

Aim:

Consider a linked list consisting of name of a person and gender as a node. Arrange the linked list using 'Ladies first' principle. You may create new linked lists if necessary.

Note: Add node at the beginning.

Source Code:

rearrangeList.c

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
struct Node
{
    int data;
    char name[20];
    char gender;
    struct Node *next;
};
void segregateEvenOdd(struct Node **head_ref)
{
    struct Node *end = *head_ref;
    struct Node *prev = NULL;
    struct Node *curr = *head_ref;
    while (end->next != NULL)
        end = end->next;
    struct Node *new_end = end;
    while (curr->data % 2 != 0 && curr != end)
    {
        new_end->next = curr;
        curr = curr->next;
        new_end->next->next = NULL;
        new_end = new_end->next;
    }
    if (curr->data % 2 == 0)
    {
        *head_ref = curr;
        while (curr != end)
        {
            if ( (curr->data) % 2 == 0 )
            {
                prev = curr;
                curr = curr->next;
            }
            else
            {
                prev->next = curr->next;
                curr->next = NULL;
                new_end->next = curr;
                new_end = curr;
                curr = prev->next;
            }
        }
    }
}
```

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    }
    else
    prev = curr;
    if (new_end!=end && (end->data)%2 != 0)
    {
        prev->next = end->next;
        end->next = NULL;
        new_end->next = end;
    }
    return;
}

void push(struct Node** head_ref, char new_name[20], char new_gender)
{
    struct Node* new_node = (struct Node*) malloc(sizeof(struct Node));
    strcpy(new_node->name, new_name);
    new_node->gender = new_gender;
    if (new_gender == 'F')
        new_node->data = 0;
    else if (new_gender == 'M')
        new_node->data = 1;
    new_node->next = (*head_ref);
    (*head_ref) = new_node;
}

void printList(struct Node *node)
{
    while (node!=NULL)
    {
        printf("%s (%c)", node->name, node->gender);
        node = node->next;
        if (node!=NULL)
            printf(" --> ");
    }
}

int main()
{
    struct Node* head = NULL;
    char name[20];
    char gender;
    int noOfInputs, i;
    int option;
    printf("Insert Data\n");
    do
    {
        printf("Enter Name: ");
        scanf(" %s", name);
        printf("Enter Gender: ");
        scanf(" %c", &gender);
        push(&head, name, gender);
        printf("1 : Insert into Linked List\n");
        printf("0 : Exit\n");
        printf("Enter your option: ");
        scanf(" %d", &option);
    }
    while(option == 1);
    printf("Original Linked list \n");
    printList(head);
}

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    segregateEvenOdd(&head);
    printf("\nModified Linked list \n");
    printList(head);
    printf("\n");
    return 0;
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Insert Data Ganga
Enter Name: Ganga
Enter Gender: F
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Yamuna
Enter Gender: F
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Raj
Enter Gender: M
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Veer
Enter Gender: M
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Narmada
Enter Gender: F
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Amar
Enter Gender: M
1 : Insert into Linked List 0
0 : Exit 0
Enter your option: 0
Original Linked list
Amar (M) --> Narmada (F) --> Veer (M) --> Raj (M) --> Yamuna (F) --> Ganga (F)
Modified Linked list
Narmada (F) --> Yamuna (F) --> Ganga (F) --> Amar (M) --> Veer (M) --> Raj (M)

Test Case - 2
User Output
Insert Data Ganga

Enter Name: Ganga
Enter Gender: F
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Yamuna
Enter Gender: F
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Narmada
Enter Gender: F
1 : Insert into Linked List 0
0 : Exit 0
Enter your option: 0
Original Linked list
Narmada (F) --> Yamuna (F) --> Ganga (F)
Modified Linked list
Narmada (F) --> Yamuna (F) --> Ganga (F)

Test Case - 3
User Output
Insert Data Raj
Enter Name: Raj
Enter Gender: M
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Veer
Enter Gender: M
1 : Insert into Linked List 1
0 : Exit 1
Enter your option: 1
Enter Name: Amar
Enter Gender: M
1 : Insert into Linked List 0
0 : Exit 0
Enter your option: 0
Original Linked list
Amar (M) --> Veer (M) --> Raj (M)
Modified Linked list
Amar (M) --> Veer (M) --> Raj (M)