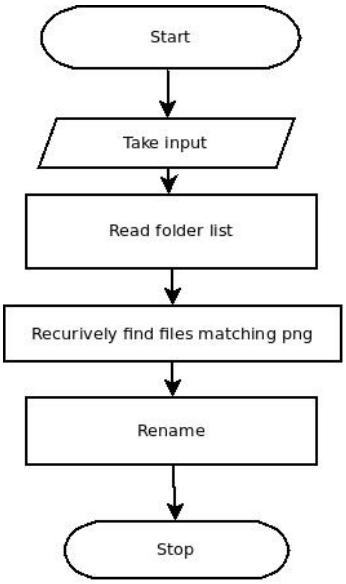
The flowcharts are in the following pages Problem 1:



Problem 2:



Problem 3:



1.5 Logic Implementation

The problem is broken into 3 parts

1. Searching and executing files
We first search for all folders using ls. We redirect the output of this to grep to find the strings that match the criteria.
Regex is used for the same.
If the number of files matching is more than 0, then the results are writen to file, otherwise nothing is done.
Finally if the file extension matches sh or c, then the files are executed (compiled and executed in case of c).

2. Renaming folders
The process is broken into 2 sub problems

a) Changing capital alphabets into small.
This is acheived by using the command 'tr' copies standard input to standard output, performing one of the following operations:
* translate, and optionally squeeze repeated characters in the result,
* squeeze repeated characters,
* delete characters,
* delete characters, then squeeze repeated characters from the result.

b) Replacing space by underscore. This is used by using the find command and redirecting the output to rename command.// Rename will rename the specified files by replacing the first occurrence of from in their name by to.
We are using regex replace to change space to underscore.

3. Renaming files
We use regex and mv command to achieve this
mv is used to Move or rename files or directories.
If the last argument names an existing directory, 'mv' moves each other given file into a file with the same name in that directory. Otherwise, if only two files are given, it renames the first as the second. It is an error if the last argument is not a directory and more than two files are given.
We use this to change extension from gif to png

1.6 Execution Directive

No compilation required. Directly run by typing

sh code.sh <foldername> <extension type>

1.7 Output Of The Program

Running the code

Sample output file

1.8 RESULT

Learnt about regular expressions. Each character in a regular expression is either understood to be a metacharacter with its special meaning, or a regular character with its literal meaning. Together, they can be used to identify textual material of a given pattern, or process a number of instances of it that can vary from a precise equality to a very general similarity of the pattern. The pattern sequence itself is an expression that is a statement in a language designed specifically to represent prescribed targets in the most concise and flexible way to direct the automation of text processing of general text files, specific textual forms, or of random input strings. We used it to search for files and folders matching a given criteria and rename them.

Problems encountered:

1. Write permissions error
2. Execute rights error

Solution: check and set permissions using chmod
In Unix-like operating systems, chmod is the name of a Unix shell command and a system call, which both change the access permissions to file system objects (including files and directories), as well as specifying special flags.

1.9 CONCLUSION

Successfully developed a code that does the following.

- Open the user given folder and search for the subfolders with names having only small letters and without spaces. In these subfolders, write the names of files that have the user given extension into âĂIJmatch.txtâĂİ in the required format.
- If the given extension is a c or sh, executes the files.
- Converts all the capital letters to small case and remove blank spaces in the names of all the subfolders of the given folder.
- Converts gif files into png in the subfolders which match pattern when the extension type is given gif