Rajalakshmi Engineering College

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 1_MCQ

Attempt : 1
Total Mark : 10
Marks Obtained : 7

Section 1 : MCQ

1. Linked lists are not suitable for the implementation of?

Answer

Binary search

Status : Correct ***Marks : 1/1***

2. The following function reverse() is supposed to reverse a singly linked list. There is one line missing at the end of the function.

What should be added in place of "/*ADD A STATEMENT HERE*/", so that the function correctly reverses a linked list?

```
struct node {
  int data;
```

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```
   struct node* next;
};
static void reverse(struct node** head_ref) {
   struct node* prev   = NULL;
   struct node* current = *head_ref;
   struct node* next;
   while (current != NULL) {
      next  = current->next;
      current->next = prev;
      prev = current;
      current = next;
   }
   /*ADD A STATEMENT HERE*/
}
```

Answer

*head_ref = prev;

Status : Correct ***Marks : 1/1***

3. The following function takes a singly linked list of integers as a parameter and rearranges the elements of the lists.

The function is called with the list containing the integers 1, 2, 3, 4, 5, 6, 7 in the given order. What will be the contents of the list after the function completes execution?

```
struct node {
   int value;
   struct node* next;
};

void rearrange (struct node* list) {
   struct node *p,q;
   int temp;
   if (! List || ! list->next) return;
   p=list; q=list->next;
   while(q) {
      temp=p->value; p->value=q->value;
```

```
        q->value=temp;p=q->next;
        q=p?p->next:0;
    }
}
```

Answer

2, 3, 4, 5, 6, 7, 1

Status : Wrong ***Marks : 0/1***

4. In a singly linked list, what is the role of the "tail" node?

Answer

It stores the last element of the list

Status : Correct ***Marks : 1/1***

5. Given the linked list: 5 -> 10 -> 15 -> 20 -> 25 -> NULL. What will be the output of traversing the list and printing each node's data?

Answer

5 10 15 20 25

Status : Correct ***Marks : 1/1***

6. Which of the following statements is used to create a new node in a singly linked list?

```
struct node {
   int data;
   struct node * next;
}
typedef struct node NODE;
NODE *ptr;
```

Answer

ptr = (NODE*)malloc(sizeof(NODE*));

Status : Wrong ***Marks : 0/1***

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7. Given a pointer to a node X in a singly linked list. If only one point is given and a pointer to the head node is not given, can we delete node X from the given linked list?

Answer

Possible if X is not first node.

Status : Wrong ***Marks : 0/1***

8. Consider an implementation of an unsorted singly linked list. Suppose it has its representation with a head pointer only. Given the representation, which of the following operations can be implemented in O(1) time?

i) Insertion at the front of the linked list

ii) Insertion at the end of the linked list

iii) Deletion of the front node of the linked list

iv) Deletion of the last node of the linked list

Answer

I and III

Status : Correct ***Marks : 1/1***

9. Consider the singly linked list: 13 -> 4 -> 16 -> 9 -> 22 -> 45 -> 5 -> 16 -> 6, and an integer K = 10, you need to delete all nodes from the list that are less than the given integer K.

What will be the final linked list after the deletion?

Answer

13 -&gt; 16 -&gt; 22 -&gt; 45 -&gt; 16

Status : Correct ***Marks : 1/1***

10. Consider the singly linked list: 15 -> 16 -> 6 -> 7 -> 17. You need to delete all nodes from the list which are prime.

What will be the final linked list after the deletion?

Answer

15 -&gt; 16 -&gt; 6

Status : Correct ***Marks : 1/1***

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 1_COD_Question 2

Attempt : 2
Total Mark : 10
Marks Obtained : 1

Section 1 : Coding

1. Problem Statement

Arun is learning about data structures and algorithms. He needs your help in solving a specific problem related to a singly linked list.

Your task is to implement a program to delete a node at a given position. If the position is valid, the program should perform the deletion; otherwise, it should display an appropriate message.

Input Format

The first line of input consists of an integer N, representing the number of elements in the linked list.

The second line consists of N space-separated elements of the linked list.

The third line consists of an integer x, representing the position to delete.

Position starts from 1.

Output Format

The output prints space-separated integers, representing the updated linked list after deleting the element at the given position.

If the position is not valid, print "Invalid position. Deletion not possible."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 5
8 2 3 1 7
2
Output: 8 3 1 7

Answer

