

Práctica 5. "Buscador de Palabras"

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1 Introduction

El reconocimiento de lenguajes formales es un tema fundamental en la teoría de la computación y la construcción de autómatas es una herramienta esencial para esta tarea. En este contexto, se plantea el desafío de diseñar un autómata que sea capaz de reconocer todas las palabras del lenguaje de programación ANSI C. Esto implica la creación de un Autómata Finito No Determinista (NFA) y su posterior conversión a un Autómata Finito Determinista (DFA) con el objetivo de identificar palabras reservadas en programas escritos en C.

2 Marco Teórico

2.1 Lenguaje de Programación ANSI C

El *Lenguaje de Programación ANSI C* es un estándar ampliamente utilizado en el desarrollo de software. El lenguaje C se caracteriza por sus palabras reservadas, que son términos específicos con significados particulares en el contexto de la programación. Identificar y reconocer estas palabras reservadas es esencial en el análisis léxico de programas escritos en C.

2.2 Autómatas Finitos

Los *autómatas finitos* son modelos matemáticos que representan sistemas que pueden estar en estados específicos y cambiar de un estado a otro en respuesta a entradas. En este proyecto, se utilizarán *autómatas finitos no deterministas (NFA)* y *autómatas finitos deterministas (DFA)* para diseñar un sistema de reconocimiento de palabras reservadas en C.

2.3 Diseño del NFA

El primer paso del proyecto implica la creación de un *Autómata Finito No Determinista (NFA)* que acepte las palabras reservadas del lenguaje ANSI C.

Este NFA se basará en la definición de las palabras reservadas y la sintaxis del lenguaje C.

2.4 Conversión a DFA

Para mejorar la eficiencia y facilidad de implementación, el NFA se convertirá en un *Autómata Finito Determinista (DFA)*. Esto implica la creación de subconjuntos de estados y la construcción de una tabla de transiciones que represente el nuevo DFA.

3 Desarrollo de la Práctica

3.1 Paso 1: Diseño del NFA

En este primer paso, se procede al diseño de un Autómata Finito No Determinista (NFA) que pueda reconocer las palabras reservadas del lenguaje de programación ANSI C. Para ello, se definen los estados, el alfabeto, las transiciones y los estados de aceptación del NFA.

3.2 Paso 2: Conversión a DFA

Una vez diseñado el NFA, se procede a la conversión a un Autómata Finito Determinista (DFA). Este proceso implica la creación de subconjuntos de estados y la construcción de una tabla de transiciones que represente el nuevo DFA.

| ES TA DO | a | b | c | d | e | f | g | h | i | k | l | m | n | o | p | r | s | t | u | v | w | x | y | z | _ | P | T |
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| 1 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 2 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 3 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 4 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 5 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 5 | 2 | 6 | | 33 | 34 | 35 | 17 | 18 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 6 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 39 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 7 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 |
| 8 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 9 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 9 | 2 | 6 | | 33 | 34 | 36 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 10 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 11 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 11 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 21 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 12 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 13 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 13 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 38 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 14 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 15 |
| 15 | 16 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 16 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 24 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 17 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 25 | 1 | 1 | 26 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 18 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 11 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 19 | 2 | 6 | | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 20 | 2 | 6 | | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |
| 21 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 29 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 |
| 22 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 |

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| 23 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 31 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 24 | 2 | 6 | | 33 | 34 | 32 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 25 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 42 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 26 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 43 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 27 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 25 | 1 | 1 | 26 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 28 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 44 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 29 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 30 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 45 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 47 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 31 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 46 | 1 | 48 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 32 | 2 | 6 | | 33 | 49 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 33 | 53 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 54 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 34 | 2 | 6 | | 33 | 34 | 55 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 35 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 36 | 2 | 6 | | 33 | 57 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 37 | 2 | 6 | | 33 | 57 | 35 | 17 | 58 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 59 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 38 | 2 | 6 | | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 60 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 39 | 2 | 6 | | 33 | 34 | 61 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 40 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 62 | 63 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 64 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 41 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 20 | 40 | 66 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 42 | 67 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 5 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 43 | 2 | 6 | | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 44 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 45 | 2 | 6 | | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 68 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 46 | 2 | 6 | | 33 | 69 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 47 | 2 | 6 | | 33 | 34 | 35 | 17 | 10 | 62 | 70 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 64 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 48 | 71 | 6 | | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |

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| 49 | 2 | 6 | 33 | 34 | 55 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 50 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 72 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 51 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 73 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 52 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 74 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 53 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 75 | 7 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 54 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 76 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 55 | 2 | 6 | 33 | 34 | 35 | 77 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 56 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 78 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 57 | 2 | 6 | 33 | 34 | 79 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 58 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 80 | 1 | 3 | 1 | 1 | 11 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 59 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 81 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 60 | 2 | 6 | 33 | 34 | 82 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 61 | 83 | 6 | 33 | 57 | 35 | 17 | 58 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 59 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 62 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 84 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 63 | 2 | 6 | 33 | 34 | 35 | 27 | 85 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 86 | 14 | 1 | 1 |
| 64 | 87 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 88 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 65 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 13 | 89 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 66 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 90 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 67 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 91 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 68 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 92 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 69 | 2 | 6 | 33 | 34 | 55 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 70 | 2 | 6 | 33 | 34 | 35 | 27 | 93 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 86 | 14 | 1 | 1 |
| 71 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 94 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 72 | 2 | 6 | 33 | 34 | 95 | 17 | 10 | 62 | 63 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 64 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 73 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 96 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 74 | 2 | 6 | 33 | 34 | 97 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |

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| 75 | 2 | 6 | 33 | 34 | 98 | 17 | 10 | 62 | 63 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 64 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 76 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 99 | 100 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 77 | 101 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 25 | 1 | 1 | 26 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 78 | 2 | 102 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 79 | 2 | 6 | 33 | 34 | 35 | 103 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 80 | 2 | 6 | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 142 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 81 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 104 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
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| 83 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 105 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 84 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 106 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
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| 86 | 2 | 6 | 33 | 34 | 108 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 87 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 109 | 41 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 88 | 2 | 6 | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 110 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 89 | 2 | 6 | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 111 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 90 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 91 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 92 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 93 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 112 | 11 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 94 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 113 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 95 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 96 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 97 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 114 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 98 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 99 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 62 | 63 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 115 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 100 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 116 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |

