S.No: 36	Exp. Name: ***Linked list Female gender first***	Date:2023-06-16

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;
         }
      }
    }
    else prev = curr;
```


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```
    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 noOInputs, 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);
   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)

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