Flyweight, Prototype

x
y
→ image
→ power

Extrinsic

Intrinsic

A

B

C

RAM

Video Game

100000

A B C

i
p
oh

3 type

x — 4
y — 4
ch — 4
p — 4
oh — 4
image — 10kb

20k A 20k B 30k C

10000 enemy

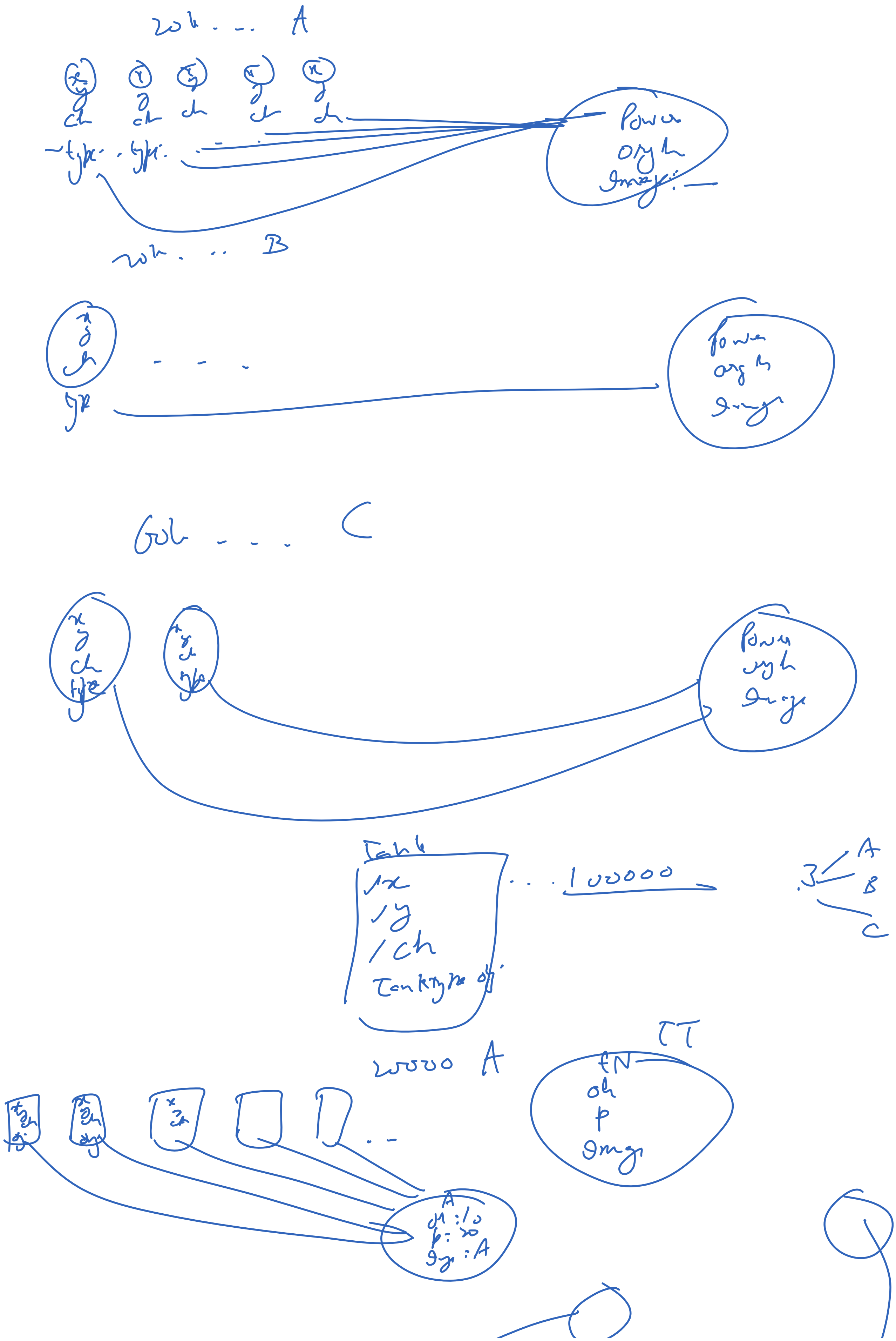
3 types

A B C

100KB

RAM

✓ — x — 4
✓ — y — 4
✓ — curr h — 4
power — 4
~~strength~~ — 4
img — 10kb


20k . . . A
20k . . . B
60k . . . C
Power
orgh
Image
Tank
x
y
ch
. . . 100000
3
A
B
C
20000 A
TT
fN
oh
p
Img
A
oh : 10
p : 20
Img : A

Prototype

Shape

AL<O> list = [10, 20, 30, 40]

Longest Common Substring

Medium Accuracy: **52.09%** Submissions: **72432** Points: **4**

This problem is part of GFG SDE Sheet. Click here to view more.