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| 101 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 117 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 102 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 118 | 1 | 1 | 1 | 1 | 39 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 103 | 101 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 25 | 1 | 1 | 26 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 104 | 2 | 6 | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 119 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 105 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 106 | 2 | 6 | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 120 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 107 | 2 | 6 | 33 | 34 | 121 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 108 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 122 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 109 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 123 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 110 | 2 | 6 | 124 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 111 | 2 | 6 | 125 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 112 | 2 | 6 | 33 | 34 | 126 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 113 | 2 | 6 | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 127 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 114 | 2 | 6 | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 128 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 115 | 87 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 88 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 116 | 2 | 6 | 33 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 129 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 117 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 130 | 1 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 118 | 2 | 6 | 33 | 34 | 131 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 119 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 120 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 121 | 2 | 6 | 33 | 132 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 122 | 2 | 6 | 33 | 34 | 35 | 133 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 123 | 2 | 6 | 134 | 34 | 35 | 27 | 10 | 1 | 19 | 1 | 3 | 1 | 28 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 124 | 53 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 54 | 1 | 20 | 40 | 135 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 125 | 53 | 6 | 33 | 34 | 35 | 17 | 10 | 136 | 19 | 1 | 3 | 1 | 1 | 54 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 126 | 2 | 6 | 33 | 137 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|----|---|----|----|-----|----|----|----|----|---|----|---|----|----|---|-----|----|-----|-----|----|----|----|---|---|----|---|---|
| 127 | 2 | 6 | 33 | 34 | 138 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 128 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 129 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 44 | 139 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 130 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 4 | 1 | 20 | 40 | 140 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 131 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 132 | 2 | 6 | 33 | 34 | 55 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 133 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 25 | 1 | 1 | 26 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 134 | 53 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 54 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 135 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 136 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 137 | 2 | 6 | 33 | 34 | 55 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 56 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 138 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 139 | 2 | 6 | 33 | 34 | 141 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 30 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |
| 140 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 141 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 142 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 62 | 63 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 143 | 22 | 23 | 65 | 1 | 1 | 1 | 14 | 1 | 1 |
| 143 | 87 | 6 | 33 | 34 | 144 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 88 | 40 | 7 | 22 | 23 | 12 | 1 | 8 | 1 | 14 | 1 | 1 |
| 144 | 2 | 6 | 33 | 34 | 35 | 17 | 10 | 1 | 19 | 1 | 50 | 1 | 51 | 1 | 1 | 145 | 40 | 7 | 22 | 23 | 12 | 52 | 1 | 1 | 14 | 1 | 1 |
| 145 | 2 | 6 | 33 | 34 | 37 | 17 | 10 | 1 | 19 | 1 | 3 | 1 | 1 | 1 | 1 | 20 | 40 | 7 | 22 | 23 | 12 | 1 | 1 | 1 | 14 | 1 | 1 |

Figure 2: Conversión del NFA a DFA

3.3 Paso 3: Lectura de Archivo de Texto

El programa ahora se encarga de leer un archivo de texto que contiene programas escritos en ANSI C. Esto podría ser un archivo de una página web o cualquier fuente de código en C.

```

1  #include <stdio.h>
2
3  int esPrimo(int num) {
4      if (num <= 1) {
5          return 0; // No es primo
6      }
7      for (int i = 2; i * i <= num; i++) {
8          if (num % i == 0) {
9              return 0; // No es primo
10         }
11     }
12     return 1; // Es primo
13 }
14
15 int main() {
16     int inicio, fin;
17
18     printf("Ingrese el inicio del rango: ");
19     scanf("%d", &inicio);
20     printf("Ingrese el fin del rango: ");
21     scanf("%d", &fin);
22
23     printf("Números primos en el rango [%d, %d]:\n", inicio, fin);
24     for (int i = inicio; i <= fin; i++) {
25         if (esPrimo(i)) {
26             printf("%d ", i);
27         }
28     }
29     printf("\n");
30
31     return 0;
32 }

```

Figure 3: Lee el archivo de Texto

3.4 Paso 4: Identificación y Conteo de Palabras Reservadas

El autómata DFA diseñado se utiliza para identificar cada palabra reservada en el archivo de texto. Se cuentan las ocurrencias y se registra la posición en el archivo donde se encuentran. Además, se enumera, cuenta y anota dónde se encuentran todas las palabras reservadas.


```

1  auto = 0      Posiciones = []
2  else = 0      Posiciones = []
3  long = 0      Posiciones = []
4  switch = 0    Posiciones = []
5  break = 0     Posiciones = []
6  enum = 0      Posiciones = []
7  register = 0   Posiciones = []
8  typedef = 0    Posiciones = []
9  case = 0       Posiciones = []
10 extern = 0      Posiciones = []
11 return = 4      Posiciones = [75, 191, 239, 659]
12 union = 0       Posiciones = []
13 float = 0       Posiciones = []
14 short = 0       Posiciones = []
15 unsigned = 0    Posiciones = []
16 const = 0       Posiciones = []
17 for = 2         Posiciones = [112, 519]
18 signed = 0      Posiciones = []
19 void = 0        Posiciones = []
20 continue = 0    Posiciones = []
21 goto = 0        Posiciones = []
22 sizeof = 0      Posiciones = []
23 volatile = 0    Posiciones = []
24 default = 0     Posiciones = []
25 if = 3          Posiciones = [50, 158, 566]
26 static = 0      Posiciones = []
27 while = 0       Posiciones = []
28 do = 0          Posiciones = []
29 int = 11        Posiciones = [22, 34, 117, 267, 285, 311, 384, 453, 524, 599, 640]
30 struct = 0      Posiciones = []
31 _Packed = 0     Posiciones = []
32 double = 0      Posiciones = []

```

Figure 4: Resultado

Palabras reservadas identificadas: "int," "if," "return.," "for"

3.5 Paso 5: Registro del Proceso

El programa genera un archivo que registra la evaluación del autómata por cada carácter leído y cambio de estado. Esto proporciona una traza detallada de cómo el autómata reconoce las palabras reservadas en los programas C.

3.6 Ejemplo de Registro del Proceso

| | |
|-----|---------|
| 525 | 20 -> r |
| 526 | 2 -> a |
| 527 | 1 -> n |
| 528 | 10 -> g |
| 529 | 11 -> o |
| 530 | 1 -> |
| 531 | 1 -> [|
| 532 | 1 -> % |
| 533 | 34 -> d |
| 534 | 1 -> , |
| 535 | 1 -> |
| 536 | 1 -> % |
| 537 | 34 -> d |
| 538 | 1 ->] |
| 539 | 1 -> : |
| 540 | 1 -> \ |
| 541 | 1 -> n |
| 542 | 1 -> " |
| 543 | 1 -> , |
| 544 | 1 -> |
| 545 | 19 -> i |
| 546 | 28 -> n |
| 547 | 19 -> i |
| 548 | 33 -> c |
| 549 | 19 -> i |
| 550 | 1 -> o |
| 551 | 1 -> , |
| 552 | 1 -> |
| 553 | 17 -> f |
| 554 | 19 -> i |
| 555 | 28 -> n |
| 556 | 1 ->) |
| 557 | 1 -> ; |

Figure 5: Proceso

3.7 Paso 6: Grafica

El programa generara la grafica del (DFA)

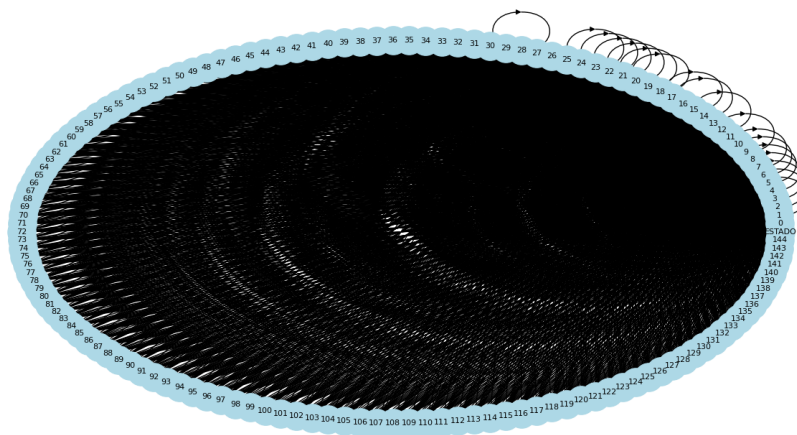


Figure 6: Grafica (DFA)

