\*測試環境 windows 10 的 cmd

1. 實作演算法介紹：

KMP是一個以failure function為輔助的演算法，當遇到重複的字串時可以依據failure function所計算出來的數值決定要往前移幾格，而非直接移到第一位重頭開始計算，如此一來當字串大量重複時可以節省許多時間。

1. 測試資料與結果並說明：

Pattern：

aAAaaaaAAAaaaaaAAaa

Text：

aasdaAsaaaaaaaAAAAAaaaaaaaaAAaaaaaAAAAAaaaaaaaaaaAAAAAaaAAaaAAAAAAAaaaaaAAAaaadaxaaafadaAAAaaaAAAaaaaAAaaaaaaaaaaaaaaaAAAAAasdadax

測試資料只有一行，而測試結果為第8~60、88~106個字都有找到相同的字串。

1. Brute-Force與KMP的執行時間：

以防萬一我測了兩次KMP與Brute-Force同樣的測資。

KMP:

453.151000/349.051000

Brute-Force:

485.026000/400.835000

因字串大量重複，故可以發現KMP執行的速度比Brute-Force快。

1. 其他：

其實影響時間的也包括輸出，我測試了另一份檔案比較大的資料(測試資料放在最下面)，結果發現有輸出的KMP執行時間是108524.012000ms / 110664.765000ms，而Brute-Force執行時間則是108865.660000ms / 109921.322000ms，但沒有輸出的KMP執行時間是515.184000ms / 515.640000ms / 530.055000ms，Brute-Force執行時間則是545.079000ms / 526.586000ms / 543.754000ms。有輸出的第一次測試說明Brute-Force比KMP快，但有輸出的第二次測試則說明KMP比較快，表示主要影響的是當時CPU的運轉狀態，以及輸出所花的時間。而沒有輸出的KMP三次測試都比Brute-Force快，雖然CPU的運轉狀態也需要列入考量，但我想因為輸出太花時間，導致CPU的運轉狀態變成了很重要的因素，才會導致如此情形發生吧。

\*第四點提到的測資Pattern 與 Text皆為相同的檔案，內容如下：

CABBBAAABACCCCCBABAC

CACACCBAABBCBCCCABBCCB

ACCAABCAACAABBACCCCCCCC

BBAAABAAABCCBABAAAACACACABA

CBCABBABBCBAAAACBABCCBBACBCC

BABABCBABCBAACAAACCCCCCAACACAB

ABACBAAAAACACCCCABAABCACAACACBBAA

CCCAABCCCBCBABBCAACABBCABCACABCABC

ACCAABAAAABCBBBCAABABAABAABBACBBCBCCC

CACABBBBACABBACACAAACBBBAABCAACACBABBC

BABBABBACABABAACAAABACCB

ACABAAABBACABBBBCACBACCACCBBBBABCAABAABCCCAAACBA

BAAABBBCABBACCBBACCBCCCBABACBBCABACBCABAACAACACBCBB

CBBBABABCACCABAAAACACBABCBACCCAAACABAACACBABABCABBAABBCBC

ABBCACCABAABCABABCBAAACAABB

BBBBBCACBABACABCCBCCACBBACCABCBAABBBABCBBCCBCABCAABBCABCACBACBBCBABABACBAA

CCBBBBBCACBBCBACBBBABACAAACCBCABBACACABAACBBBABCBCAACCACCAABABCABBCABACAAAAACBABBBBBBCBCC

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CBCABACBACABACBCCBBCCCCABBABCABBCBCBBBCAB

AACAACCCCCABBCABACABABACACABA

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AABCCAABABBCBB

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CACACCBAABBCBCCCABBCCB

ACCAABCAACAABBACCCCCCCC

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CBCABBABBCBAAAACBABCCBBACBCC

BABABCBABCBAACAAACCCCCCAACACAB

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AAACBBCABABCAACACAABBABBACBBBC

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BCBAACCACCCCBCACABB

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CACBBAAACBACCCCBBAACCABBBCBCCC

BABACCBBAACCCABBCCABAC

AABCCAABABBCBB

ACABCABBBAAABACCCCCBABAC

CACACCBAABBCBCCCABBCCB

ACCAABCAACAABBACCCCCCCC

BBAAABAAABCCBABAAAACACACABA

CBCABBABBCBAAAACBABCCBBACBCC

BABABCBABCBAACAAACCCCCCAACACAB

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