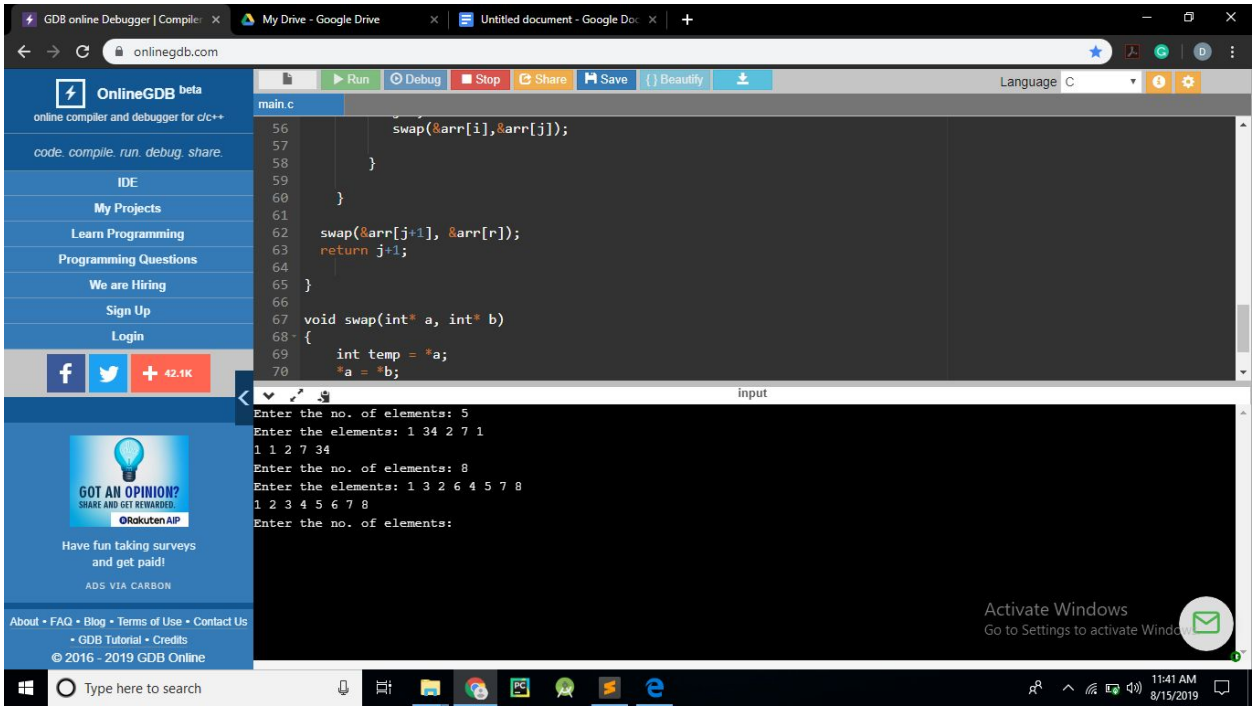
Lab 2 Dhruv Goyal 2018ucp1460

Q1 Quick sort

```
#include<stdio.h>


void quick(int arr[], int p, int r);
int quickpart(int arr[], int p, int r);
void swap(int *a, int* b);

int main()
{
   while(1)
   {
   int a;
   printf("Enter the no. of elements: ");
   scanf("%d", &a);

   int arr[a];

   printf("Enter the elements: ");
   for (int i = 0 ; i < a ; i++)
      scanf("%d", &arr[i]);

   quick(arr, 0, a-1);

   for (int i = 0 ; i < a ; i++)
      printf("%d ", arr[i]);
   printf("\n");
   }

}

void quick(int arr[], int p, int r)
{
   if (p < r)
```

```
    {
     int a = quickpart(arr, p, r);

     quick(arr, p, a-1);
     quick(arr, a+1, r);
    }
}


int quickpart(int arr[], int p, int r)
{


    int pivot = arr[r];

    int j = p-1;
    for (int i = p; i <= r-1 ; i++)
    {

        if (arr[i] <= pivot)
        {
          j++;
          swap(&arr[i],&arr[j]);

        }

    }

  swap(&arr[j+1], &arr[r]);
  return j+1;

}

void swap(int* a, int* b)
{
    int temp = *a;
    *a = *b;
    *b = temp;
```