3.8 Código Grafica

```
1 import networkx as nx
2 import matplotlib.pyplot as plt
3 import csv
4
5 # Crea un grafo dirigido
6 G = nx.DiGraph()
7
8 # Lee el archivo CSV y agrega las transiciones al grafo
9 with open('datos_actualizados.csv', 'r') as csvfile:
10     reader = csv.reader(csvfile)
11     for row in reader:
12         # El primer elemento en cada fila es el estado
13         # actual
14         current_state = row[0]
15         for i, next_state in enumerate(row[1:]):
16             # Ignora las transiciones vac as (representadas
17             # por '1' en tu CSV)
18             if next_state != '1':
19                 # Agrega una arista desde el estado actual
20                 # al siguiente estado
21                 G.add_edge(current_state, str(i))
22
23 # Dibuja el grafo
```

```

21 pos = nx.circular_layout(G) # Cambia la disposici n a
    circular
22
23 plt.figure(figsize=(8, 8)) # Ajusta el tama o total del
    gr fico
24 nx.draw(G, pos, with_labels=True, node_size=800, node_color=
    "lightblue", font_size=8, font_color="black")
25 plt.show()

```

Listing 1: Grafica

3.9 Código Main

```

1 import funciones_buscadore as fb
2
3 archivo_leer = 'leer.txt'
4 archivo_resultado = 'resultado.txt'
5
6 with open(archivo_leer, 'rb') as archivo_entrada:
7     contenido = archivo_entrada.read()
8
9 resultado = fb.buscadore(contenido.decode('utf-8')) #
    Decodificar como utf-8 si es un archivo de texto
10
11 # Abre el archivo de resultado en modo escritura ('w')
12 with open('resultado.txt', 'w', encoding='utf-8') as
    archivo_resultado:
13     for clave, arreglo in resultado.items():
14         # Formatea la salida con la clave, el primer
            elemento del arreglo y el resto de elementos
15         texto_formateado = f'{clave} = {arreglo[0]} \t\t
            Posiciones = {arreglo[1:]} \n'
16         archivo_resultado.write(texto_formateado)
17
18 letra, estado = fb.regresa_historia()
19
20 # Abre el archivo "historia.txt" en modo escritura
21 with open("historia.txt", "w") as archivo_historia:
22     for i in range(len(letra)):
23         linea = f"{letra[i]} -> {estado[i]} \n"
24         archivo_historia.write(linea)

```

Listing 2: Main Buscadore

3.10 Código funciones

```

1 estado = []
2 letra = []

```

```

3
4
5 def e1(letra):
6     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
7     estado.append(transiciones.get(letra, 1))
8     return transiciones.get(letra, 1)
9
10 def e2(letra):
11     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 91,
"u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
12     estado.append(transiciones.get(letra, 1))
13     return transiciones.get(letra, 1)
14
15 def e3(letra):
16     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
17     estado.append(transiciones.get(letra, 1))
18     return transiciones.get(letra, 1)
19
20 def e4(letra):
21     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 5, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
22     estado.append(transiciones.get(letra, 1))
23     return transiciones.get(letra, 1)
24
25 def e5(letra):
26     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 18, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
27
28     estado.append(transiciones.get(letra, 1))
29     return transiciones.get(letra, 1)
30
31 def e6(letra):
32     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":

```

```

35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 39, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
33 estado.append(transiciones.get(letra, 1))
34 return transiciones.get(letra, 1)
35
36 def e7(letra):
37     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_": 14, "P": 1}
38     estado.append(transiciones.get(letra, 1))
39     return transiciones.get(letra, 1)
40
41 def e8(letra):
42     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 9, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
43     estado.append(transiciones.get(letra, 1))
44     return transiciones.get(letra, 1)
45
46 def e9(letra):
47     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 36, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
48     estado.append(transiciones.get(letra, 1))
49     return transiciones.get(letra, 1)
50
51 def e10(letra):
52     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 11, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
53     estado.append(transiciones.get(letra, 1))
54     return transiciones.get(letra, 1)
55
56 def e11(letra):
57     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 21, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
58     estado.append(transiciones.get(letra, 1))

```

```

59     return transiciones.get(letra, 1)
60
61 def e12(letra):
62     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 13, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
63     estado.append(transiciones.get(letra, 1))
64     return transiciones.get(letra, 1)
65
66 def e13(letra):
67     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 38, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
68     estado.append(transiciones.get(letra, 1))
69     return transiciones.get(letra, 1)
70
71 def e14(letra):
72     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 15}
73     estado.append(transiciones.get(letra, 1))
74     return transiciones.get(letra, 1)
75
76 def e15(letra):
77     transiciones = {"a": 16, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
78     estado.append(transiciones.get(letra, 1))
79     return transiciones.get(letra, 1)
80
81 def e16(letra):
82     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 24, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
83     estado.append(transiciones.get(letra, 1))
84     return transiciones.get(letra, 1)
85
86 def e17(letra):
87     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m":

```

```

88     ": 1, "n": 1, "o": 26, "p": 1, "r": 20, "s": 40, "t": 7,
89     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
90     14, "P": 1}
91     estado.append(transiciones.get(letra, 1))
92     return transiciones.get(letra, 1)
93
94 def e18(letra):
95     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
96     35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 25, "m": 1, "n": 1, "o": 11, "p": 1, "r": 20, "s": 40, "t":
97     7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
98     14, "P": 1}
99     estado.append(transiciones.get(letra, 1))
100     return transiciones.get(letra, 1)
101
102 def e19(letra):
103     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
104     35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
105     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
106     14, "P": 1}
107     estado.append(transiciones.get(letra, 1))
108     return transiciones.get(letra, 1)
109
110 def e20(letra):
111     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
112     37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
113     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
114     14, "P": 1}
115     estado.append(transiciones.get(letra, 1))
116     return transiciones.get(letra, 1)
117
118 def e21(letra):
119     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
120     35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 29, "p": 1, "r": 20, "s": 40, "t": 7,
121     "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
122     14, "P": 1}
123     estado.append(transiciones.get(letra, 1))
124     return transiciones.get(letra, 1)
125
126 def e22(letra):
127     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
128     35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
129     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
130     14, "P": 1}
131     estado.append(transiciones.get(letra, 1))
132     return transiciones.get(letra, 1)

