Algorithms and Data Structures---Project 1

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Program Design:

The program consists of two parts. 1st part is encoding handled by ***Encoder.java*** file and 2nd part is decoding which is handled by ***Decoder.java***.

The **Encoder.java** file has an Encoder class which handles the encoding of the file. To run this file, it requires two arguments. 1st argument is the name of the file along with its path which must be encoded and the 2nd argument is the N bit which should be less than 16.
This program generates the compressed ".lzw" file of the given input file at the same location as of the input file.

The **Decoder.java** file has a Decoder class which handles the decoding of the file. To run this file, it requires two arguments. 1st argument is the name of the file along with its path which must be decoded and the 2nd argument is the N bit which should be less than 16.
This program generates the "_decoded .txt" file of the given encoded file at the same location as of the input file with the _decoded added to the file name.

Data Structure used:

For encoding "**Hashtable"** is used. Hash table is used to keep the track of the table with String being the key and Integer being the value as in encoding we access the integer value (code) based on the string.

For decoding String "**Arraylist"** is used. Array list of Strings is used to keep the track of the table as in decoding we access the string stored in the table based on the Integer(code) value here it will be the index of the array.

Testing:

All the examples provided in canvas worked perfectly without any issues. I have even tested files with multiple lines containing multiple empty line spaces it has worked correctly with no issues.

The case of if no arguments passed is also handled and I have tried to fix all the cases that I can come across.

To verify the correctness of the program I have used the Beyond Compare tool which accepts two files data and checks if there is any difference between them and in all the testing there was no difference between the input file and the decoded file.

Programming language used: Java - 1.8.0_151

How to run the program?

Need to compile each java file using the **javac** command as

javac <name of the file>

or compile all java files in the directory using the below command

javac *.java

After compiling run the below command to execute the Encoder

java Encoder <file name along with the path> <Bit Length>

After compiling run the below command to execute the Decoder

java Decoder <file name along with the path> <Bit Length>