CSC2400 / Chapter 7 Homework

Due: Thursday, November 7, 2019

NAME:_____

1. (3 points) What are the three methods for exploiting space for time tradeoffs?
   a. Input enhancement
   b. Pre-structuring
   c. Dynamic programming

2. (10 points) Assuming that the set of possible list values is **{a, b, c, d}**, sort the following list in alphabetical order by the distribution-counting algorithm.

   b, c, d, c, b, a, a, b

   Frequency Array:

A	B	C	D
2	3	2	1

   Distribution Count Array:

A	B	C	D
2	(2+3) = 5	(5+2) = 7	(7+1)=8

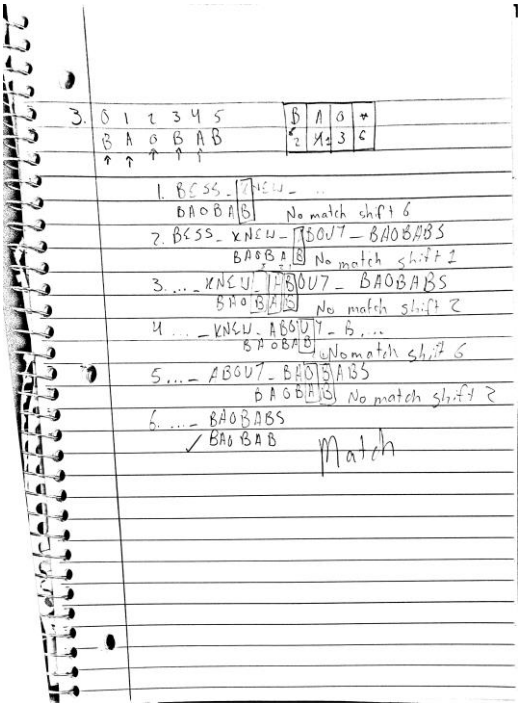
   Sorted Array:

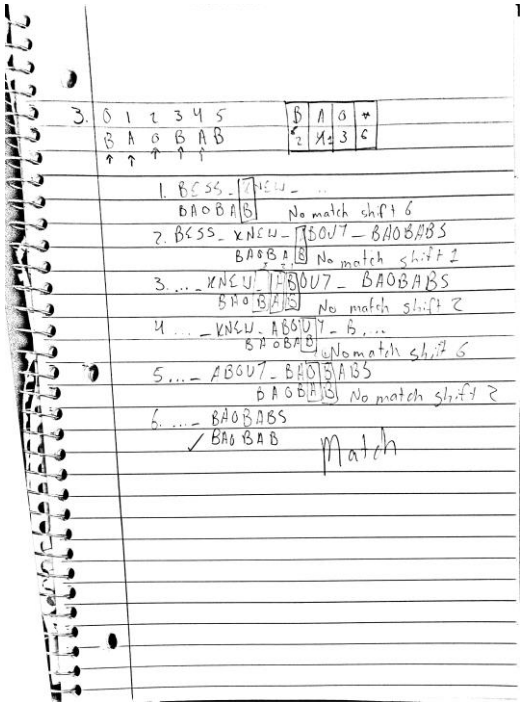
A	A	B	B	B	C	C	D

3. (10 points) Demonstrate the Horspool's algorithm to search for the pattern **BAOBAB** in the text **BESS_KNEW_ABOUT_BAOBABS**.

0 1 2 3 4 5 < Index Value

B A O B A B < pattern length =6



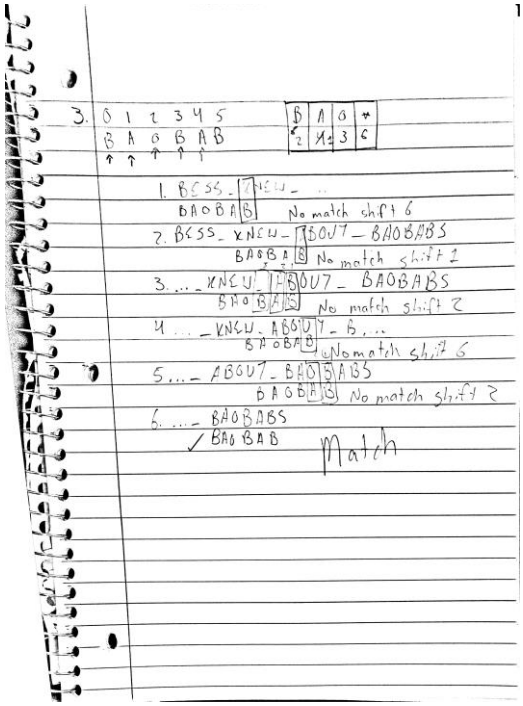


3.