```



```

115
116 def e23(letra):
117     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 31, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
118     estado.append(transiciones.get(letra, 1))
119     return transiciones.get(letra, 1)
120
121 def e24(letra):
122     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
32, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
123     estado.append(transiciones.get(letra, 1))
124     return transiciones.get(letra, 1)
125
126 def e25(letra):
127     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 42, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
128     estado.append(transiciones.get(letra, 1))
129     return transiciones.get(letra, 1)
130
131 def e26(letra):
132     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 43, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
133     estado.append(transiciones.get(letra, 1))
134     return transiciones.get(letra, 1)
135
136 def e27(letra):
137     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 25, "
m": 1, "n": 1, "o": 26, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
138     estado.append(transiciones.get(letra, 1))
139     return transiciones.get(letra, 1)
140
141 def e28(letra):
142     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 44,

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    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
143     14, "p": 1}
    estado.append(transiciones.get(letra, 1))
144     return transiciones.get(letra, 1)
145
146 def e29(letra):
147     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
148     estado.append(transiciones.get(letra, 1))
149     return transiciones.get(letra, 1)
150
151 def e30(letra):
152     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 45, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 47, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
153     estado.append(transiciones.get(letra, 1))
154     return transiciones.get(letra, 1)
155
156 def e31(letra):
157     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 46, "k": 1, "l": 48, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
158     estado.append(transiciones.get(letra, 1))
159     return transiciones.get(letra, 1)
160
161 def e32(letra):
162     transiciones = {"a": 2, "b": 6, "c": 33, "d": 49, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "p": 1}
163     estado.append(transiciones.get(letra, 1))
164     return transiciones.get(letra, 1)
165
166 def e33(letra):
167     transiciones = {"a": 53, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 54, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
168     estado.append(transiciones.get(letra, 1))
169     return transiciones.get(letra, 1)
170

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171 def e34(letra):
172     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
55, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
173     estado.append(transiciones.get(letra, 1))
174     return transiciones.get(letra, 1)
175
176 def e35(letra):
177     transiciones = {"a": 2, "b": 6, "c": 33, "d": 49, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
178     estado.append(transiciones.get(letra, 1))
179     return transiciones.get(letra, 1)
180
181 def e36(letra):
182     transiciones = {"a": 2, "b": 6, "c": 33, "d": 57, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
183     estado.append(transiciones.get(letra, 1))
184     return transiciones.get(letra, 1)
185
186 def e37(letra):
187     transiciones = {"a": 2, "b": 6, "c": 33, "d": 57, "e":
35, "f": 17, "g": 58, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
59, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
188     estado.append(transiciones.get(letra, 1))
189     return transiciones.get(letra, 1)
190
191 def e38(letra):
192     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 60, "
m": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
193     estado.append(transiciones.get(letra, 1))
194     return transiciones.get(letra, 1)
195
196 def e39(letra):
197     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
61, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":

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14, "p": 1}
198 estado.append(transiciones.get(letra, 1))
199 return transiciones.get(letra, 1)
200
201 def e40(letra):
202     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 62, "i": 63, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
64, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "_
": 14, "p": 1}
203     estado.append(transiciones.get(letra, 1))
204     return transiciones.get(letra, 1)
205
206 def e41(letra):
207     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t":
66, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "p": 1}
208     estado.append(transiciones.get(letra, 1))
209     return transiciones.get(letra, 1)
210
211 def e42(letra):
212     transiciones = {"a": 67, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 5, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
213     estado.append(transiciones.get(letra, 1))
214     return transiciones.get(letra, 1)
215
216 def e43(letra):
217     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
218     estado.append(transiciones.get(letra, 1))
219     return transiciones.get(letra, 1)
220
221 def e44(letra):
222     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "p": 1}
223     estado.append(transiciones.get(letra, 1))
224     return transiciones.get(letra, 1)
225
226 def e45(letra):

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227     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 68, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
228     estado.append(transiciones.get(letra, 1))
229     return transiciones.get(letra, 1)
230
231 def e46(letra):
232     transiciones = {"a": 2, "b": 6, "c": 33, "d": 69, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
233     estado.append(transiciones.get(letra, 1))
234     return transiciones.get(letra, 1)
235
236 def e47(letra):
237     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 62, "i": 70, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
64, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
238     estado.append(transiciones.get(letra, 1))
239     return transiciones.get(letra, 1)
240
241 def e48(letra):
242     transiciones = {"a": 71, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
243     estado.append(transiciones.get(letra, 1))
244     return transiciones.get(letra, 1)
245
246 def e49(letra):
247     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
55, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
248     estado.append(transiciones.get(letra, 1))
249     return transiciones.get(letra, 1)
250
251 def e50(letra):
252     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 72, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}

```

```

253     estado.append(transiciones.get(letra, 1))
254     return transiciones.get(letra, 1)
255
256 def e51(letra):
257     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 73, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
258     estado.append(transiciones.get(letra, 1))
259     return transiciones.get(letra, 1)
260
261 def e52(letra):
262     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 74,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
263     estado.append(transiciones.get(letra, 1))
264     return transiciones.get(letra, 1)
265
266 def e53(letra):
267     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 75, "t": 7,
"u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
268     estado.append(transiciones.get(letra, 1))
269     return transiciones.get(letra, 1)
270
271 def e54(letra):
272     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 76, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
273     estado.append(transiciones.get(letra, 1))
274     return transiciones.get(letra, 1)
275
276 def e55(letra):
277     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 77, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "
_": 14, "P": 1}
278     estado.append(transiciones.get(letra, 1))
279     return transiciones.get(letra, 1)
280
281 def e56(letra):
282     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":

```

```

35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 78, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
283 estado.append(transiciones.get(letra, 1))
284 return transiciones.get(letra, 1)
285
286 def e57(letra):
287     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
79, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
288 estado.append(transiciones.get(letra, 1))
289 return transiciones.get(letra, 1)
290
291 def e58(letra):
292     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 80, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 11, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
293 estado.append(transiciones.get(letra, 1))
294 return transiciones.get(letra, 1)
295
296 def e59(letra):
297     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 81, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
298 estado.append(transiciones.get(letra, 1))
299 return transiciones.get(letra, 1)
300
301 def e60(letra):
302     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
82, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
303 estado.append(transiciones.get(letra, 1))
304 return transiciones.get(letra, 1)
305
306 def e61(letra):
307     transiciones = {"a": 83, "b": 6, "c": 33, "d": 57, "e":
35, "f": 17, "g": 58, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
59, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "
_": 14, "P": 1}
308 estado.append(transiciones.get(letra, 1))

