Inhalt

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[4.10.1 1](#_Toc29477211)

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## 4.10

### 4.10.1

ABRACADABRA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| j | pat.charAt(j) | dfa[][j] | | | | |  |  |
|  |  | A | B | C | D | R | ABRACADABRA | |
| 0 | A | 1 |  |  |  |  | **A** |  |
|  |  |  |  |  |  |  | B |  |
|  |  |  | 0 |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  |  | C |  |
|  |  |  |  | 0 |  |  |  | ABRACADABRA |
|  |  |  |  |  |  |  | D |  |
|  |  |  |  |  | 0 |  |  | ABRACADABRA |
|  |  |  |  |  |  |  | R |  |
|  |  |  |  |  |  | 0 |  | ABRACADABRA |
| 1 | B |  | 2 |  |  |  | **AB** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  | 1 |  |  |  |  | AA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | AC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | AD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | AR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 2 | R |  |  |  |  | 3 | **ABR** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  | 1 |  |  |  |  | ABA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 0 |  |  |  | ABB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 3 | A | 4 |  |  |  |  | **ABRA** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 0 |  |  |  | ABRB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 4 | C | 5 |  |  |  |  | **ABRAC** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 1 |  |  |  | ABRAA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRAB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRAC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRAR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 5 | A | 7 |  |  |  |  | **ABRACA** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 0 |  |  |  | ABRACB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRACC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 6 | D | 7 |  |  |  |  | **ABRACAD** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 1 |  |  |  | ABRACAA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 2 |  |  | ABRACAB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACAC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACAR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 7 | A | 7 |  |  |  |  | **ABRACADA** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 0 |  |  |  | ABRACADB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRACADC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACADD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACADR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 8 | A | 7 |  |  |  |  | **ABRACADAB** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 1 |  |  |  | ABRACADAA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRACADAC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACADAD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACADAR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 9 | A | 7 |  |  |  |  | **ABRACADABR** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 1 |  |  |  | ABRACADABA |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRACADABB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACADABC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACADABD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
| 10 | A | 7 |  |  |  |  | **ABRACADABRA** |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  | 0 |  |  |  | ABRACADABRB |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  | 0 |  |  | ABRACADABRC |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  | 0 |  | ABRACADABRD |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |
|  |  |  |  |  |  | 0 | ABRACADABRR |  |
|  |  |  |  |  |  |  |  | ABRACADABRA |

### 4.10.2

To implement the mismatched character heuristic, we use an array right[] that gives, for each character in the alphabet, the index of its rightmost occurrence in the pattern (or -1 if the character is not in the pattern).

ABRACADABRA

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **R** | **A** | **C** | **A** | **D** | **A** | **B** | **R** | **A** |  |
| **c** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **right[c]** |
| **A** |  |  |  |  |  |  |  |  |  |  | 10 | **10** |
| **B** |  | 1 |  |  |  |  |  |  |  |  |  | **1** |
| **C** |  |  |  |  | 4 |  |  |  |  |  |  | **4** |
| **D** |  |  |  |  |  |  | 6 |  |  |  |  | **6** |
| **R** |  |  |  |  |  |  |  |  |  | 9 |  | **9** |

## 4.11

Boyer-Moore

TXTXXTXUTXTXUXTXXUTTTTTTXUUTXTTT

TXUUT

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T | X | T | X | X | T | X | U | T | X | T | X | U | X | T | X | X | U | T | T | T | T | T | T | X | U | U | T | X | T | T | T |
| T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | T | X | U | U | T |  |  |  |  |

Rabin-Karp

hash(TXUUT) = h0

TUXTXXTXUTXTXUXTXXUTTTTTTXUUTXTTT

|  |  |  |
| --- | --- | --- |
| | x | | hash(x) | == h0 ? |
| | TUXTX | XTXUTXTXUXTXXUTTTTTTXUUTXTTT | h1 | no |
| T | UXTXX | TXUTXTXUXTXXUTTTTTTXUUTXTTT | h2 | no |
| TU | XTXXT | XUTXTXUXTXXUTTTTTTXUUTXTTT | h3 | no |
| … |  |  |
| TUXTXXTXUTXTXUXTXXUTTTTT | TXUUT | XTTT | h0 | yes |
| T == T  X == X  U == U  U == U  T == T  → match | | |
| … |  |  |
| TUXTXXTXUTXTXUXTXXUTTTTTTXUU | T XTTT | | h4 | no → done |

## 4.13

### 4.13.1

Der eine Buchstabe würde durch 0 und der andere durch 1 repräsentiert werden

### 4.13.2

RunLength: 1a1b, 1a1b1a1b, …

LZW: 81, 8181, 81818181

|  |  |
| --- | --- |
| codeword table | |
| key | value |
| ab | 81 |

### 4.13.3

????

## 4.14

### 4.14.1

Es kommt auf die Sortierung nach dem nach Häufigkeit sortiert wurde an. Je nachdem kann die Kodierung abweichen

### 4.14.2

Der am schnellsten zu erreichende Knoten und somit der mit der kürzesten Bitfolge ist das häufigste und der am langsamsten zu erreichende Knoten, der unterste, und somit der mit der längsten Bitfolge ist das am wenigsten häufige Zeichen

4.15

EINS+EINSISTNICHTEINS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| + | C | E | I | N | H | S | T | EOF |
| 2B | 43 | 45 | 49 | 4E | 48 | 53 | 54 | 80 |

EI 81

IN 82

NS 83

S+ 84

+E 85

EIN 86

NSI 87

IS 88

ST 89

TN 8A

NI 8B

IC 8C

CH 8D

HT 8E

TE 8F

EINS 90

SEOF 91

----------------

45 49 4E 53 2B 86 87 49 53 54 4E 49 43 48 54 90 53 80