}



Q2 Linked List

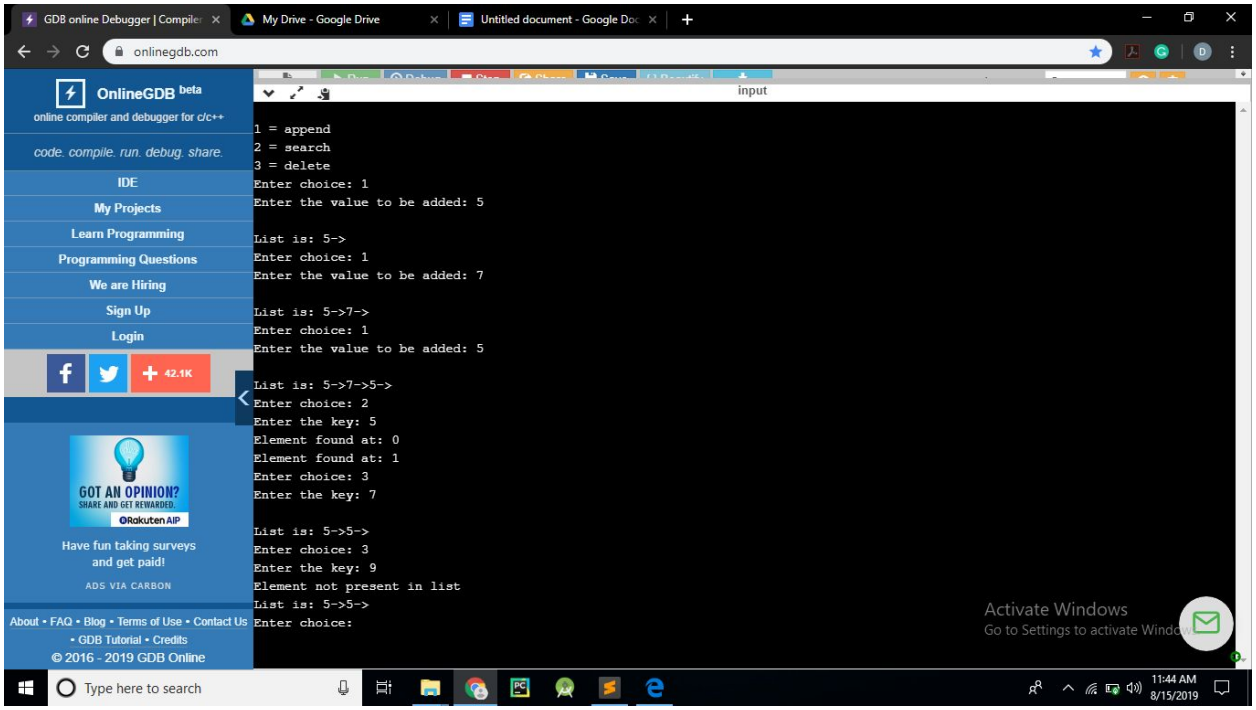
```
#include <stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
};

void append();
void delete();
void search();
void print();
struct node* head = NULL;
struct node* tail = NULL;
int main()
{
    printf("\n1 = append\n2 = search\n3 = delete\n");
```

```
    while(1)
    {
        int n;


        printf("Enter choice: ");
        scanf("%d",&n);

        switch(n)
        {
            case 1 : append();break;
            case 2 : search();break;
            case 3 : delete();break;
            default : printf("Invalid Number\n");
        }



}
}

void print()
{
    struct node*p = head;
    printf("\nList is: ");
    while(p != NULL)
    {
        printf("%d->",p->data);
        p = p->next;
    }
    printf("\n");
}

void append()
{
    struct node* temp = (struct node*)malloc(sizeof(struct node));
    temp->next = NULL;
    printf("Enter the value to be added: ");
    scanf("%d", &(temp->data));
```

```
    if (head == NULL)
    {
        head = temp;
        tail = temp;
    }
    else
    {
        tail->next = temp;
        tail = temp;
    }

   print();
}

void search()
{
    int counter = 0;
    int key;

    printf("Enter the key: ");
    scanf("%d",&key);

    if (head == NULL)
    {
         printf("No elements in the list\n");
    }
    else
    {
        struct node* p = head;
        while(p != NULL)
        {
            if (p->data == key)
            {

                printf("Element found at: %d\n",counter);
                counter++;
            }
            p = p->next;
```

```
        }

          if (counter == 0)
             printf("Element not found");
    }



}


void delete()
{
    int counter = 0 , a = 0;
    int key;

    printf("Enter the key: ");
    scanf("%d",&key);

    if (head == NULL)
         printf("No elements in the list\n");
    else
    {
        struct node* q = head;
        struct node* p = head;
        while(p != NULL)
        {
            if (p->data == key)
            {
                if (p == head)
                {
                    a = 1;
                    head = head->next;
                    struct node* temp = p;
                    p = p->next;
                    temp->next = NULL;
                    free(temp);
```

```
            }
            else
            {
            for (int i = 0 ; i < counter ; i++)
                q = q->next;

            q->next = p->next;
            struct node* temp = p;
            p = p->next;
            temp->next = NULL;
            free(temp);

            counter++;
            }
          }
          else
          {
           p = p->next;
          }


       }
     if (counter == 0 && a == 0)
        printf("Element not present in list");
   }
   print();
}
```