0	1	2	3	4	5
B	A	O	B	A	B

B	A	O	*
2	1	3	6

1. BESS_KNEW_...
   BAOBAB — No match shift 6
2. BESS_KNEW_ABOUT_BAOBABS
   BAOBA — No match shift 1
3. ..._KNEW_ABOUT_BAOBABS
   BAOBA — No match shift 2
4. ..._KNEW_ABOUT_B...
   BAOBAB — No match shift 6
5. ..._ABOUT_BAOBABS
   BAOBA — No match shift 2
6. ..._BAOBABS
   ✓ BAOBAB Match

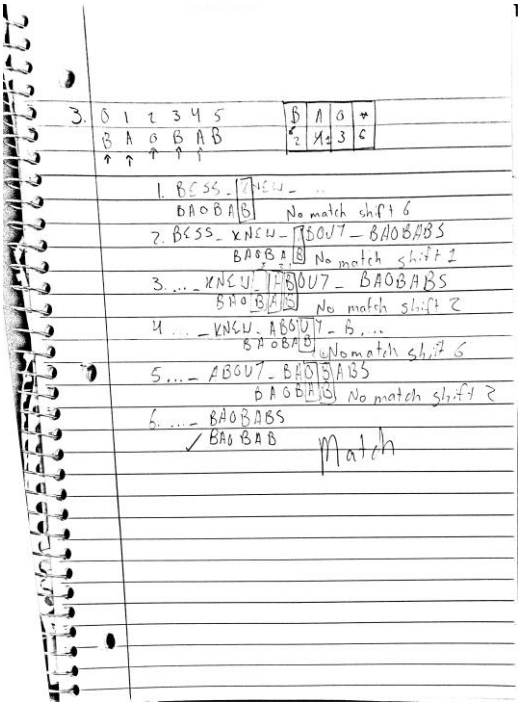


3.

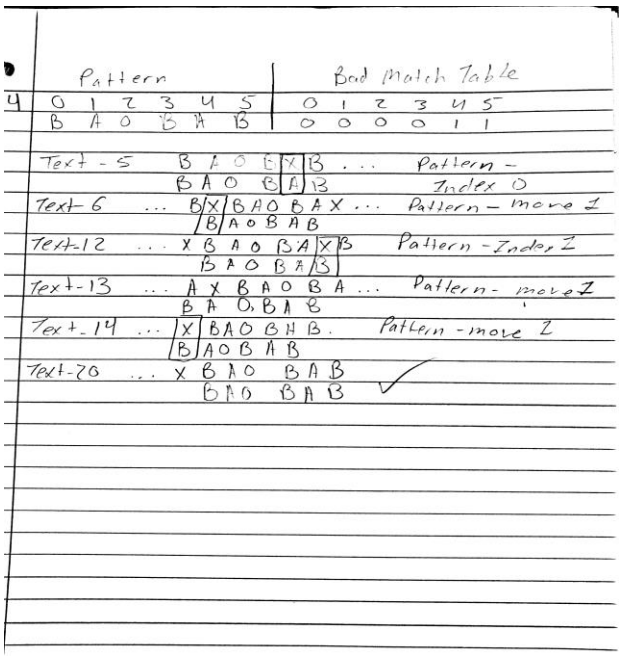
0	1	2	3	4	5
B	A	O	B	A	B

B	A	O	*
2	1	3	6

1. BESS_KNEW_...
   BAOBAB — No match shift 6
2. BESS_KNEW_ABOUT_BAOBABS
   BAOBA — No match shift 1
3. ..._KNEW_ABOUT_BAOBABS
   BAOBA — No match shift 2
4. ..._KNEW_ABOUT_B...
   BAOBAB — No match shift 6
5. ..._ABOUT_BAOBABS
   BAOBA — No match shift 2
6. ..._BAOBABS
   ✓ BAOBAB Match



4. (10 points) Demonstrate the Knuth-Morris-Pratt Algorithm to search for the pattern **BAOBAB** in the text **BAOBXBAOBAXBAOBAB**.



5. (10 points) For the input **30, 20, 56, 75, 31, 19** and hash function h(K) = K % 11, construct the open hash table (**chaining** method for collision management).

Bucket 0

Bucket 1 [56]

Bucket 2

Bucket 3

Bucket 4

Bucket 5

Bucket 6

Bucket 7

Bucket 8 [30] --> [19]

Bucket 9 [20] --> [75] --> [31]

Commented [HB1]: Follow Up: 20]

6. (2 points) For problem #5, find the largest number of key comparisons in a successful search in this table.

3

7. (10 points) For the input **30, 20, 56, 75, 31, 19** and hash function h(K) = K % 11, construct the closed hash table (**linear probing** method for collision management).

Bucket 0 75

Bucket 1 56

Bucket 2 31

Bucket 3 19

Bucket 4

Bucket 5

Bucket 6

Bucket 7

Bucket 8 30

Bucket 9 20

Commented [HB2]: Follow Up: 20]

8. (2 points) For problem #7, find the largest number of key comparisons in a successful search in this table.

1

SCORE: _____ / 57