* Why we consider the array as static data structure?

Because we declare the array size in advance that much bytes or space is reserved in memory and cant be increased later.

لسبب لأننا نعلم حجم المصفوفة مسبقاً. لذلك يتم حجز هذا القدر من البايت أو المساحة في الذاكرة ولا يمكنه زيادتها لاحقاً.

* How to overcome the false overflow problem? when this problem occures?

The false overflow occures when we try to push more items on a stack than it can hold.
The false we can overcome it by put size to stack

نتغلب على المشكلة بوضع حجم للكدس (Stack) بحيث يتم فحص الحجم في كل مرة نريد أن نضع عنصر في الكدس (stack).

تظهر المشكلة عندما نحاول أن نضع الكثير من العناصر في الكدس زيادة على الحد الذي يستطيع حمله.

QUESTION 1:

1.1 Why we consider the array as static data structure? (2 marks)

1.2 How to overcome the false overflow problem? When this problem occurs? (3 marks)

* Is it easier to insert a new node before or after a specified node in a linked list? why?

Yes. Because we have the index of the specific node, that means we know the pointer of the before and next node.

نعم. من السهل إدراج node جديده قبل أو بعد نود محدودة.
وذلك لأننا قد عرفنا الـ (Index) أي بمعنى آخر
عرفنا مؤشر الـ (node) السابقة ومؤشر الـ (node) اللاحقة.

2 *Is it easier to insert a new node before or after a specified node in a linked list? Why?* (2 marks)

التاريخ

موضوع الدرس

Question 1

1.1

- Insertion in the middle. problems:-

we need to:- 1- Length of the array.

2- mid point index.

3- right shift all the elements from the mid to the end.

4- overwrite the new element in the mid index.

- Removing elements from the beginning:-

Problem:-

we need to:- 1- Shift left all the elements from index 1 to index (n-1)

2- make the last element "0"

QUESTION 1:

1.1 What are the problems of performing the following operations in an Array? (3 marks)

- Insertion in the middle

- Removing elements from the beginning

Question 2

2.1

* when it is appropriate to use the data structure linked list? what is the major disadvantage of linked list ?

1- Dynamic memory Allocation.
2- Implementing advanced data Structure
3- Manipulating polynomials.
4- Arithmetic operations.

The major disadvantage of linked list:-
1- more memory required.
2- more Time-Consuming for traversal.
3- Random Access is not possible.
4- Nodes are stored incontiguously.

QUESTION 2: [9 marks]

2.1 When it is appropriate to use the data structure Linked List? What is the major disadvantage of Linked List? (3 marks)

2.3

(a)

$90 \times 400 = 36000$

$100 \times 400 = 40000$

wol 4000

(b) $60 \times 400 = 24000$

$100 \times 400 = 40000$

wol = 16000

(c) size of

↑each node in a Linked list will be

$400 + 1 + 1$

∴ the size will be $(n * 400)$

linkedlist 2.3

$90 \times 400 = 36000$

$90 \times 2 = 180$

$36,000 + 180 = 36180$

$60 \times 400 = 24,000$

$60 \times 2 = 120$

$24,000 + 120 = 24120$

2.3 If the items in a list are structures taking 400 memory locations each, compare the amount of space required altogether and determine which data structure you will use if (a) the list is kept contiguously in an array 90 percent full (b) the list is kept contiguously in an array 60 percent full and (c) the list is kept as a linked list (where the pointers take one memory location each) (4 marks)

Question 3 :-

3.1 :- answer :-

- The worst Case is that you have to look at every item.
- The worst Case occurs ~~the~~ when the item to be Searched is in the end of Array.

3.2 :- answer

4, 8, 9, 14

- Mid point of (0 - 14) indexes is $0+14/2 = 7^{th}$ element that will be 8
- Mid point of one half of (1-5) is $1+5/2 = 3^{th}$
- " " " Second half of (6-10) is $6+10/2 = 8^{th}$
- " " " Third half of (11-15) is $11+15/2 = 13^{th}$

$7^{th} = 8$
$3^{th} = 4$
$8^{th} = 9$
$13^{th} = 14$

QUESTION 3:

[6 marks]

3.1 What is the worst case of complexity of linear search algorithm? When it occurs? (3 marks)

3.2 Here is an array with 15 elements:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Suppose that we are doing a binary search for an element. Which elements can be found by making three or less comparisons? (3 marks)

تكون ان اضافه عنصر في المصفوفة انه يستغرق جهد
ووقت حتى يتم اضافه عنصر جديد

1.2 What are the impacts of storing huge number of integers in array? (2 marks)

It takes time and effort to save
the data in the array