```



```

309     return transiciones.get(letra, 1)
310
311 def e62(letra):
312     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 84, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
313     estado.append(transiciones.get(letra, 1))
314     return transiciones.get(letra, 1)
315
316 def e63(letra):
317     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 85, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 86, "_":
14, "P": 1}
318     estado.append(transiciones.get(letra, 1))
319     return transiciones.get(letra, 1)
320
321 def e64(letra):
322     transiciones = {"a": 87, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 88, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
323     estado.append(transiciones.get(letra, 1))
324     return transiciones.get(letra, 1)
325
326 def e65(letra):
327     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 13, "i": 89, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
328     estado.append(transiciones.get(letra, 1))
329     return transiciones.get(letra, 1)
330
331 def e66(letra):
332     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 90, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
333     estado.append(transiciones.get(letra, 1))
334     return transiciones.get(letra, 1)
335
336 def e67(letra):
337     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m

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338     ": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 91,
339     "u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
340     14, "P": 1}
341     estado.append(transiciones.get(letra, 1))
342     return transiciones.get(letra, 1)
343
344 def e68(letra):
345     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
346     35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
347     ": 1, "n": 92, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
348     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
349     14, "P": 1}
350     estado.append(transiciones.get(letra, 1))
351     return transiciones.get(letra, 1)
352
353 def e69(letra):
354     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
355     55, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
356     ": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
357     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
358     14, "P": 1}
359     estado.append(transiciones.get(letra, 1))
360     return transiciones.get(letra, 1)
361
362 def e70(letra):
363     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
364     35, "f": 27, "g": 93, "h": 1, "i": 19, "k": 1, "l": 3, "m
365     ": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
366     "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
367     14, "P": 1}
368     estado.append(transiciones.get(letra, 1))
369     return transiciones.get(letra, 1)
370
371 def e71(letra):
372     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
373     35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
374     ": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 94,
375     "u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
376     14, "P": 1}
377     estado.append(transiciones.get(letra, 1))
378     return transiciones.get(letra, 1)
379
380 def e72(letra):
381     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
382     95, "f": 17, "g": 10, "h": 62, "i": 63, "k": 1, "l": 3, "m
383     ": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
384     64, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "_":
385     14, "P": 1}
386     estado.append(transiciones.get(letra, 1))
387     return transiciones.get(letra, 1)

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365
366 def e73(letra):
367     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 96, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
368     estado.append(transiciones.get(letra, 1))
369     return transiciones.get(letra, 1)
370
371 def e74(letra):
372     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
97, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_
": 14, "P": 1}
373     estado.append(transiciones.get(letra, 1))
374     return transiciones.get(letra, 1)
375
376 def e75(letra):
377     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
98, "f": 17, "g": 10, "h": 62, "i": 63, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
64, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
378     estado.append(transiciones.get(letra, 1))
379     return transiciones.get(letra, 1)
380
381 def e76(letra):
382     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 99, "t":
100, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "
_": 14, "P": 1}
383     estado.append(transiciones.get(letra, 1))
384     return transiciones.get(letra, 1)
385
386 def e77(letra):
387     transiciones = {"a": 101, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 25,
"m": 1, "n": 1, "o": 26, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
388     estado.append(transiciones.get(letra, 1))
389     return transiciones.get(letra, 1)
390
391 def e78(letra):
392     transiciones = {"a": 2, "b": 102, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t":

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7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_"
: 14, "P": 1}
393 estado.append(transiciones.get(letra, 1))
394 return transiciones.get(letra, 1)
395
396 def e79(letra):
397     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 103, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50,
"m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_"
": 14, "P": 1}
398 estado.append(transiciones.get(letra, 1))
399 return transiciones.get(letra, 1)
400
401 def e80(letra):
402     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 142, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_"
": 14, "P": 1}
403 estado.append(transiciones.get(letra, 1))
404 return transiciones.get(letra, 1)
405
406 def e81(letra):
407     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 30, "o": 1, "p": 1, "r": 104, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_"
": 14, "P": 1}
408 estado.append(transiciones.get(letra, 1))
409 return transiciones.get(letra, 1)
410
411 def e82(letra):
412     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_"
": 14, "P": 1}
413 estado.append(transiciones.get(letra, 1))
414 return transiciones.get(letra, 1)
415
416 def e83(letra):
417     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 105, "l": 3,
"m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_"
": 14, "P": 1}
418 estado.append(transiciones.get(letra, 1))
419 return transiciones.get(letra, 1)
420

```

```

421 def e84(letra):
422     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 106, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
423     estado.append(transiciones.get(letra, 1))
424     return transiciones.get(letra, 1)
425
426 def e85(letra):
427     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 107, "o": 11, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
428     estado.append(transiciones.get(letra, 1))
429     return transiciones.get(letra, 1)
430
431 def e86(letra):
432     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
108, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
433     estado.append(transiciones.get(letra, 1))
434     return transiciones.get(letra, 1)
435
436 def e87(letra):
437     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
109, "u": 41, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "
_": 14, "P": 1}
438     estado.append(transiciones.get(letra, 1))
439     return transiciones.get(letra, 1)
440
441 def e88(letra):
442     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 110, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
443     estado.append(transiciones.get(letra, 1))
444     return transiciones.get(letra, 1)
445
446 def e89(letra):
447     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t":
111, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "

```

```

    "_": 14, "p": 1}
448     estado.append(transiciones.get(letra, 1))
449     return transiciones.get(letra, 1)
450
451 def e90(letra):
452     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
453     estado.append(transiciones.get(letra, 1))
454     return transiciones.get(letra, 1)
455
456 def e91(letra):
457     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "p": 1}
458     estado.append(transiciones.get(letra, 1))
459     return transiciones.get(letra, 1)
460
461 def e92(letra):
462     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
463     estado.append(transiciones.get(letra, 1))
464     return transiciones.get(letra, 1)
465
466 def e93(letra):
467     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 112, "o": 11, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "p": 1}
468     estado.append(transiciones.get(letra, 1))
469     return transiciones.get(letra, 1)
470
471 def e94(letra):
472     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 113, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "p": 1}
473     estado.append(transiciones.get(letra, 1))
474     return transiciones.get(letra, 1)
475
476 def e95(letra):

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```

477     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
478     estado.append(transiciones.get(letra, 1))
479     return transiciones.get(letra, 1)
480
481 def e96(letra):
482     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
483     estado.append(transiciones.get(letra, 1))
484     return transiciones.get(letra, 1)
485
486 def e97(letra):
487     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 114, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
488     estado.append(transiciones.get(letra, 1))
489     return transiciones.get(letra, 1)
490
491 def e98(letra):
492     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
493     estado.append(transiciones.get(letra, 1))
494     return transiciones.get(letra, 1)
495
496 def e99(letra):
497     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 62, "i": 63, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
115, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "
_": 14, "P": 1}
498     estado.append(transiciones.get(letra, 1))
499     return transiciones.get(letra, 1)
500
501 def e100(letra):
502     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 116, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_
": 14, "P": 1}

```



```

503     estado.append(transiciones.get(letra, 1))
504     return transiciones.get(letra, 1)
505
506 def e101(letra):
507     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 117, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
508     estado.append(transiciones.get(letra, 1))
509     return transiciones.get(letra, 1)
510
511 def e102(letra):
512     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 118,
"m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
513     estado.append(transiciones.get(letra, 1))
514     return transiciones.get(letra, 1)
515
516 def e103(letra):
517     transiciones = {"a": 101, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 25,
"m": 1, "n": 1, "o": 26, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
518     estado.append(transiciones.get(letra, 1))
519     return transiciones.get(letra, 1)
520
521 def e104(letra):
522     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 119, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
523     estado.append(transiciones.get(letra, 1))
524     return transiciones.get(letra, 1)
525
526 def e105(letra):
527     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
528     estado.append(transiciones.get(letra, 1))
529     return transiciones.get(letra, 1)
530
531 def e106(letra):
532     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":

```

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37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 120, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
533 estado.append(transiciones.get(letra, 1))
534 return transiciones.get(letra, 1)
535
536 def e107(letra):
537     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 121, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
538     estado.append(transiciones.get(letra, 1))
539     return transiciones.get(letra, 1)
540
541 def e108(letra):
542     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "m": 1, "n": 51, "o": 122, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_": 14, "P": 1}
543
544     estado.append(transiciones.get(letra, 1))
545     return transiciones.get(letra, 1)
546
547 def e109(letra):
548     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 123, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_": 14, "P": 1}
549     estado.append(transiciones.get(letra, 1))
550     return transiciones.get(letra, 1)
551
552 def e110(letra):
553     transiciones = {"a": 2, "b": 6, "c": 124, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_": 14, "P": 1}
554     estado.append(transiciones.get(letra, 1))
555     return transiciones.get(letra, 1)
556
557 def e111(letra):
558     transiciones = {"a": 2, "b": 6, "c": 125, "d": 34, "e": 35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_": 14, "P": 1}