```
#include <stdio.h>
#include <stdlib.h>

void insert(int);
void display_List();
void deleteNode(int);

struct node {
   int data;
   struct node* next;
} *head = NULL, *tail = NULL;


void insert(int value) {
   struct node* newNode = (struct node*)malloc(sizeof(struct node));
   newNode->data = value;
   newNode->next = NULL;

   if (!head) {
      head = tail = newNode;
   } else {
      tail->next = newNode;
```

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```
        tail = newNode;
    }
}

// Function to delete a node at a given position
void deleteNode(int position) {
    if (!head || position < 1) {
        printf("Invalid position. Deletion not possible.\n");
        return;
    }

    struct node* temp = head;

    // If deleting the first node
    if (position == 1) {
        head = head->next;
        free(temp);
        if (!head) tail = NULL; // If list becomes empty
        return;
    }

    struct node* prev = NULL;
    for (int i = 1; temp && i < position; i++) {
        prev = temp;
        temp = temp->next;
    }

    // If position is out of bounds
    if (!temp) {
        printf("Invalid position. Deletion not possible.\n");
        return;
    }

    // Unlink the node and free memory
    prev->next = temp->next;
    if (temp == tail) tail = prev; // Update tail if last node is deleted
    free(temp);
}

// Function to display the linked list
void display_List() {
    struct node* temp = head;
    while (temp) {
        printf("%d ", temp->data);
        temp = temp->next;
    }
    printf("\n");
}

int main() {
    int num_elements, element, pos_to_delete;

    scanf("%d", &num_elements);

    for (int i = 0; i < num_elements; i++) {
        scanf("%d", &element);
        insert(element);
    }

    scanf("%d", &pos_to_delete);

    deleteNode(pos_to_delete);

    return 0;
}
```

Status : Partially correct ***Marks : 1/10***

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NeoColab_REC_CS23231_DATA STRUCTURES

REC_DS using C_Week 1_COD_Question 1

Attempt : 3
Total Mark : 10
Marks Obtained : 10

Section 1 : Coding

1. Problem Statement

Janani is a tech enthusiast who loves working with polynomials. She wants to create a program that can add polynomial coefficients and provide the sum of their coefficients.

The polynomials will be represented as a linked list, where each node of the linked list contains a coefficient and an exponent. The polynomial is represented in the standard form with descending order of exponents.

Input Format

The first line of input consists of an integer n, representing the number of terms in the first polynomial.

The following n lines of input consist of two integers each: the coefficient and the exponent of the term in the first polynomial.

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The next line of input consists of an integer m, representing the number of terms in the second polynomial.

The following m lines of input consist of two integers each: the coefficient and the exponent of the term in the second polynomial.

Output Format

The output prints the sum of the coefficients of the polynomials.

Sample Test Case

Input: 3
2 2
3 1
4 0
3
2 2
3 1
4 0

Output: 18

Answer

```
#include <stdio.h>
#include <stdlib.h>

typedef struct Node {
   int coeff;
   int exp;
   struct Node* next;
} Node;

Node* insertTerm(Node* head, int coeff, int exp) {
   Node* newNode = (Node*)malloc(sizeof(Node));
   newNode->coeff = coeff;
   newNode->exp = exp;
   newNode->next = head;
   return newNode;
}

int sumCoefficients(Node* head) {
   int sum = 0;
   while (head) {
```

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```
        sum += head->coeff;
        head = head->next;
    }
    return sum;
}

int main() {
    int n, m, coeff, exp;
    Node* poly1 = NULL;
    Node* poly2 = NULL;


    scanf("%d", &n);
    for (int i = 0; i < n; i++) {
        scanf("%d %d", &coeff, &exp);
        poly1 = insertTerm(poly1, coeff, exp);
    }

    scanf("%d", &m);
    for (int i = 0; i < m; i++) {
        scanf("%d %d", &coeff, &exp);
        poly2 = insertTerm(poly2, coeff, exp);
    }

    int totalSum = sumCoefficients(poly1) + sumCoefficients(poly2);

    printf("%d\n", totalSum);

    return 0;
}
```

Status : Correct ***Marks : 10/10***

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