Given two strings. The task is to find the length of the longest common substring.

9:08 - 9:15 Try

Example 1:

```
Input: S1 = "ABCDGH", S2 = "ACDGHR", n = 6, m = 6
Output: 4
Explanation: The longest common substring
is "CDGH" which has length 4.
```

Example 2:

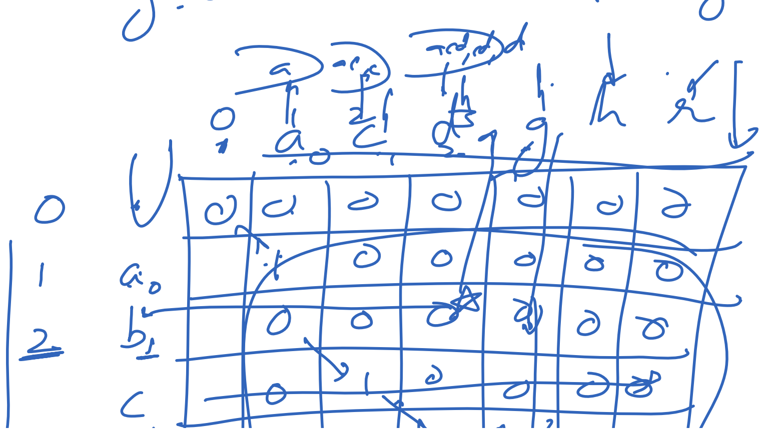
A B C D G H

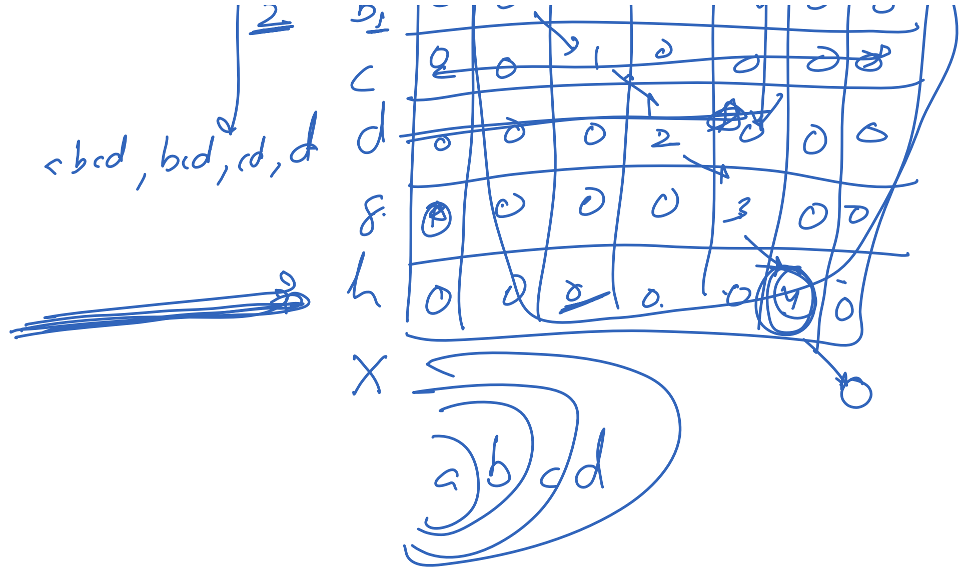
a
ab b
abc bc c
abcd bcd cd d
abcdg bcdg cdg dg g
abcdgh bcdgh cdgh dgh gh h