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```

559     estado.append(transiciones.get(letra, 1))
560     return transiciones.get(letra, 1)
561
562 def e112(letra):
563     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
126, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
564     estado.append(transiciones.get(letra, 1))
565     return transiciones.get(letra, 1)
566
567 def e113(letra):
568     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 127,
    "m": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
569     estado.append(transiciones.get(letra, 1))
570     return transiciones.get(letra, 1)
571
572 def e114(letra):
573     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 128, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
574     estado.append(transiciones.get(letra, 1))
575     return transiciones.get(letra, 1)
576
577 def e115(letra):
578     transiciones = {"a": 87, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 88, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
579     estado.append(transiciones.get(letra, 1))
580     return transiciones.get(letra, 1)
581
582 def e116(letra):
583     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 129, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
584     estado.append(transiciones.get(letra, 1))
585     return transiciones.get(letra, 1)
586
587 def e117(letra):
588     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":

```

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35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 130,
"m": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
589 estado.append(transiciones.get(letra, 1))
590 return transiciones.get(letra, 1)
591
592 def e118(letra):
593     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
131, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
594 estado.append(transiciones.get(letra, 1))
595 return transiciones.get(letra, 1)
596
597 def e119(letra):
598     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
599 estado.append(transiciones.get(letra, 1))
600 return transiciones.get(letra, 1)
601
602 def e120(letra):
603     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
604 estado.append(transiciones.get(letra, 1))
605 return transiciones.get(letra, 1)
606
607 def e121(letra):
608     transiciones = {"a": 2, "b": 6, "c": 33, "d": 132, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_":
14, "P": 1}
609 estado.append(transiciones.get(letra, 1))
610 return transiciones.get(letra, 1)
611
612 def e122(letra):
613     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 133, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
614 estado.append(transiciones.get(letra, 1))

```

```

615     return transiciones.get(letra, 1)
616
617 def e123(letra):
618     transiciones = {"a": 2, "b": 6, "c": 134, "d": 34, "e":
35, "f": 27, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 28, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
619     estado.append(transiciones.get(letra, 1))
620     return transiciones.get(letra, 1)
621
622 def e124(letra):
623     transiciones = {"a": 53, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 54, "p": 1, "r": 20, "s": 40, "t":
135, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "
_": 14, "P": 1}
624     estado.append(transiciones.get(letra, 1))
625     return transiciones.get(letra, 1)
626
627 def e125(letra):
628     transiciones = {"a": 53, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 136, "i": 19, "k": 1, "l": 3,
"m": 1, "n": 1, "o": 54, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_
": 14, "P": 1}
629     estado.append(transiciones.get(letra, 1))
630     return transiciones.get(letra, 1)
631
632 def e126(letra):
633     transiciones = {"a": 2, "b": 6, "c": 33, "d": 137, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
634     estado.append(transiciones.get(letra, 1))
635     return transiciones.get(letra, 1)
636
637 def e127(letra):
638     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
138, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
639     estado.append(transiciones.get(letra, 1))
640     return transiciones.get(letra, 1)
641
642 def e128(letra):
643     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m

```

```

        ": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
        "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
        14, "P": 1}
644     estado.append(transiciones.get(letra, 1))
645     return transiciones.get(letra, 1)
646
647 def e129(letra):
648     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
        35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
        ": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 44,
        "u": 139, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
        14, "P": 1}
649     estado.append(transiciones.get(letra, 1))
650     return transiciones.get(letra, 1)
651
652 def e130(letra):
653     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
        35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
        ": 1, "n": 1, "o": 4, "p": 1, "r": 20, "s": 40, "t":
        140, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "
        _": 14, "P": 1}
654     estado.append(transiciones.get(letra, 1))
655     return transiciones.get(letra, 1)
656
657 def e131(letra):
658     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
        35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
        m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
        7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "
        _": 14, "P": 1}
659     estado.append(transiciones.get(letra, 1))
660     return transiciones.get(letra, 1)
661
662 def e132(letra):
663     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
        55, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
        ": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
        "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
        14, "P": 1}
664     estado.append(transiciones.get(letra, 1))
665     return transiciones.get(letra, 1)
666
667 def e133(letra):
668     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
        35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 25, "
        m": 1, "n": 1, "o": 26, "p": 1, "r": 20, "s": 40, "t":
        7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
        14, "P": 1}
669     estado.append(transiciones.get(letra, 1))
670     return transiciones.get(letra, 1)

```

```

671
672 def e134(letra):
673     transiciones = {"a": 53, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 54, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
674     estado.append(transiciones.get(letra, 1))
675     return transiciones.get(letra, 1)
676
677 def e135(letra):
678     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
679     estado.append(transiciones.get(letra, 1))
680     return transiciones.get(letra, 1)
681
682 def e136(letra):
683     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
684     estado.append(transiciones.get(letra, 1))
685     return transiciones.get(letra, 1)
686
687 def e137(letra):
688     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
55, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 56, "p": 1, "r": 20, "s": 40, "t": 7,
    "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
689     estado.append(transiciones.get(letra, 1))
690     return transiciones.get(letra, 1)
691
692 def e138(letra):
693     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "
": 14, "P": 1}
694     estado.append(transiciones.get(letra, 1))
695     return transiciones.get(letra, 1)
696
697 def e139(letra):
698     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
141, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 30, "o": 1, "p": 1, "r": 20, "s": 40, "t":

```



```

7, "u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
: 14, "P": 1}
699     estado.append(transiciones.get(letra, 1))
700     return transiciones.get(letra, 1)
701
702 def e140(letra):
703     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
704     estado.append(transiciones.get(letra, 1))
705     return transiciones.get(letra, 1)
706
707 def e141(letra):
708     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 20, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
709     estado.append(transiciones.get(letra, 1))
710     return transiciones.get(letra, 1)
711
712 def e142(letra):
713     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 62, "i": 63, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t":
143, "u": 22, "v": 23, "w": 65, "x": 1, "y": 1, "z": 1, "
_": 14, "P": 1}
714     estado.append(transiciones.get(letra, 1))
715     return transiciones.get(letra, 1)
716
717 def e143(letra):
718     transiciones = {"a": 87, "b": 6, "c": 33, "d": 34, "e":
144, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "
m": 1, "n": 1, "o": 1, "p": 1, "r": 88, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 8, "z": 1, "_":
14, "P": 1}
719     estado.append(transiciones.get(letra, 1))
720     return transiciones.get(letra, 1)
721
722 def e144(letra):
723     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
35, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 50, "
m": 1, "n": 51, "o": 1, "p": 1, "r": 145, "s": 40, "t":
7, "u": 22, "v": 23, "w": 12, "x": 52, "y": 1, "z": 1, "_
": 14, "P": 1}
724     estado.append(transiciones.get(letra, 1))
725     return transiciones.get(letra, 1)
726

