


The Ministry of Higher Education and Scientific Research		Subject: ECE211 Prog. III Year: Second
The University of Kufa College of Engineering		Date: November 6th, 2024 Exam Duration: 120 min
The Department of Electronic and Communications Engineering		Examiner: Dr Wahhab Mousa Midterm Exam (B)

Notes: (1) Answer four questions; (2) Use ONLY English; and (3) No internet.

Student's Name (in Arabic):

Q1: (A) Circle all suitable answers: (25 Marks)

- (1) A do-while loop can be used to delete an element from a linked-list. (True, False, With modifications).
- (2) A switch statement in C functions as expected without the need for the "default" statement: (True, False, It depends, Not Necessary).
- (3) For a switch statement in C, a "break" is necessary for proper operation: (True, False, It depends, Not Necessary).
- (B) Discuss the following:
 - (1) Write essential steps to insert a node from the beginning of a linked-list.
 - (2) Write essential steps to delete a node from the beginning of a linked-list.

Q2: (25 Marks)

In a queue, the insertion and deletion of elements happen at different endpoints. The behavior of a queue is described as "First In, First Out" (FIFO). Write a C code program that implements queue using array in C. Consider the following basic operations: (1) enqueue (insert); (2) dequeue (delete); and (3) NumberOfElements.

Q3: (25 Marks)

Compare the complexity for the following data structures in terms of memory consumption, insertion, indexing, deletion, search, and sort: Linked-list vs. Array.

Q4: (25 Marks)

Write a C code program that copies a linked-list to an array.

Q5: (25 Marks)

Assume a C program that handles a linked-list. (1) Describe the functionality of the code segment (step by step). (2) Modify to add "insert node" at the end of a linked-list.

```

struct node { int data; struct node *next; };
void X2 (int position){
int i=2; struct node *newnode, *temp = head;
newnode = malloc(sizeof(struct node));
newnode->data = 16-2;
while ( i < position) {
    i++;
    if(temp->next != NULL) {
        temp = temp->next;
    }
}
newnode->next = temp->next;
temp->next = newnode;
}
void main (){ ... }
```