Question 8

Complete Mark 1.00 out of 1.00 Flag question

Given the hash function

$h(k)=(2k+5)\%7$,

in which of the seven slots

$\{0,\ldots,6\}$

the key

19

is stored if we are using linear probing and the following operations have been performed on an initially empty hash table:

`insert 5, insert 20, insert 13`

?

Answer: 2

Question 9

Complete Mark 1.00 out of 1.00 Flag question

What is the (ordinary/weak) partial match table for KMP algorithm for the following pattern?

bacabacababab

b	0
ba	0
bac	0
baca	0
bacab	1
bacaba	2
bacabac	3
bacabaca	4
bacabacab	5
bacabacaba	6
bacabacabab	1
bacabacababa	2
bacabacababab	1

Question 2

Complete Mark 1.00 out of 1.00 Flag question

Given the hash function

$h(k)=(2k+5)\%7$

and a hash table with seven slots,

$(0,\ldots,6)$,

the following operations have been performed for the initially empty hash table. What is the average length of a non-empty chain if separate chaining is used?

`insert 5, insert 20, insert 13, insert 19`

Answer: 2

Question 3

Complete Mark 1.00 out of 1.00 Flag question

Given pattern P = "maba" and text T = "bambambab" decide at which positions spurious hits occur while the Rabin-Karp algorithm is performed with hash function implied by the following

Σ={a,b,m}

h("abma") = ($0 \cdot 3^3+1 \cdot 3^2+2 \cdot 3^1+0 \cdot 3^0$) mod 7 = 1

Positions in T are numbered starting from 0.

1 no spurious hit

5 spurious hit

0 no spurious hit

Question 4

Complete Mark 0.00 out of 1.00 Flag question

Question 5

Complete Mark 1.00 out of 1.00 Flag question

On the graph described by the adjacency list below the recursive DFS algorithm is used. How are its edges classified if the set of vertices and adjacency lists are iterated over in increasing order of vertex ID's.

```
1:2,3,4
2:
3:
4:3
5:1
```

(4,3) cross

(5,1) cross

(1,2) tree

(1,4) tree

(1,3) tree

Question 10

Complete Mark 1.00 out of 1.00 Flag question

An optimal Huffman encoding has been constructed for the text

dababecdab

What is the number of bits that this encoding will use to represent the string

abc

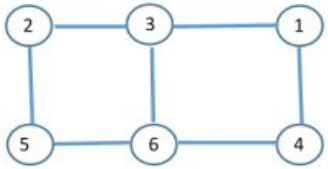
?

Answer: 7

Question 9

Correct Mark 1.00 out of 1.00 Flag question

What is the predecessor table for BFS algorithm, with 1 as the starting point and the nodes are iterated over in the order of increasing ID's?



1	none
2	3
3	1
4	1
5	2
6	3

Question 10

Complete Mark 1.00 out of 1.00 Flag question

What is the optimal complexity of an algorithm that enumerates all subsets of a set, if there are n of those subsets?

- a. 2^n
- b. n^2
- c. n
- d. $n!$
- e. $n \log n$
- f. $n2^n$

Question 10

Complete Mark 1.00 out of 1.00 Flag question

Given pattern

```
P = "mama"
```

and text

```
T = "babambmbama",
```

decide how many of 11 characters of the text T are read in the course of execution of the Sunday pattern matching algorithm with the usual **left-to-right** scan.

Answer: 8

Question 7

Complete Mark 1.00 out of 1.00 Flag question

What is the value of the transition function

```
engine(state=14,char='s')
```

constructed for the FSM exact matching algorithm for the pattern

```
sdfsdfssdfsdfsd
```

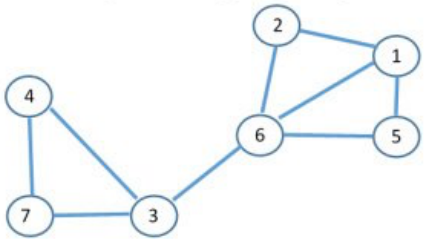
?

Answer: 8

Question 6

Correct Mark 1.00 out of 1.00 Flag question

Which of the edges of the following graph are tree edges if (recursive) DFS is run for the graph, and the nodes are iterated over in the order of increasing ID's. In particular, we start with vertex 1.



{6,3}	tree
{1,6}	non-tree
{1,2}	tree
{3,4}	tree
{1,5}	non-tree
{3,7}	non-tree
{4,7}	tree

Question 13

Complete Mark 1.00 out of 1.00 Flag question

The Graham scan algorithm is used to find the convex hull of the following set of points:

(3,1), (4,1), (3,3), (5,4), (2,5)

Assuming that the scan starts pushing on an auxiliary stack the lowest leftmost point and proceeds counterclockwise, what is the order in which the points will be pushed on the stack?

(5,4) 3

(4,1) 2

(3,3) 4

(2,5) 5

(3,1) 1

Question 13

Complete Mark 1.00 out of 1.00 Flag question

The Graham scan algorithm is used to find the convex hull of the following set of points:

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(5,4) 3

(4,1) 2

(3,3) 4

(2,5) 5

(3,1) 1

Question 12

Complete Mark 1.00 out of 1.00 Flag question

A trie stores the following set of strings

"mab", "mabam", "bam", "bama", "mabab" , "maba"

What is the number of leaves in the tree?

Answer: 3