```

```

727 def e145(letra):
728     transiciones = {"a": 2, "b": 6, "c": 33, "d": 34, "e":
37, "f": 17, "g": 10, "h": 1, "i": 19, "k": 1, "l": 3, "m
": 1, "n": 1, "o": 1, "p": 1, "r": 20, "s": 40, "t": 7,
"u": 22, "v": 23, "w": 12, "x": 1, "y": 1, "z": 1, "_":
14, "P": 1}
729     estado.append(transiciones.get(letra, 1))
730     return transiciones.get(letra, 1)
731
732
733 def buscador(cadena):
734
735     estado = 1
736
737     p_auto = [0]
738     p_else = [0]
739     p_long = [0]
740     p_switch = [0]
741     p_break = [0]
742     p_enum = [0]
743     p_register = [0]
744     p_typedef = [0]
745     p_case = [0]
746     p_extern = [0]
747     p_return = [0]
748     p_union = [0]
749     p_float = [0]
750     p_short = [0]
751     p_unsigned = [0]
752     p_const = [0]
753     p_for = [0]
754     p_signed = [0]
755     p_void = [0]
756     p_continue = [0]
757     p_goto = [0]
758     p_sizeof = [0]
759     p_volatile = [0]
760     p_default = [0]
761     p_if = [0]
762     p_static = [0]
763     p_while = [0]
764     p_do = [0]
765     p_int = [0]
766     p_struct = [0]
767     p__Packed = [0]
768     p_double = [0]
769
770     for indice, i in enumerate(cadena):
771
772         letra.append(i)

```

```
773
774     if estado == 1:
775
776         estado = e1(i)
777
778     elif estado == 2:
779         estado = e2(i)
780
781     elif estado == 3:
782         estado = e3(i)
783
784     elif estado == 4:
785         estado = e4(i)
786
787     elif estado == 5:
788         estado = e5(i)
789
790     elif estado == 6:
791         estado = e6(i)
792
793     elif estado == 7:
794         estado = e7(i)
795
796     elif estado == 8:
797         estado = e8(i)
798
799     elif estado == 9:
800         estado = e9(i)
801
802     elif estado == 10:
803         estado = e10(i)
804
805     elif estado == 11:
806         estado = e11(i)
807
808     elif estado == 12:
809         estado = e12(i)
810
811     elif estado == 13:
812         estado = e13(i)
813
814     elif estado == 14:
815         estado = e14(i)
816
817     elif estado == 15:
818         estado = e15(i)
819
820     elif estado == 16:
821         estado = e16(i)
822
```

```

823     elif estado == 17:
824         estado = e17(i)
825
826     elif estado == 18:
827         p_long[0] += 1
828         p_long.append(indice-1-3)
829         estado = e18(i)
830
831     elif estado == 19:
832         estado = e19(i)
833
834     elif estado == 20:
835         estado = e20(i)
836
837     elif estado == 21:
838         estado = e21(i)
839
840     elif estado == 22:
841         estado = e22(i)
842
843     elif estado == 23:
844         estado = e23(i)
845
846     elif estado == 24:
847         estado = e24(i)
848
849     elif estado == 25:
850         estado = e25(i)
851
852     elif estado == 26:
853         estado = e26(i)
854
855     elif estado == 27:
856         p_if[0] += 1
857         p_if.append(indice-1-1)
858         estado = e27(i)
859
860     elif estado == 28:
861         estado = e28(i)
862
863     elif estado == 29:
864         p_goto[0] += 1
865         p_goto.append(indice-1-1)
866         estado = e29(i)
867
868     elif estado == 30:
869         estado = e30(i)
870
871     elif estado == 31:
872         estado = e31(i)

```

```

873
874     elif estado == 32:
875         estado = e32(i)
876
877     elif estado == 33:
878         estado = e33(i)
879
880     elif estado == 34:
881         estado = e34(i)
882
883     elif estado == 35:
884         estado = e35(i)
885
886     elif estado == 36:
887         estado = e36(i)
888
889     elif estado == 37:
890         estado = e37(i)
891
892     elif estado == 38:
893         estado = e38(i)
894
895     elif estado == 39:
896         estado = e39(i)
897
898     elif estado == 40:
899         estado = e40(i)
900
901     elif estado == 41:
902         estado = e41(i)
903
904     elif estado == 42:
905         estado = e42(i)
906
907     elif estado == 43:
908         p_for[0] += 1
909         p_for.append(indice-1-2)
910         estado = e43(i)
911
912     elif estado == 44:
913         p_int[0] += 1
914         p_int.append(indice-1-2)
915         estado = e44(i)
916
917     elif estado == 45:
918         estado = e45(i)
919
920     elif estado == 46:
921         estado = e46(i)
922

```

```
923     elif estado == 47:
924         estado = e47(i)
925
926     elif estado == 48:
927         estado = e48(i)
928
929     elif estado == 49:
930         p__Packed[0] += 1
931         p__Packed.append(indice-1-6)
932         estado = e49(i)
933
934     elif estado == 50:
935         estado = e50(i)
936
937     elif estado == 51:
938         estado = e51(i)
939
940     elif estado == 52:
941         estado = e52(i)
942
943     elif estado == 53:
944         estado = e53(i)
945
946     elif estado == 54:
947         estado = e54(i)
948
949     elif estado == 55:
950         estado = e55(i)
951
952     elif estado == 56:
953         p_do[0] += 1
954         p_do.append(indice-1-1)
955         estado = e56(i)
956
957     elif estado == 57:
958         estado = e57(i)
959
960     elif estado == 58:
961         estado = e58(i)
962
963     elif estado == 59:
964         estado = e59(i)
965
966     elif estado == 60:
967         estado = e60(i)
968
969     elif estado == 61:
970         estado = e61(i)
971
972     elif estado == 62:
```

```

973         estado = e62(i)
974
975     elif estado == 63:
976         estado = e63(i)
977
978     elif estado == 64:
979         estado = e64(i)
980
981     elif estado == 65:
982         estado = e65(i)
983
984     elif estado == 66:
985         estado = e66(i)
986
987     elif estado == 67:
988         estado = e67(i)
989
990     elif estado == 68:
991         estado = e68(i)
992
993     elif estado == 69:
994         p_void[0] += 1
995         p_void.append(indice-1-3)
996         estado = e69(i)
997
998     elif estado == 70:
999         estado = e70(i)
1000
1001     elif estado == 71:
1002         estado = e71(i)
1003
1004     elif estado == 72:
1005         estado = e72(i)
1006
1007     elif estado == 73:
1008         estado = e73(i)
1009
1010     elif estado == 74:
1011         estado = e74(i)
1012
1013     elif estado == 75:
1014         estado = e75(i)
1015
1016     elif estado == 76:
1017         estado = e76(i)
1018
1019     elif estado == 77:
1020         estado = e77(i)
1021
1022     elif estado == 78:

```

```

1023         estado = e78(i)
1024
1025     elif estado == 79:
1026         estado = e79(i)
1027
1028     elif estado == 80:
1029         estado = e80(i)
1030
1031     elif estado == 81:
1032         estado = e81(i)
1033
1034     elif estado == 82:
1035         p_while[0] += 1
1036         p_while.append(indice-1-4)
1037         estado = e82(i)
1038
1039     elif estado == 83:
1040         estado = e83(i)
1041
1042     elif estado == 84:
1043         estado = e84(i)
1044
1045     elif estado == 85:
1046         estado = e85(i)
1047
1048     elif estado == 86:
1049         estado = e86(i)
1050
1051     elif estado == 87:
1052         estado = e87(i)
1053
1054     elif estado == 88:
1055         estado = e88(i)
1056
1057     elif estado == 89:
1058         estado = e89(i)
1059
1060     elif estado == 90:
1061         p_auto[0] += 1
1062         p_auto.append(indice-1-3)
1063         estado = e90(i)
1064
1065     elif estado == 91:
1066         p_float[0] += 1
1067         p_float.append(indice-1-4)
1068         estado = e91(i)
1069
1070     elif estado == 92:
1071         p_union[0] += 1
1072         p_union.append(indice-1-4)

