UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER I
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KERTAS SOALAN INI MENGANDUNGI LIMA (5) MUKA SURAT

SECTION A

Instruction: State whether each of the following statements is **TRUE** or **FALSE**.

Q1 A linked list must have at least a data and one pointer pointing to the following node.

Q2 The `new( )` function is used to allocate memory.

Q3 `isEmpty( )` stack operations could result to stack underflow.

Q4 The operation for adding an entry to queue is commonly called `enqueue`.

Q5 Two ways for implementing stack are using array and pointer (in linked list).

Q6 Deleting an element in stack is known as `dequeue`.

Q7 Quick sort uses divide and conquer approach to sort the element in data structure.

Q8 Quick sort is most efficient when the pivot is located in the front of the array.

Q9 A node with same parent is called sibling.

Q10 If the tree is not empty, the first node is called the root.

(10 marks)

SECTION B
Instruction: Answer **ALL** questions.

Q11 Define the following terms.

(a) Array (3 marks)

(b) Stack (3 marks)

(c) Queue (3 marks)

(d) Linked List (3 marks)

(e) Tree (3 marks)

Q12 Based on **Figure Q12**, how many asterisks are printed by the method call quiz(4)?

```
void quiz(int i)
{
   if (i > 1)
   {
      quiz(i / 2);
   }
   System.out.print("*");
}
```

Figure Q12

(4 marks)

Q13 Refer to the array statement below:

```
char status[6] = {'s','i','m','p','l','e'};
```

(a) Using sequential searching, what is the index to find target `'l'`?

(1 mark)

(b) Write a sequential function in C language to find element `'l'` in the array.

(5 marks)

Q14 Refer to the array statement below:

```
char alphabet [8] = {'b','d','e','g','j','o','w','z'};
```

(a) Using binary searching, how many interation to find target `'o'`?

(1 mark)

(b) What is the main concern before using binary searching?

(1 mark)

(c) Draw step by step in binary searching to find target `'e'`.

(8 marks)

Q15 Given the following integer list:

```
100   34   84   20   69   3   217
```

Show a trace for each execution of:

(a) Selection sort.

(5 marks)

(b) Bubble sort.

(5 marks)

(c) Insertion sort.

(5 marks)

Q16 Given a list `{6,4,8,2,5,7,12,1,3,10,14,9}`,

(a) Draw a Binary Search Tree.

(6 marks)

(b) Based on the answer in **Q16(a)**, write sequences of nodes using inorder, preorder and postorder methods.

(6 marks)

(c) Draw a new Binary Search Tree after inserting `13` and `15` in the list.

(4 marks)

(d) Draw a new Binary Search Tree after deleting `12` and `15` from the list.

(4 marks)

Q17 Based on the following stack declaration:

```
 typedef struct STACK
{
 int top;
 int list[3];
}stack;
```

(a) Write a function in C language to create stack.

(2 marks)

(b) What should be considered before `push` and `pop` operations can be done?

(4 marks)

(c) Write **TWO (2)** functions in C language for the answer in **Q17(b)**.

(4 marks)

(d) Write a function in C language for `push` operation.

(5 marks)

(e) Write a function in C language for `pop` operation.

(5 marks)