

# Generación de un Algoritmo de Separación de Sílabas en Castellano

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## 1. Introducción

Mediante este documento se indicarán las consideraciones necesarias para realizar un algoritmo de separación de sílabas en castellano. El lector puede buscar crear un algoritmo de separación basado en otro lenguaje de programación o crear un separador para otros idiomas que funcionen de manera similar, como el resto de lenguas romances (probablemente excluyendo el francés) u otros cuya estructura silábica funcione de manera similar, como el euskera, el turco o el finés.

## 2. Estructura Silábica

El castellano cuenta con una estructura silábica bien definida, lo cual permite realizar esta tarea a un computador una vez es programado para ello. Conviene diferenciar en primer lugar el comportamiento de las vocales y de las consonantes.

### 2.1. Vocales: Diptongos e Hiatos

El castellano diferencia dos tipos de vocales: **fuertes** y **débiles**. El conjunto de vocales fuertes se denotará mediante una  $A$  y el de las débiles mediante una  $I$ :

$$A = \{a, e, o\} \quad I = \{i, u\}$$

Los diptongos en castellano se forman con la unión de una vocal fuerte y una débil, de la forma  $ai$  o  $ia$ , donde  $a \in A$  e  $i \in I$ . También pueden estar formados por dos vocales débiles de la forma  $ii$ .

En el caso de la unión de dos vocales fuertes,  $aa$ , se formará siempre un hiato, separando estas dos vocales en sílabas distintas:  $a-a$ .

Sin embargo, en el caso en el que una vocal débil rompa un diptongo formando un hiato deberá indicarse utilizando un acento agudo sobre la vocal débil, de la forma  $\acute{i}-a$  o  $a-\acute{i}$ . En el caso de la diéresis sobre la  $u$ , esta será siempre una vocal débil ya que formará diptongo con una  $e$  o una  $i$ .

En el caso de triptongos, estos serán siempre de la forma  $iai$ .

Teniendo en cuenta todas estas consideraciones, conviene redefinir los conjuntos  $A$  e  $I$  teniendo en cuenta el acento agudo y la diéresis de la siguiente manera:

$$A = \{a, e, o, á, é, í, ó, ú\} \quad I = \{i, u, ü\}$$

## 2.2. Consonantes: Grupos Consonánticos

### 2.2.1. Ataque silábico

Los ataques silábicos que ocurren en castellano de más de dos letras son aquellos que comienzan por una consonante plosiva seguida de una consonante líquida. Las consonantes plosivas del castellano son  $p, b, t, d, c$  (ante  $a, o, u$ ),  $k$  y  $g$  (ante  $a, o, u$ ); y las líquidas  $r$  y  $l$ . Además hay que añadir la consonante  $f$  que forma ataques silábicos en palabras como *freno* o *flanco*; y restar el grupo  $dl$  ya que forma dos sílabas distintas, como en *traedlo*<sup>1</sup>.

Otros grupos de letras también forman un ataque silábico a pesar de no entrar en esta categoría, tales como  $ch, rr, ll$  y cuando ocurren a principio de palabra  $pn, ps, pt$  y  $gn$ . Conviene tratar estos tres primeros grupos como una única letra, y en el caso de los que solo ocurren al inicio de palabra considerarlos excepciones.

En el caso de la  $h$ , cuando aparece a principio de palabra siempre acompaña a la siguiente vocal en la sílaba, haciendo de ataque silábico. Cuando aparece en el interior de una palabra, siempre aparecerá entre dos vocales formando un hiato, haciendo de ataque silábico de la segunda sílaba. Es por ello que se puede considerar igual que cualquier otra consonante.

Teniendo esto en cuenta, conviene realizar la distinción entre tres conjuntos distintos:  $P$ , el conjunto que contiene a todas las plosivas menos la  $v$  y añade la  $f$ ;  $L$ , el conjunto que contiene a las líquidas  $r$  y  $l$ ; y  $C$ , el conjunto que contiene al resto de consonantes, incluyendo  $h, ch, ll$  y  $rr$ .

### 2.2.2. Coda

En el caso de finales de sílaba, los grupos consonánticos que aparecen son los que involucran una  $s$  seguidos de consonante, como por ejemplo *ins-truir*.

En el caso de una estructura  $vccv$ , donde  $v \in A \cup I$  y  $c \in P \cup L \cup C$ , la división silábica ocurrirá de la siguiente manera:

- $v-c_1c_2v$  si  $c_1 \in P$  y  $c_2 \in L$
- $vc_1-c_2v$  en caso contrario

En el caso de que haya más consonantes seguidas, los grupos consonánticos de final de sílaba ( $ns$ ) harán la función de  $c_1$  y/o los grupos consonánticos de inicio de sílaba ( $tr, bl...$ ) harán función de  $c_2$ .

<sup>1</sup>En este caso la consonante  $d$  no es plosiva sino fricativa, aunque esto no es inconveniente para formar ataques silábicos ya que estos pueden formarse con fricativas y líquidas como la  $f$  antes mencionada o en otros idiomas como el inglés, por ejemplo en la palabra *three*.

## 2.3. Más consideraciones

En el caso de g y c no hay que tener en cuenta si su sonido es fricativo o plosivo, es decir, si va antes de e o de i, ya que en cuanto a la estructura silábica se comportan igual.

Del mismo modo, los grupos gu y qu tampoco deberán ser tenidos en cuenta como excepciones ya que la u formará un diptongo con la siguiente vocal añadida, ya sea e o i, incluso en palabras como quienes. El caso de gü ya se tiene en cuenta al añadir ü al conjunto I.

## 3. Algoritmo

El algoritmo a diseñar constará de dos partes. En primer lugar, tendrá que separar las letras de la palabra una a una indicando a qué conjunto pertenece cada una. Para ello es recomendable el uso de un ciclo `while` en vez de un ciclo `for` ya que en casos como la detección de ch, rr... el salto entre una letra y la siguiente incrementa en 2 el valor del índice que recorre la palabra y no en 1.

En la segunda parte del algoritmo, el programador deberá crear un autómata finito de estados en los cuales estarán definidas todas las reglas de la sección 2. Para ello, deberá considerar la posibilidad de entrar al autómata mediante un elemento de cada uno de los 5 conjuntos definidos y hacia qué estado derivará el hecho de encontrarse con cada tipo de elemento. Deberá considerar también la posibilidad de lanzar una excepción, un puntero vacío u otro tipo de marca de error en el caso de palabras mal formadas.

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