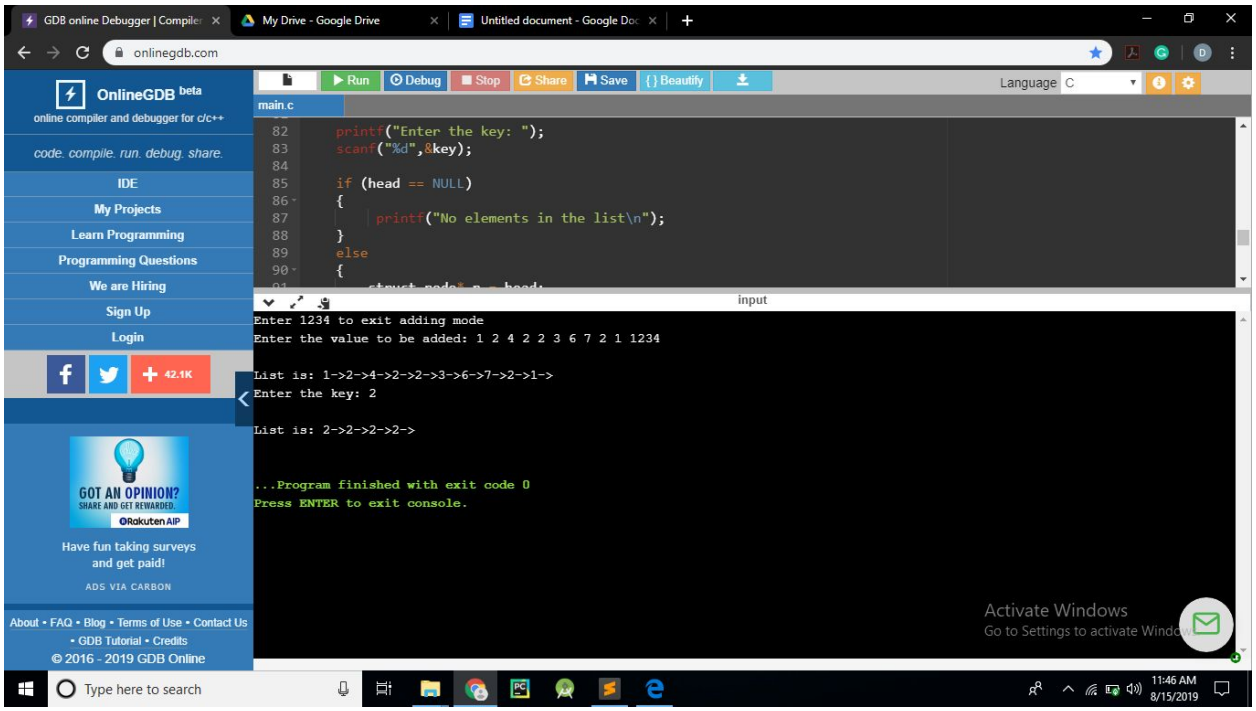
Q3 Key search in Linked List

```
#include <stdio.h>
#include<stdlib.h>
struct node{
    int data;
    struct node* next;
};

void append(struct node** head, struct node** tail, int a);
void search(struct node* head,struct node** h, struct node** tail2);
void print(struct node* head);

int main()
{
    int a;
    struct node* head1 = NULL;
    struct node* tail1 = NULL;

    struct node* head2 = NULL;
```

```
    struct node* tail2 = NULL;

     printf("Enter 1234 to exit adding mode");
     printf("\nEnter the value to be added: ");
    while(1)
    {
     scanf("%d", &a);
     if (a == 1234)
        break;
     append(&head1,&tail1,a);
    }
    print(head1);
    search(head1,&head2,&tail2);
    print(head2);

}

void print(struct node* head)
{
    struct node*p = head;
    printf("\nList is: ");
    while(p != NULL)
    {
        printf("%d->",p->data);
        p = p->next;
    }
    printf("\n");
}

void append(struct node** head, struct node** tail, int a)
{
    struct node* temp = (struct node*)malloc(sizeof(struct node));
    temp->next = NULL;
    temp->data = a;


    if ((*head) == NULL)
    {
        (*head) = temp;
```

```
        (*tail) = temp;
    }
    else
    {
        (*tail)->next = temp;
        (*tail) = temp;
    }


}

void search(struct node* head,struct node** h, struct node** tail2)
{
    int counter = 0;
    int key;

    printf("Enter the key: ");
    scanf("%d",&key);

    if (head == NULL)
    {
         printf("No elements in the list\n");
    }
    else
    {
        struct node* p = head;
        while(p != NULL)
        {
            if (p->data == key)
            {
                append(h,tail2,key);
                counter++;
            }
            p = p->next;

        }

          if (counter == 0)
             printf("Element not found");
```

```
    }


}
```



