1. true
2. ~~false~~ true ---
3. false
4. ~~false~~ true thought soft
5. ~~false~~ true 3k
6. ~~true~~ false
7. true
8. ~~true~~ false 4k
9. false

$T(n) = 4T(\frac{n}{2}) + 1$

$= 4(4T(\frac{n}{4}) + 1) + 4$

$= 16T(\frac{n}{4}) + 4 + 1$

$= 16(4T(\frac{n}{8}) + 1) + 4 + 1$

$= 64T(\frac{n}{8}) + 16 + 4 + 1$

$= 4^k T(\frac{n}{2^k}) + \sum_{j=0}^{k-1} 4^j$

$= 4^{\log n} T(1) + \sum_{j=0}^{\log n - 1} 4^j$

$= n^2 + 1 + 4 + \cdots + 4^{\log n - 1}$

$= n^2 + 1 + 4 + \cdots + \frac{n^2}{4}$

$= n^2(1 + \frac{1}{n^2} + \frac{4}{n^2} + \cdots + \frac{1}{16} + \frac{1}{4}) \in \Theta(n^2)$

$T(n) = T(n/2) + n^2$

$= T(n/4) + \frac{n^2}{4} + n^2$

$= T(\frac{n}{8}) + \frac{n^2}{16} + \frac{n^2}{4} + n^2$

$= T(\frac{n}{2^k}) + \sum_{j=0}^{k-1} \frac{n^2}{2^{2j}}$

1 2 4 16 -

$$T(n) = \sum_{i=0}^{\log n} n/2^i$$

$$= n \sum_{i=0}^{\log n} \frac{1}{2^i}$$

LZW:

0 A
1 B
2 C
3 AC
4 CA
5 AB
6 BA
7 ACA
8 ACAB

A C AB AC AC AB
0 2 0 1 3 7 5

0 A
1 B
2 C
3 D
4 BA
5 AD
6 DA
7 AB
8 BAB
9 BC

BADABABABC

0 A
1 B
2 C
3 D
4 BA
5 AD
6 DA
7 AB

10304

BWT

ACADACA$ ✓✓ A
CADACA$A ✓ C
ADACA$AC ✓✓ D
DACA$ACA ✓✓ $
ACA$ACAD ✓✓ C
CA$ACADA ✓✓ A
A$ACADAC ✓✓ A
$ACADACA ✓✓ A

C= EHHHTTTGE$

E 0
H 1
H 2
H 3
T 4
T 5
T 6
E 7
E 8
$ 9

→

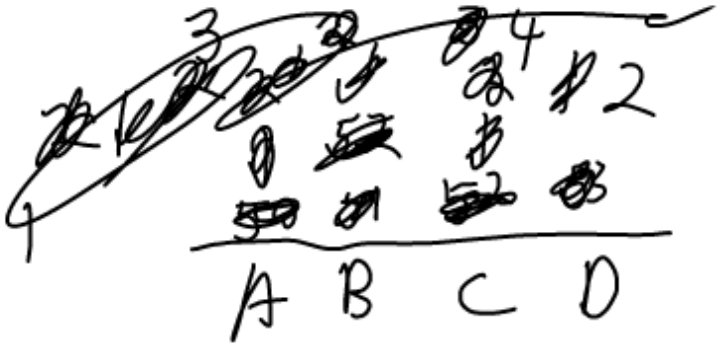
$ 9
E 0
E 7
E 8
H 1
H 2
H 3
T 4
T 5
T 6

→

S=THETHETH$

7=9
=6
=3
=8
=5

MTF



1 2 3 0

5 0 5 2 1 5 2 1 2 5 3 2 1

1 0 1 1 0

01

10010000

1010