Analysis Report

The one with the order numbers

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1 Introduction

This report aim to solve a simple problem utilizing Polya's Problem Solving Technique. This method consists of first gathering an understanding of the problem, then a plan of how to solve it is devised. These steps constitutes the main focus of this report. Additionally with a plan at hand the last steps consists of execute according to the plan and reflecting whether the strategy sufficed to achieve a suitable solution to the problem.

2 Step 1

2.1 Rephrasing the problem

Given order numbers and a dictionary of words as input the objective is to display all possible words that can be reconstructed from the order number using ITU E.161/ISO 9995-8 standard, see figure 1.
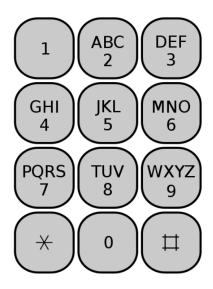

Figure 1: Illustration of the ITU E.161/ISO 9995-8 standard

For example if the order number is 43556 then the words "gekko" and "hello" should be return if they are in the dictionary of words, while angle should not be a match. If it's not possible to read the files a suitable error message should be displayed to the user and likewise for the case were no words could be reconstructed from the order number.

2.2 Understanding the words

This task was a bit tricky not the least since the ITU E.161/ISO 9995-8 standard is hardly a standard in today's society anymore since the transition to touch screens. However the attached links helped to explain how the standard works in case this information was forgotten.

3 Devising a plan

3.1 Approach of choice

The rough idea of how to approach the problem can be illustrated with pseudo code. In very short terms the problem consists of solving the following parts:

```python
# Dictionary of all integers in the ITU/ISO standard explained
    above that corresponds to letters
TRANSITION = {"2" : "abc", "3" : "def", ...}

# Store filenames as a list of strings
filenames = sys.argv[1:]

# Try to read files otherwise display error msg
try:
    # Reads and returns the Set of order numbers stored in the
    file.
    orders = read_orders(filenames[0])

    # Reads filename and returns a list of it's words.
    valid_words = read_words(filenames[1])
except Exception as err:
    print("Error: There was a problem with at least one of the
    files.")
    # The program is stopped if an error was encountered
    stop_program()


for order_number in orders:
    # Finds all the possible combinations that can be achieved
    using the digits in the order_number string.
    possible_combinations = find_all_possible_combinations(
    order_number)
    # find_all_possible_combinations could utilize an internal
    function that returns all possible combinations given a digit
    and extending the possible combinations when a new digit is
    added.
```

```python
# Finds all combinations from possible_combinations that also
exists in valid_words.
words = filter_valid_words(possible_combinations, valid_words)

# Displaying one order_number and the potential real words it
can translate into.
display_possible_words(order_number, words)
```