A C D G H R

a
ac c
acd cd d
acdg cdg dg g
acdgh cdgh dgh gh h
acdghr cdghr dghr ghr hr r

abcdgh acdghr





a → a

b → ab, b

c → abc, bc, c

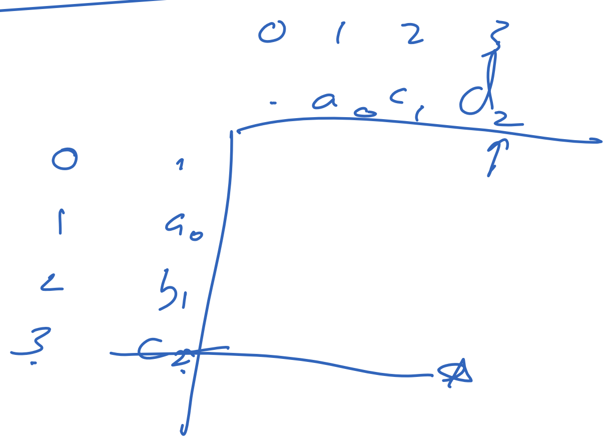
d → abcd, bcd, cd, d

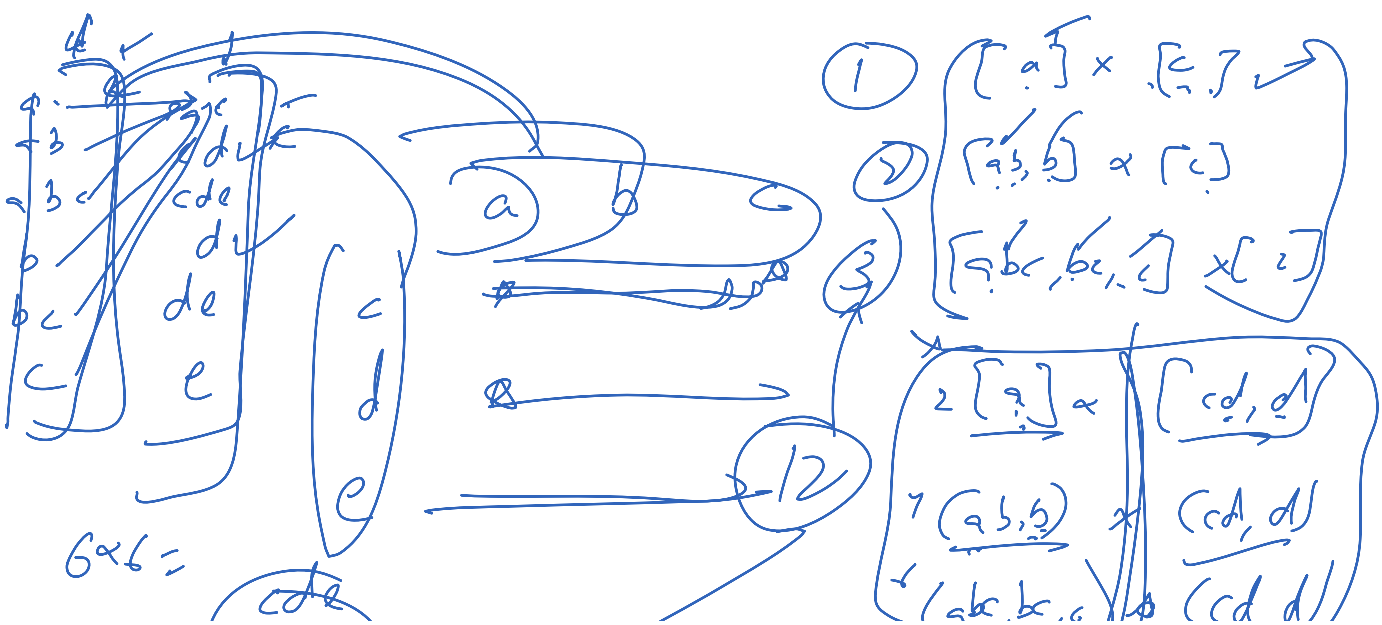
a

ab   b

abc   bc   c

abcd   bcd   cd   d





6x6 =

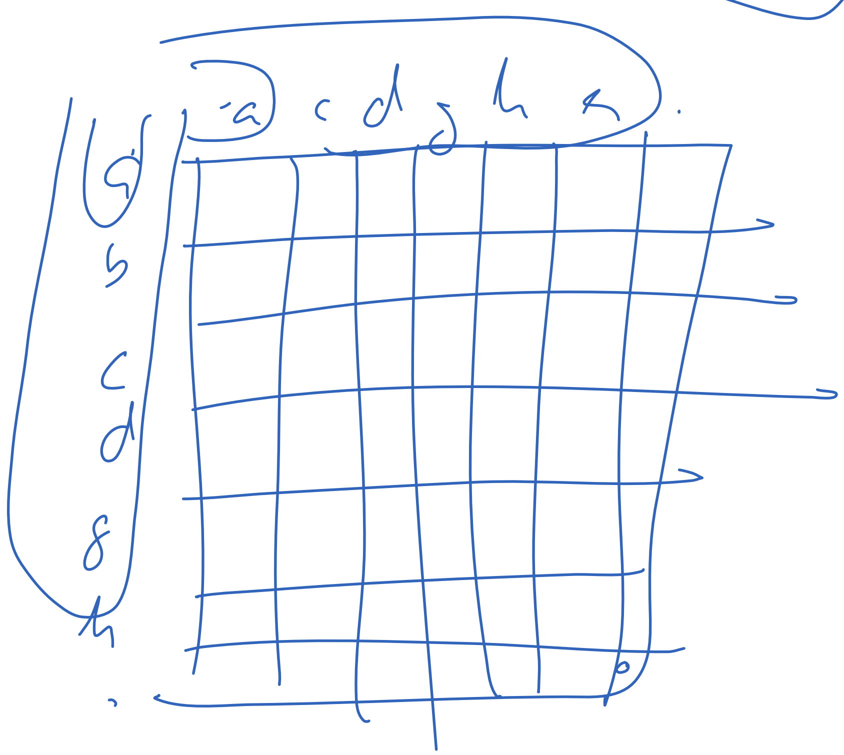
cde
de
e

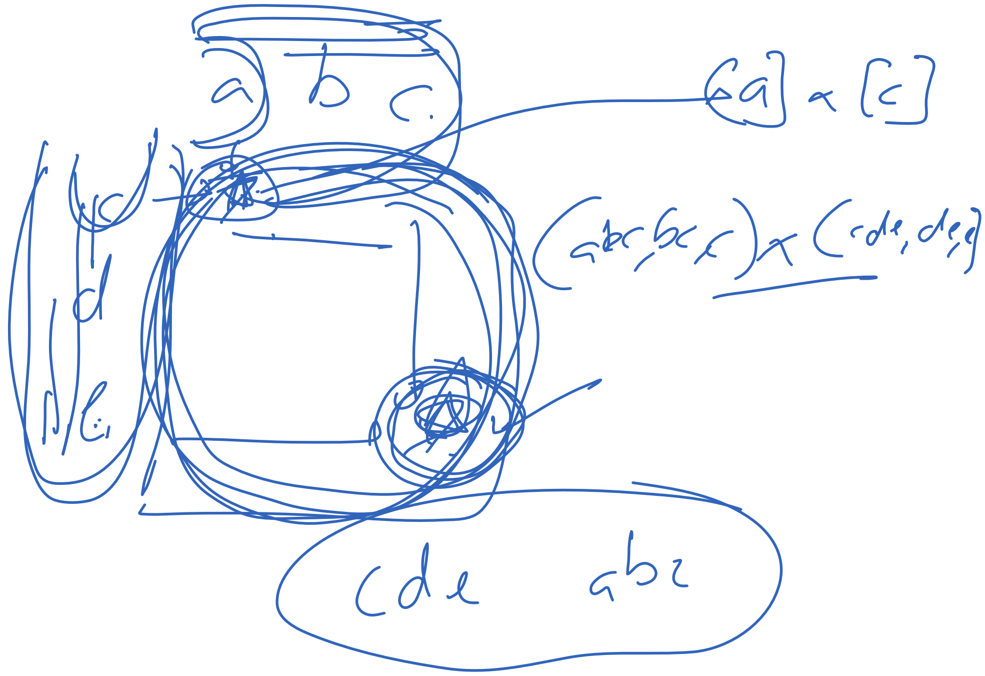
18

(a) x (cde, de, e)

(ab, b) x

abc, bc, c x (de, de, e)





647. Palindromic Substrings

Medium 7966 171 Add to List Share

Given a string `s`, return *the number of* ***palindromic substrings*** *in it.*

A string is a **palindrome** when it reads the same backward as forward.

A **substring** is a contiguous sequence of characters within the string.

