

TOPIC 5 REVISION QUESTIONS

[Maximum mark: 3]

These flower names should be inputted in the following order,

Gladiolus, Lantana, Hyacinth, Iris, Columbine

and inserted into a binary tree in such a way that an inorder traversal of the binary tree visits the nodes in alphabetical order of the names.

Sketch the resulting binary tree.

[3]

Consider the following recursive method:

```
fun (N)
  if N > 0
    then
      return (N mod 10) + fun(N div 10)
    else
      return 0
    end if
  end fun
```

(a) Determine the value of `fun(1216)`. Show all your working.

[4]

(b) Deduce the purpose of this recursive method.

[2]

A programmer is developing a program to record information about patients as they arrive at the emergency department of a hospital.

Due to the unplanned nature of patient attendance, the emergency department must provide treatment for a range of illnesses and injuries, some of which may be critical and require immediate attention.

The programmer decided to use a linked list for storing the patients' data.

(a) Describe the structure of a linked list. [2]

(b) Explain why a queue data structure is **not** suitable in this situation. [3]

The information about the most seriously ill patient is held at the beginning of the linked list.

The linked list should be updated as each new patient arrives at the emergency department.

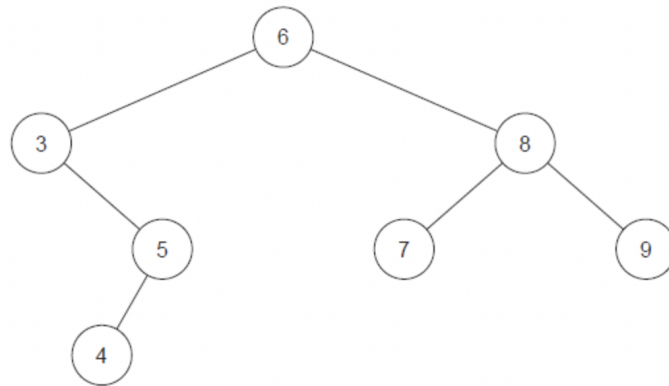
(c) Describe how the linked list should be updated if a new patient arrives at the emergency department with more serious symptoms than all the other patients. [3]

Consider the following recursive method:

```
rec(A)
  if A >= 2
    then
      return rec(A-2) + rec(A-1)
    else
      return 1
    end if
  end rec
```

- (a) Determine the value of `rec(5)` (*show all your working*). [4]
- (b) Outline **two** disadvantages of recursive methods. [4]

Consider the following binary tree, in which each node stores a number greater than all the numbers in the node's left subtree and less than those in its right subtree.



- (a) Identify the leaf nodes in this binary tree. [1]
- (b) State the result of the preorder traversal. [1]
- (c) Sketch the resulting binary tree after the deletion of the root node. [3]