VIETNAM NATIONAL UNIVERSITY - HO CHI MINH CITY
HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING

INTRODUCTION TO COMPUTING - CO1005

ASSIGNMENT 2

SAY IT IN HAWAIIAN

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ASSIGNMENT'S SPECIFICATION

Version 1.0

1 Assignment's outcome

Upon completion of this assignment, students will be able to:

- Apply fundamental string processing techniques to real-world problems.
- Demonstrate proficiency in using loops, conditionals, and basic data structures for text manipulation.

2 Introduction

Languages often have unique rules for pronunciation that may not be obvious from their written form. Hawaiian, for example, has a small alphabet and well-defined rules that determine how words should be spoken. In this assignment, students will design and implement a program that translates written Hawaiian words into their phonetic pronunciation according to a set of specified rules.

The purpose of this assignment is not only to practice implementing string manipulation and rule-based processing, but also to experience how real-world problems, such as linguistic processing, can be modeled and solved using programming. By carefully applying control structures, conditionals, students will strengthen their ability to transform abstract rules into precise, working code.

3 Description

Hawaiian words can often appear intimidating at first glance. For example, a word such as *humuhumunukunukuapua'a* may look overwhelming, yet the Hawaiian language is built on a very small alphabet and a simple set of pronunciation rules. In fact, Hawaiian contains only 12 characters: `a, e, i, o, u, p, k, h, l, m, n, w`.

In this assignment, you will write a program that takes a Hawaiian word as input and generates its pronunciation as output, following the correct phonetic rules. For instance, the word *humuhumunukunukuapua'a* would be pronounced as hoo-moo-hoo-moo-noo-koo-noo-koo-ah-poo-ah'ah.

3.1 Consonants

The consonants in the Hawaiian language are pronounced similarly to the English versions, though `w`'s are pronounced with a *w* or *v* sound, as illustrated in Table 1.

Consonant(s)	Pronunciation Rule
`p, k, h, l, m, n`	Pronounced like the English versions.
`w` (start of word)	Either pronounced as *w* or *v*. We shall pronounce it as *w*.
`w` (after `a`)	Either pronounced as *w* or *v*. We shall pronounce it as *w*.
`w` (after `i` or `e`)	Pronounced as a *v* sound.
`w` (after `u` or `o`)	Pronounced as a *w* sound.

Table 1: Consonant pronunciation rules in Hawaiian

3.2 Vowels

The vowels in the Hawaiian language are `a, e, i, o, u` (Table 2).

Vowel	Pronunciation Rule
`a`	sounds like ah. eg. like that in "Austin" (ah-stin)
`e`	sounds like eh. eg. like that in "egg" (eh-gg)
`i`	sounds like ee. eg. like that in "bee"
`o`	sounds like oh. eg. like that in "obey" (oh-bay)
`u`	sounds like oo. eg. like that in "mood" (moo-d)

Table 2: Vowel pronunciation rules in Hawaiian

These rules allow us to create phonetic guides for some simple Hawaiian words. For instance, *aloha* is pronounced as ah-loh-hah.

3.3 Vowel groups

Vowel groups are also present in the Hawaiian language. More "*complex*" words can have many vowels that, when grouped, require additional rules. This means we can't simply replace all `a`'s with ah, all `e`'s with eh, etc. We will consider the following simplification of the Hawaiian vowel groups for this assignment (Table 3).

The Hawaiian word *keiki* means child, with the `ei` is pronounced as ay; *keiki* sounds like kay-kee. The island of *Maui* is pronounced as mow-ee.

In cases where a combination of vowels (e.g., `oa`) is not represented in the "vowel groups" table, each vowel is pronounced as individual vowel sounds. Accordingly, `oa` would be pronounced as

Vowel groups	Pronunciation Rule
ai	sounds like eye. eg. like that in “ice”
ae	sounds like eye, same as ai
ao	sounds like ow. eg. like that in “how”
au	sounds like ow. eg. like that in “house”
ei	sounds like ay. eg. like that in “hay”
eu	sounds like eh-oo.
iu	sounds like ew.
oi	sounds like oy.
ou	sounds like ow.
ui	sounds like ooey. eg. like that in “gooey”

Table 3: Vowel groups pronunciation rules in Hawaiian

oh-ah. The Hawaiian word *Hoaloha* means friend and would be pronounced as Hoh-ah-loh-hah.

There are words with more than 2 vowels in a row. These are approached in the same way. If aia is in a word, the ai would be said like eye. Then you'd pronounced the a as ah. aia thus sounds like eye-ah. *Kaiapuni* is the Hawaiian word for environment and is pronounced Keye-ah-poo-nee.

If there are more than two vowels in a row and the first two do not have a single sound, then you would say the first vowel normally, and then check to see if vowels 2 and 3 have a combined sound. The ua in *Huaai* does not have a sound. So you'd just pronounced the u as oo, and then evaluate the aa. Since there is no sound for aa, you'd just pronounced the first a as ah, and then evaluate ai. The ai is said like eye. So the word would be said as Hoo-ah-eye.

For simplicity, we will ignore accents in words. ã or â is simply an a. Notice that in writing the pronunciation, the placement of the hyphen comes after a vowel or vowel group.

4 Requirements

- The program must validate that the word contains only valid Hawaiian characters. Spaces and the apostrophe (') are also considered valid.
- If a word is not valid, the program must warn the user about the invalid characters.
- Spaces indicate breaks between words and should be preserved.
- The apostrophe represents a hard stop and must be preserved in the word. For example, the word *a'i* is pronounced ah'ee. Without the apostrophe, it would be pronounced eye.
- You are not allowed to use the `.replace()` method. You must evaluate the characters entered one at a time according to the rules.
- Apart from arrays, you are not allowed to use other data structures.

- Be careful when using `int` in loops involving `string.size()`. The `.size()` function returns an unsigned long (`size_t`), while `int` is signed.

5 Submission

Students must submit their code via the LMS. Students are allowed to have a **maximum of up to 5 submissions**; however, only the final submission will be used for grading and evaluation.

Due to the possibility of system overload when many students submit simultaneously, it is strongly recommended to submit as early as possible. Late submissions are the student's responsibility. Once the submission deadline has passed, the system will be closed and no further submissions will be accepted. Submissions through other means will not be considered under any circumstances.

6 Other Regulations

- Students must complete this assignment independently and must not allow others to copy their work. Any violation will be treated as academic dishonesty in accordance with university regulations.
- All decisions made by the instructors responsible for this assignment are final.
- Test cases will not be disclosed after grading.

7 Changelog

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