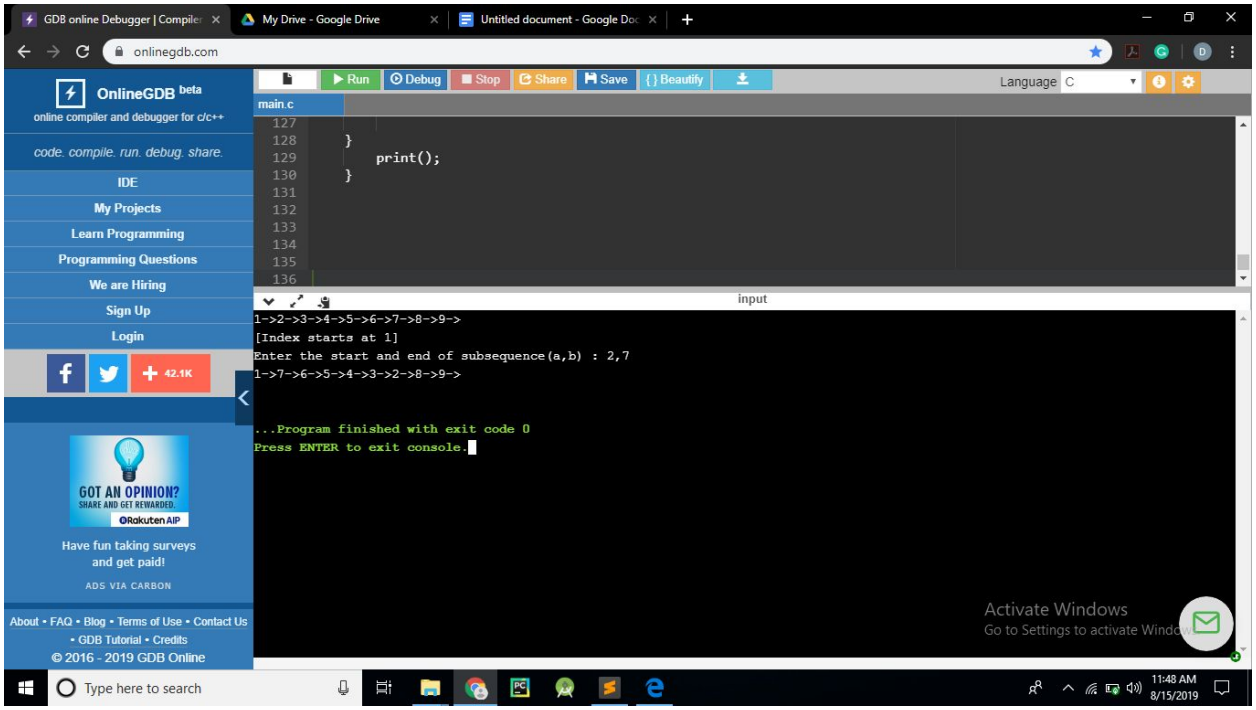
Q4 Subsequence of Linked List reversing

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

void append(int);
void print();
int length();
void reverse();

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

```
struct node* head = NULL;
struct node* tail = NULL;

int main()
{
    int arr[] = {1,2,3,4,5,6,7,8,9};

    for(int i = 0; i < 9 ; i++)
    {
        append(arr[i]);
    }
    print();

    reverse();


    return 0;
}

void append(int a)
{
     struct node* temp = (struct node*)malloc(sizeof(struct node*));
        temp->data = a;
        temp->next = NULL;

        if (head == NULL)
        {
            head = temp;
            tail = temp;
        }
        else
        {
            tail->next = temp;
            tail = temp;
        }
}

void print()
{
```

```
    struct node* p = head;
    while (p != NULL)
    {
        printf("%d->",p->data);
        p = p->next;
    }
    printf("\n");
}

int length()
{
    int count = 0;
    struct node* p = head;
    while(p != NULL)
    {
        count++;
        p = p->next;
    }
    return count;
}



void reverse()
{
    int a, b;
    printf("[Index starts at 1]\nEnter the start and end of subsequence(a,b) : ");
    scanf("%d,%d",&a,&b);

    if (a >= b)
        printf("Start index must be a lower value\n");
    else if (a > length() || b > length())
        printf("Subsequence must not exceed length of subsequence\n");
    else if (a <= 0 || b <= 0)
        printf("Indexes must be positive\n");
    else
    {
        struct node* p = head;
        struct node* q = NULL;
```

```
    int index = 1;
    while (index != a)
        {
            p = p->next;
            index++;
        }


    while(p != q)
    {
        q = head;
        index = 1;
        while (index != b)
         {
             q = q->next;
             index++;
         }
        int temp = q->data;
        q->data = p->data;
        p->data = temp;

        p = p->next;
        b--;



    }

}
    print();
}
```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Run
Debug
Stop
Share
Save
{ } Beautify
Language C
main.c
127
128 }
129 print();
130 }
131
132
133
134
135
136
input
1->2->3->4->5->6->7->8->9->
[Index starts at 1]
Enter the start and end of subsequence(a,b) : 2,7
1->7->6->5->4->3->2->8->9->
...Program finished with exit code 0
Press ENTER to exit console.
Activate Windows
Go to Settings to activate Windows
Type here to search
11:48 AM
8/15/2019