**Topic 1**

1 Define the term SaaS (software as a service) [1]

2 Identify two ways of user training [2]

3 Discuss one advantage and one disadvantage of beta testing [4]

4

A school is considering to replace the old printing system by a new one

1. Identify two features that need to be considered when planning the new system [2]
2. Explain the roles of users in the process of developing the new printing system [2]

To ensure that students and teachers won’t be influenced too much by the changing, the time limit for changing is only a few hours

1. Discuss which kind of testing should be used [2]

To make sure the users can understand how to use the new system, a user documentation is needed.

1. Discuss one advantage and one disadvantage of printed materials as user documentation [4]

**Topic 4**

1 Define what is meant by binary search [1]

2 Define what is meant by operator [1]

3 Explain two essential features of a computer language [2]

4

The collection AGE contains the average age for each class of boys and girls respectively. There are 5 classes, from S1C1 to S1C5.

1. State the total number of elements in the collection [1]
2. Construct an algorithm to read the data into this 2D array, A, that would allow the age for girls and boys of a specific class to be accessed directly. [4]
3. Construct an algorithm that will output the class, as a word, on which the smallest age for the sum of average age of boys and girls [6]

5

SCORES is an array containing the computer science final exam scores of 10 students.

1. Construct an algorithm to sort this array using bubble sort [4]
2. Outline the steps involved in performing a binary search on this array of ascending numbers[4]

A new student’s score is needed to be inserted into the collection

1. Identify whether static or dynamic data structure is suitable for this task[2]

6

A Fibonacci sequence is a sequence that the third elements equals to the sum of the previous two element. For example, the fifth element in this sequence is 5.

1. Identify the eighth element in this sequence[1]
2. Construct an algorithm to build a function “Fib” to find the Nth element in this sequence [3]
3. Trace Fib(4) [3]

**Topic 5**

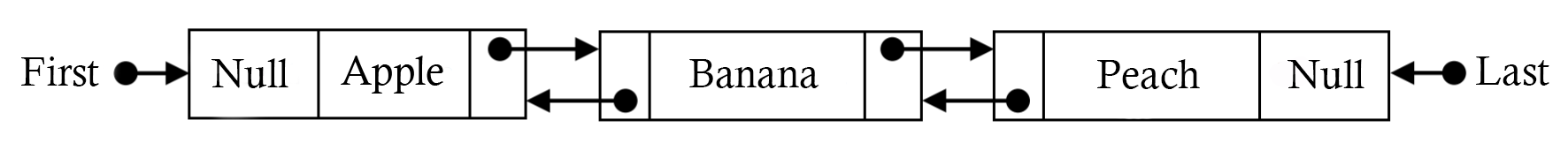
1 Identify the components of a node in a doubly linked list [3]

2 Identify one advantage of a static data structure [2]

3

1. Identify one advantage and one disadvantage of a dynamic data structure[4]

Consider the following linked list which holds the names of fruits in alphabetical order



1. Explain how “Lemon” can be inserted into this doubly linked list [6]
2. Describe how an item could be found in this list [5]

4

|  |
| --- |
| … |
| Mary |
| Betty |
| Ryan |
| Zoe |

The names of students waiting in line to print are recorded in a queue data structure as each one arrived

Note that Mary is the first one in the queue

1. Describe the characteristic of a queue [1]
2. Outline one advantage of making the queue dynamic [2]
3. Draw the queue after another student “Leo” comes and “Mary” has finished her work [3]

Mark scheme

Topic 1

1 A delivery method;

Allows software/data to be hosted/managed;

On a remote data center;

2 Award up to [2 max]

Self-instruction;

Formal classes;

Remote / Online training; [2]

3 Award [1] for identifying the advantage/disadvantage

Award [1] for explaining the reason for advantage/disadvantage

Reduce the risk of product failure;

Since it is performed by end-users;

Doesn’t allow any control over the testing;

It is carried out in real environment; [4]

4

1. Award up to [2 max]

The cost/budget limits;

Cost-effective;

Time limits;

Roles/activities of the users;

…

(Other answers may from technical, economic and operational aspects)[2]

1. Award up to[2 max]

All users are involved in training;

