Assignment 1 of CISC 3025

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1

a

```
[a-z]*b
```

b

```
\bgrottos\b.*\braven\b|\braven\b.*\bgrottos\b
```

c

```
([a-zA-Z]+)\s+\1
```

2

a

Do not contain any alphabet.

```
12345, OK
123As, No
```

b

Two digts/Two digts/Four digts. Date

```
10/11/2021
```

c

Case 1: This string contains two substring, the first substring contains at least one a. The second substring is starting with a b and following by at least one a. This string can contains at least one the second substring.

Case 2: This string contain nothing(*null*)

```
aabaababaabaaa
    or
null
```

3

```
e, 5, 6, 5, 4, 3, 4
f, 4, 5, 4, 3, 4, 5
i, 3, 4, 3, 2, 3, 4
r, 2, 3, 2, 3, 4, 5
b, 1, 2, 3, 4, 5, 6
0, 0, 1, 2, 3, 4, 5
   0, d, r, i, v, e
```

```
s, 6, 5, 4, 3, 2, 1
e, 5, 4, 3, 2, 1, 0
v, 4, 3, 2, 1, 0, 1
i, 3, 2, 1, 0, 1, 2
r, 2, 1, 0, 1, 2, 3
d, 1, 0, 1, 2, 3, 4
0, 0, 1, 2, 3, 4, 5
   0, d, r, i, v, e
```

drive is closer to *driver* than $brife$.

4

s	6	↓5	↓4	↓3	↓2	↓***1***
e	5	↓4	↓3	↓2	↓1	↙***0***
v	4	↓3	↓2	↓1	↙***0***	← 1
i	3	↓2	↓1	↙***0***	←1	←2
r	2	↓1	↙***0***	←1	←2	←3
d	1	↙***0***	←1	←2	←3	←4
0	***0***	1	2	3	4	5
	0	d	r	i	v	e

5

a

$$
\begin{aligned}
|V| =& 6 \\
P(do|<s>) =& \frac{2}{11} \\
P(do|Same) =& \frac{1}{11} \\
P(Sam|<s>) =& \frac{4}{11} \\
P(Sam|do) =& \frac{1}{8} \\
P(I|Sam) =& \frac{4}{11} \\
P(I|do) =& \frac{2}{8} \\
=& \frac{1}{4} \\
P(like|I) =& \frac{3}{11}
\end{aligned}
$$

b

$$
\begin{aligned}
P(do\ Sam\ I\ like) =& P(do|<s>) \times P(Sam|do) \\
& \times P(I|do\ Sam) \times P(like|do\ Sam\ I) \\
\approx& P(do|<s>) \times P(Sam|do) \\
& \times P(I|Sam) \times P(like|I) \\
=& \frac{2}{11} \times \frac{1}{8} \times \frac{4}{11} \times \frac{3}{11} \\
=& \frac{3}{1331} \\
P(Sam\ do\ I\ like) =& P(Sam|<s>) \times P(do|Sam) \\
=& P(I|do) \times P(like|I) \\
=& \frac{4}{11} \times \frac{1}{11} \times \frac{2}{8} \times \frac{3}{11} \\
=& \frac{3}{1331}
\end{aligned}
$$