Example 1:

```
Input: s = "abc"
Output: 3
Explanation: Three palindromic strings: "a", "b", "c".
```

Example 2:

10:05-10:20

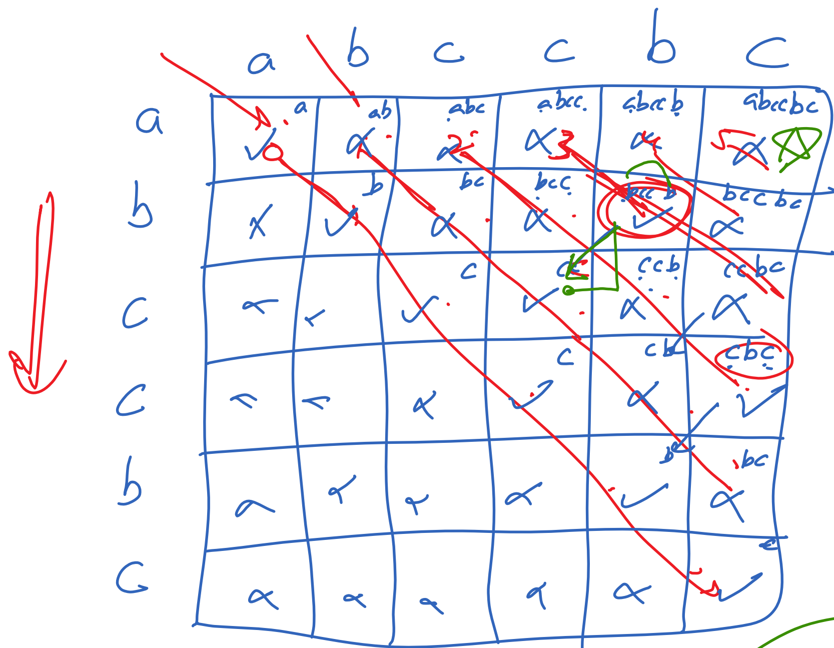
```
Input: s = "aaa"
Output: 6
Explanation: Six palindromic strings: "a", "a", "a", "aa", "aa", "aaa".
```

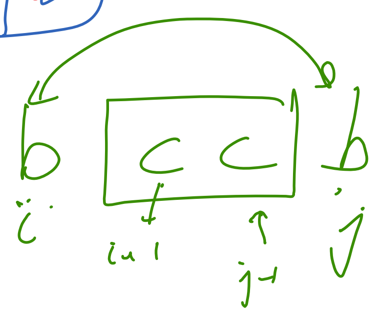
abc cbc

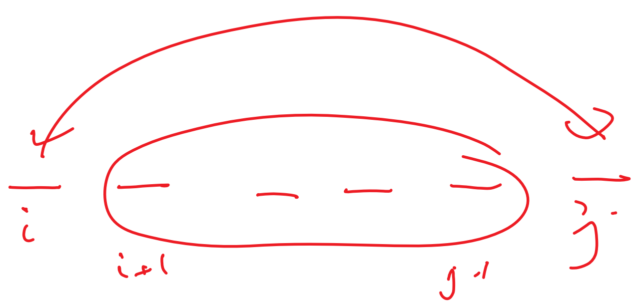
9 palindromic ss

q palindromic ss

bccb







a b c c b c

c b c c b a

Count Palindromic SS

abccbc

Example 2:

Input:

Str = "aab"

Output:

4

Explanation:

palindromic subsequence are :"a", "a", "b", "aa"

10:46 - 10:50

Try

s(abcd) — s(bc) — (_ _, _c, b_, bc)

+

a s(bc) — a_ _, a_c, ab_, abc

s(bc)d — _ _d, _cd, b_d, bcd

a s(bc) d — a_ _d, a_cd, ab_d, abcd

c(abcd) ⟶ s(abcd)

s(bc) s1

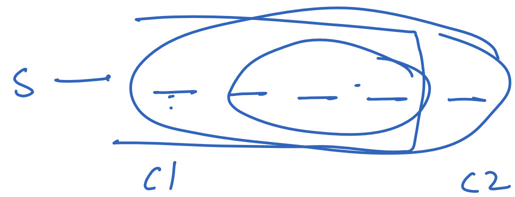
a s(bc) s2

s(bc) d s3

a s(bc) d s4

s(m)

+



$s(\dots)$
+
$c1\ s(m)$
+
$s(m)c2$
+
$c1\ s(m)c2$

$s(c1m)$ — $x\,s(m)$; $c1\ s(m)$

$s(m c2)$ — $s(m)\,x$ + $s(m)\,c2$ ✓

$s_\xi(c1\ m\ c2)$ — $s_\xi(m)$; $c1\,s_\xi(m)$; $s_\xi(m)\,c2$; $c1\,s_\xi(m)\,c2$