All users are involved in testing;

Users are involved in approving the budget;

All user must be participated and explain how they use the system; [2]

1. Alpha testing;

It is a kind of testing performed at developers’ site, therefore it is quick

1. Award [1] for identifying the advantage/disadvantage

Award [1] for explaining the reason for advantage/disadvantage

It is always available;

It is based on paper, which does not depend on anything else (e.g. Internet);

It cannot be updated;

Since it is based on paper, it can’t be updated as the online materials

Topic 4

1 Compares the search value with a value of the middle element of the array [1]

2 It is used to manipulate operands [1]

3 award up to [max 2]

Fixed vocabulary;

Unambiguous meaning;

Consistent grammar;

Syntax; [2]

4

1. 10
2. Award [1] for any nested loop.

Award [1] for the correct nested loop.

Award [1] for the correct assignment to A.

Award [1] for the correct retrieval from AGE.

loop for CLASS from 0 to 4

loop for DATA from 0 to 1

A[CLASS][DATA] = AGE.getNext()

end loop

end loop

1. Award [1] for initialization of LOWEST

Award [1] for initialization of NAMES

Award [1] for the correct loop

Award [1] for the correct comparison and the assignment of LOWEST

Award [1] for the assignment of POS within if statement

Award [1] for the correct output statement

LOWEST = A[0][0]+A[0][1]

NAMES= [“S1C1”, “S1C2”, “S1C3”, “S1C4”, “S1C5”]

POS = 0

Loop for CLASS from 1 to 4

If A[CLASS][0]+A[CLASS][1] < LOWEST

LOWEST = A[CLASS][0]+A[CLASS][1]

POS = CLASS

end if

end loop

output(NAMES[POS])

5

1. Award [1] for correct outer loop

Award [1] for correct inner loop

Award [1] for correct comparison

Award [1] for correct use of changing the position

loop for I from 0 to 9

loop for J from 0 to 9

if SCORES[j]>SCORES[j+1]

TEMP=SCORE[j]

SCORE[j]=SCORE[j+1]

SCORE[j+1]=TEMP

End if

End loop

End loop

1. A position/index of the middle value calculated from HI and LOW;

If search value equals to value in the array at this position, then end;

Otherwise, change HI or LOW according to whether search value is above or below;

Repeat the process until search value is found;

1. A dynamic data structure;

The size could be varied;

6

1. 21
2. Award [1] for each base case

Award [1] for correct use of recursion

Fib(N):

If N == 1 or N==2:

Return 1

Else

Return fib(N-1) + fib(N-2)

End if

1. Award [1] for fib(3) shown

Award [1] for fib(2) or fib(1) shown

Award [1] for fib(2) shown twice and fib (1) shown once

Fib(4)=fib(3)+fib(2)

=fib(2)+fib(1)+1

=1+1+1

=3

Topic 5

1 Data;

A pointer to the previous node;

A pointer to the next node; [3]

2 Award [1] for identifying the advantage

Award [1] for explaining the reason for advantage

It is quick;

The elements can be directly accessed; [2]

3

1. Award [1] for identifying the advantage/disadvantage

Award [1] for explaining the reason for advantage/disadvantage

Flexible;

The number of elements does not have to be defined in advance;

Slow;

Access is sequential;

1. Award up to [6 max]

Create new node;

Instantiation of values and pointers in new node;

Initially compare with node pointed to by the head;

(If not correctly place) move through list using pointers until correct alphabetical position is found;

Update pointers in new node;

Update pointers from the node at the insertion point, to the new node;

Update external pointers; [6]

1. Temporary pointer should be set to point to the beginning of the list;

Follow the internal pointers;

Compare the data in the node pointed to by the temporary pointer with the searched data;

If found stop searching;

If the end of the list is reached then the searched data is not on the list;

4

1. A data structure in which elements are added from one end and deleted from another end
2. Award [1] for identifying the advantage

Award [1] for explaining the reason for advantage

Efficient use of memory;

Does not have predetermined/fixed size;

|  |
| --- |
| … |
| Betty |
| Ryan |
| Zoe |
| Leo |

1. [1] for Betty

[1] for Leo

[1] for others