```



```

1073         estado = e92(i)
1074
1075     elif estado == 93:
1076         estado = e93(i)
1077
1078     elif estado == 94:
1079         estado = e94(i)
1080
1081     elif estado == 95:
1082         p_else[0] += 1
1083         p_else.append(indice-1-3)
1084         estado = e95(i)
1085
1086     elif estado == 96:
1087         p_enum[0] += 1
1088         p_enum.append(indice-1-3)
1089         estado = e96(i)
1090
1091     elif estado == 97:
1092         estado = e97(i)
1093
1094     elif estado == 98:
1095         p_case[0] += 1
1096         p_case.append(indice-1-3)
1097         estado = e98(i)
1098
1099     elif estado == 99:
1100         estado = e99(i)
1101
1102     elif estado == 100:
1103         estado = e100(i)
1104
1105     elif estado == 101:
1106         estado = e101(i)
1107
1108     elif estado == 102:
1109         estado = e102(i)
1110
1111     elif estado == 103:
1112         p_typedef[0] += 1
1113         p_typedef.append(indice-1-6)
1114         estado = e103(i)
1115
1116     elif estado == 104:
1117         estado = e104(i)
1118
1119     elif estado == 105:
1120         p_break[0] += 1
1121         p_break.append(indice-1-4)
1122         estado = e105(i)

```

```

1123
1124     elif estado == 106:
1125         estado = e106(i)
1126
1127     elif estado == 107:
1128         estado = e107(i)
1129
1130     elif estado == 108:
1131         estado = e108(i)
1132
1133     elif estado == 109:
1134         estado = e109(i)
1135
1136     elif estado == 110:
1137         estado = e110(i)
1138
1139     elif estado == 111:
1140         estado = e111(i)
1141
1142     elif estado == 112:
1143         estado = e112(i)
1144
1145     elif estado == 113:
1146         estado = e113(i)
1147
1148     elif estado == 114:
1149         estado = e114(i)
1150
1151     elif estado == 115:
1152         p_const[0] += 1
1153         p_const.append(indice-1-4)
1154         estado = e115(i)
1155
1156     elif estado == 116:
1157         estado = e116(i)
1158
1159     elif estado == 117:
1160         estado = e117(i)
1161
1162     elif estado == 118:
1163         estado = e118(i)
1164
1165     elif estado == 119:
1166         p_return[0] += 1
1167         p_return.append(indice-1-5)
1168         estado = e119(i)
1169
1170     elif estado == 120:
1171         p_short[0] += 1
1172         p_short.append(indice-1-4)

```

```

1173         estado = e120(i)
1174
1175     elif estado == 121:
1176         estado = e121(i)
1177
1178     elif estado == 122:
1179         estado = e122(i)
1180
1181     elif estado == 123:
1182         estado = e123(i)
1183
1184     elif estado == 124:
1185         estado = e124(i)
1186
1187     elif estado == 125:
1188         estado = e125(i)
1189
1190     elif estado == 126:
1191         estado = e126(i)
1192
1193     elif estado == 127:
1194         estado = e127(i)
1195
1196     elif estado == 128:
1197         p_extern[0] += 1
1198         p_extern.append(indice-1-5)
1199         estado = e128(i)
1200
1201     elif estado == 129:
1202         estado = e129(i)
1203
1204     elif estado == 130:
1205         estado = e130(i)
1206
1207     elif estado == 131:
1208         p_double[0] += 1
1209         p_double.append(indice-1-5)
1210         estado = e131(i)
1211
1212     elif estado == 132:
1213         p_signed[0] += 1
1214         p_signed.append(indice-1-5)
1215         estado = e132(i)
1216
1217     elif estado == 133:
1218         p_sizeof[0] += 1
1219         p_sizeof.append(indice-1-5)
1220         estado = e133(i)
1221
1222     elif estado == 134:

```

```

1223         p_static[0] += 1
1224         p_static.append(indice-1-5)
1225         estado = e134(i)
1226
1227     elif estado == 135:
1228         p_struct[0] += 1
1229         p_struct.append(indice-1-5)
1230         estado = e135(i)
1231
1232     elif estado == 136:
1233         p_switch[0] += 1
1234         p_switch.append(indice-1-5)
1235         estado = e136(i)
1236
1237     elif estado == 137:
1238         p_unsigned[0] += 1
1239         p_unsigned.append(indice-1-7)
1240         estado = e137(i)
1241
1242     elif estado == 138:
1243         p_volatile[0] += 1
1244         p_volatile.append(indice-1-7)
1245         estado = e138(i)
1246
1247     elif estado == 139:
1248         estado = e139(i)
1249
1250     elif estado == 140:
1251         p_default[0] += 1
1252         p_default.append(indice-1-6)
1253         estado = e140(i)
1254
1255     elif estado == 141:
1256         p_continue[0] += 1
1257         p_continue.append(indice-1-7)
1258         estado = e141(i)
1259
1260     elif estado == 142:
1261         estado = e142(i)
1262
1263     elif estado == 143:
1264         estado = e143(i)
1265
1266     elif estado == 144:
1267         estado = e144(i)
1268
1269     elif estado == 145:
1270         p_register[0] += 1
1271         p_register.append(indice-1-7)
1272         estado = e145(i)

```

```

1273
1274     return {
1275         'auto': p_auto,
1276         'else': p_else,
1277         'long': p_long,
1278         'switch': p_switch,
1279         'break': p_break,
1280         'enum': p_enum,
1281         'register': p_register,
1282         'typedef': p_typedef,
1283         'case': p_case,
1284         'extern': p_extern,
1285         'return': p_return,
1286         'union': p_union,
1287         'float': p_float,
1288         'short': p_short,
1289         'unsigned': p_unsigned,
1290         'const': p_const,
1291         'for': p_for,
1292         'signed': p_signed,
1293         'void': p_void,
1294         'continue': p_continue,
1295         'goto': p_goto,
1296         'sizeof': p_sizeof,
1297         'volatile': p_volatile,
1298         'default': p_default,
1299         'if': p_if,
1300         'static': p_static,
1301         'while': p_while,
1302         'do': p_do,
1303         'int': p_int,
1304         'struct': p_struct,
1305         '_Packed': p__Packed,
1306         'double': p_double
1307     }
1308
1309 def regresa_historia():
1310     return estado, letra

```

Listing 3: Funciones del Buscador

4 Conclusión

En esta práctica de teoría de la computación, hemos diseñado un detector de palabras clave en el lenguaje de programación ANSI C utilizando autómatas. Primero, creamos un autómata que reconoce las palabras reservadas, luego lo simplificamos para hacerlo más eficiente. Al aplicar este detector a programas en C, pudimos contar y ubicar las palabras reservadas, y además generamos un

registro detallado del proceso. Esta práctica ilustra cómo los conceptos teóricos pueden ser poderosas herramientas en la resolución de problemas prácticos en la programación.

5 Bibliografía

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