(count

abc cbc — Palindromic Subsequences

str = c1 ___m___ c2

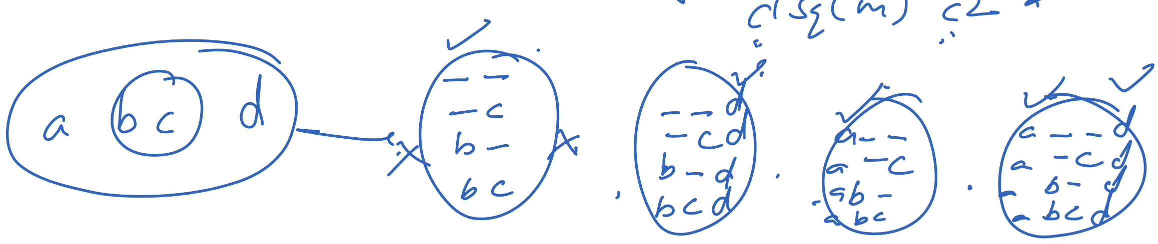
$s_\xi(str) = s_\xi(c1\ \underline{\ m\ }\ c2)$ — $s_\xi(m)$ – S1 ; + $s_\xi(m)\,c2$ – S2

$sq(str) = sq(c1 \; m \; c2)$

$sq(m)\,c2 \leftarrow s2$

$c1\,sq(m) \leftarrow s3$

$c1\,sq(m)\,c2 \leftarrow s4$



$c1 \quad \underline{m \quad c2}$

$\cancel{sq(abcd)}$

$c(abcd) \Rightarrow$

$sq(abcd) =$

$sq(m) \longrightarrow s1$

$sq(m)\,c2 \longrightarrow s2$

$c1\,sq(m) \longrightarrow s3$

$c1\,sq(m)\,c2 \longrightarrow s4$

$c1\,m$

m

$c1\,m$

$\underline{s1 + s2 + s3 + s4}$

$c1 = c2 \Rightarrow \underline{s4 = s1 + 1}$

$s1 + s2 + s3 + s1 + 1$

$c(i+1, j) + c(i, j-1) + 1$

$c1 \neq c2 \Rightarrow s4 = 0$

$s1 + s2 + s3 + s1 - s1$

$s1 + s2 + s1 + s3 - s1$

$c(\underline{i+1, j}) + c(i, j-1)$

$- c(i+1, j-1)$

$c1\,sq(m) \longrightarrow s3$

$c1\,sq(m)\,c2 \longrightarrow s4$

$sq(c1\,m) <$ $sq(m)$ / $c1\,sq(m)$

$sq(m\,c2) \to sq(m)$

$sq(m\,c2) \to sq(m)\,c2$

Derive the formula

$c(i,j)$:

- $i_c = j_c$: $c(i+1, j) + c(i, j+1) + 1$
- $i_c \neq j_c$: $c(i+1, j) + c(i, j-1) - c(i+1, j-1)$

ab

- - α
- b
a -
ab

- - α
- c ✓
c - ✓
cc ✓

	a	b	c	c	b	c
a	a 1	ab 2	abc 3	abcc 5	abcb 10	abccbc 16
b	X	b 1	bc 2	bcc 4	bccb 9	bcbc 15
c	X	X	c 1	cc 3	ccb 4	ccbc 10
c	X	∝	∝	c 1	cb 2	cbc 5
b	∝	∝	∝	∝	b 1	bc 2
c	∝	∝	∝	∝	∝	c 1

$= c(m\,c2)$

str = c1 m c2

$sq(c1\,m\,c2)$ → $sq(m)$ + $sq(m)c2$, $c1\,sq(m)$, $c1\,sq(m)c2$

str = c1 m

$sq(c1\,m)$ → $sq(m)$, $c1\,sq(m)$

str = mc2

$sq(mc2)$ → $sq(m)$ + $sq(m)\,c2$

$c(ch1\,m\,ch2) \Rightarrow sq(ch1\,m\,ch2)$ → $sq(m)$ c1, $sq(m)c2$ c2, $c1\,sq(m)$ c3, $c1\,sq(m)c2$ c4

$= c1 + c2 + c3 + c4$

ch1 = ch2 (c4 = c1 + 1)

$c1 + c2 + c3 + c1 + 1$

$c(mc2) + c(c1m) + 1$

$c(i+1, j) + c(i, j-1) + 1$

ch1 ≠ ch2 (c4 = 0)

$c1 + c2 + c3 + c1 - c1$

$c(mc2) + c(c1m)$ − c(m)

$c(i+1, j)$ $+ c(i, j-1)$ $- c(i+1, j-1)$

$c(i+1,j)$

$-c(i+1, j-1)$

$+c(i,j-1)$