Report of Fundamentals of Embedded Programming Project

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***Abstract*—Morse code was one of the most prominent character encoding scheme in humanity’s history. The cypher codes are utilized effectively in telecommunication in order to help operators transmit messages as series of electric pulse of varied length, visual signals or mechanical waving, such as flashing lights, waving flag.**

# I. INTRODUCTION

**T**he Morse code indicates to either of two coding systems for symbolizing characters of the alphabet, special letters, punctuation marks as well as numerals by a composition of dots, dashes and spaces. There are numerous versions of Morse cypher being still disputed prevalently until nowadays. The original Morse system are supposed to spring from the United State by American artist – Samuel F.B Morse. In 1830s, Samuel Morse cooperated with his friend – Joseph Henry was a physicist to enhance telecommunication system. This was the age of World War II, so informative transmission was especially imperative role for countries. It was applied in radio communications during wartime by militaries to communicate secret messages in the battlefield, particular in Vietnam war. The International Morse Code was more accurate system devised from original version. The dot duration in Morse code is the basic time unit and duration of a dash is triple compared to dot ones. Signal absence is represented by space character that has mission to separate each letter in a word. The rate of Morse code is commonly specified as words per minute. This cypher code has changed mankind’s lives thanks to the development of telegraph over the last several centuries. Although the golden age of Morse code may be over, it still plays an integral part of modern communication at the present.

# II. PROBLEM ANALYSIS

**T**his mini project is principally divided into 2 parts: handling main’s arguments and transformation characters. Consequently, we illustrated the algorithm diagram of the program on the next page.

* When the morse.exe file is run, command line arguments are checked by a function called “check valid”. If the user’s arguments are not valid, this program will display error message to announce user to entering other ones or read “-h” to get more information.
* The other branch of “check valid” is handling arguments. Following flowchart sequence of if-else if statements, if the input file is a text file or user get “-t” option, the Encoder will be used. Otherwise, the file will be pass through a Decoder object.
* When user enters “-c” option, the “print statics” method, that is a common method of Decoder and Encoder, is applied and print the statics of the transformation process.

Diagram

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Figure 1: Main flowchart of morse.exe

Diagram

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Figure 2: The class diagram

* Class Encoder and Decoder is inherited from class Parent, which have 2 main public methods run() and printStatics().
* The TimeClass class with start() and end() is used inside Parent class to record the running time of transformation process.
* A HashMap is used to save the law of converting. In Encoder, the keys and values are normal characters and Morse characters, respectively, and vice versa.
* In transformation process, the program uses a stringSplit function, that is defined in lib and src folder, to divide the file into characters. Each character is passed through predefined HashMap to get the equivalent character in Morse code. Subsequently, the below image shows full folder tree:

A picture containing text

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Figure 3: Folder tree

# III. WORK ASSIGNED

|  |  |
| --- | --- |
| Mission | Performer |
| 1. Simplify the problem to some tasks and assign to members | Leader Bui Quang Manh |
| 1. Sketch algorithm flowchart | All members |
| 1. Design class diagram | Nguyen Dang Lan |
| 1. Optional command | Bui Quang Manh |
| 1. Encoder | Nguyen The Thao |
| 1. Decoder | Nguyen Dang Lan |
| 1. Error format situation | Nguyen The Thao |
| 1. Grafting code | Bui Quang Manh |
| 1. Testing program | All members |
| 1. Report | All members |

# 

# IV. CONCLUSION

1. *Result:*

We have done all the function that the project given required in technical requirement but we can’t handle the duration problem. Our code run too fast so that we can’t store exact value in time. We have also designed our project to some library that can be reusable for another project and uploaded it to github: <https://github.com/ndanglan/ktlt_project>.

1. *Main Example:*

* Case 1: Valid input and one optional:

-t: convert text file to morse file;

-m: convert morse file to text file;

-c: check file and choose appropriate mode to convert;

-h: print help instruction;

A screenshot of a computer

Description automatically generated with medium confidence

* Case 2: Valid input and two optional:

-t -m: throw Error command;

-t -c: convert text file to morse file and print to cmd;

-m -c: convert morse file to text file and print to cmd;

Graphical user interface, text, application

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* Case 3: Invalid input and inappropriate optional (It will print Error to cmd):

Text

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