DSA hw2 ****b05902086****

1.1.

(a)

2 1 3 5 4

FLIP(5)

4 5 3 1 2

FLIP(2)

5 4 3 1 2

FLIP(5)

2 1 3 4 5

FLIP(2)

1 2 3 4 5

(b)

5 4 1 2 3

FLIP(5)

3 2 1 4 5

FLIP(3)

1 2 3 4 5

(b)

1 4 3 2 5

FLIP(4)

2 3 4 1 5

FLIP(3)

4 3 2 1 5

FLIP(4)

1 2 3 4 5

1.2.

[8, 4, 2, 6, 10, 9, 5, 1, 3, 7]

1.3.

(a)

參考1.2.的pseudo code，然後會發現每次都會把最大的東西移到最後面，而每次移到後面只會使用兩次操作，而總共最多做N-1次把最大的東西移到最後面這件事情，因此最多FLIP N-1次

(b)

N=2 case: [2, 1]

N=3 case: [3, 1, 2]

N=4 case: [4, 2, 1, 3]

N≥5 case: [1, 3, 5, … 2, 4, 6, …] (先奇在偶)

因為會發現每個相鄰的數字之間都相差2以上，而每次FLIP只能改變一組相鄰數字之間的差，而總共有N-1組差，所以至少要FLIP N-1次才能把它排序好。

2.1.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 8 | 7 | 4 | 7 | 1 | 3 | 5 | 6 | 2 | 4 | 8 |

**… …** mod 13

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 9 | 9 | 8 | 6 | 0 | 9 | 4 | 10 | 11 | 9 |
|  | valid match | spurious match |  |  |  | spurious match |  |  |  | spurious match |

2.2.

用KMP在 (T0 + T0) 裡面尋找 T，如果找到即代表T為T0的cyclic rotation，反之則不是。

2.3.

建出prefix function的陣列(令其為A)之後，答案即為

Calc(P):

N=P.length()

Let A[1..m] be a new array

A[1]=0

k=0

for q=2 to N:

while k>0 and P[k+1]!=P[q]:

k=A[k]

if P[k+1]==P[q]:

k=k+1

A[q]=k

return max(1,N/(N-A[N]))

2.4.

KMP algorithm

Prefix function

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Done!

Boyer-Moore algorithm

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使用The Bad Character Rule.

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使用The Bad Character Rule.

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使用The Good Suffix Rule.

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Done!