

DS LAB PROGRAM 5

5.

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
struct node
{
    int info;
    struct node *link;
};

typedef struct node *NODE;
NODE getnode()
{
    NODE x;
    x=(NODE)malloc(sizeof(struct node));
    if(x==NULL)
    {
        printf("Memory is full\n");
        exit(0);
    }
    return x;
}

void freenode(NODE x)
{
    free(x);
}

NODE insert_front(NODE first,int item)
{
    NODE temp;
    temp=getnode();
    temp->info=item;
    temp->link=NULL;
    if(first==NULL)
    {
        return temp;
    }
    temp->link=first;
    first=temp;
    return first;
}
```

```

NODE delete_front(NODE first)
{
    NODE temp;
    if(first==NULL)
    {
        printf("List is empty, Cannot Delete item\n");
        return first;
    }
    temp=first;
    temp=temp->link;
    printf("Item Deleted at the front-end is: %d\n",first->info);
    free(first);
    return temp;
}

```

```

NODE insert_rear(NODE first ,int item)
{
    NODE temp,cur;
    temp=getnode();
    temp->info=item;
    temp->link=NULL;
    if(first==NULL)
        return temp;
    cur=first;
    while(cur->link!=NULL)
        cur=cur->link;
    cur->link=temp;
    return first;
}

```

```

NODE delete_rear(NODE first)
{
    NODE cur,prev;
    if(first==NULL)
    {
        printf("The List is Empty, Cannot Delete Item\n");
        return first;
    }
    if(first->link==NULL)
    {
        printf("Item Deleted is: %d",first->info);
        free(first);
        return NULL;
    }
    prev=NULL;

```

```

cur=first;
while(cur->link!=NULL)
{
    prev=cur;
    cur=cur->link;
}
printf("Item Deleted at the rear-end is : %d",cur->info);
free(cur);
prev->link=NULL;
return first;
}

```

NODE insert_pos(int item, int pos ,NODE first)

```

{
    NODE temp;
    NODE prev,cur;
    int count;
    temp=getnode();
    temp->info=item;
    temp->link=NULL;
    if(first==NULL && pos==1)
        return temp;
    if(first==NULL)
    {
        printf("Invalid Position\n");
        return first;
    }
    if(pos==1)
    {
        temp->link=first;
        return temp;
    }
    count=1;
    prev=NULL;
    cur=first;
    while(cur!=NULL && count!=pos)
    {
        prev=cur;
        cur=cur->link;
        count++;
    }
    if(count==pos)
    {
        prev->link=temp;
    }
}

```

```

        temp->link=cur;
        return first;
    }
    printf("IP\n");
    return first;
}

```

```

void display(NODE first)
{
    NODE temp;
    if(first==NULL)
        printf("List is EMPTY , Cannot Display Items\n");
    printf("\n*****\n");
    for(temp=first;temp!=NULL;temp=temp->link)
    {
        printf("%d\n",temp->info);
    }
    printf("\n*****\n");
}

```

```

void main()
{
    int item,choice,pos;
    NODE first=NULL;
    for(;;)
    {

```

```

        printf("\n1:Insert_front\n2:Delete_front\n3:Insert_rear\n4:Delete_rear\n5:insert_pos\n6:display_list\n7:Exit\n");

```

```

        printf("Enter the choice: ");
        scanf("%d",&choice);
        switch(choice)
        {
            case 1:printf("Enter the item at front-end: ");
                    scanf("%d",&item);
                    first=insert_front(first,item);
                    break;
            case 2:first=delete_front(first);
                    break;
            case 3:printf("Enter the item at rear-end: ");
                    scanf("%d",&item);
                    first=insert_rear(first,item);
                    break;

```

```
case 4: first = delete_rear(first);  
        break;  
case 5: printf("Enter the position: ");  
        scanf("%d", &pos);  
        first = insert_pos(item, pos, first);  
        break;  
case 6: display(first);  
        break;  
default: exit(0);  
        break;  
    }  
}
```

OUTPUT:-

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```
main.c
159      printf("Enter the choice: ");
160      scanf("%d",&choice);
161      switch(choice)
162      {
163
```

input

```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 1
Enter the item at front-end: 6
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 1
Enter the item at front-end: 7
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
```

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```
main.c
159      printf("Enter the choice: ");
160      scanf("%d",&choice);
161      switch(choice)
162      {
163
```

input

```
6:display_list
7:Exit
Enter the choice: 1
Enter the item at front-end: 8
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 6
8
7
6
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
```

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```
main.c
159 print("Enter the choice: ");
160 scanf("%d",&choice);
161 switch(choice)
162 {
163 }
```

input

Enter the choice: 2
Item Deleted at the front-end is: 8

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 2
Item Deleted at the front-end is: 7

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 3
Enter the item at rear-end: 4

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear

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```
main.c
159 print("Enter the choice: ");
160 scanf("%d",&choice);
161 switch(choice)
162 {
163 }
```

input

4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice:
3
Enter the item at rear-end: 7

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 3
Enter the item at rear-end: 9

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 6

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main.c

159
160
161
162
163

```
printf("Enter the choice: ");
scanf("%d",&choice);
switch(choice)
{
```

Run Debug Stop Share Save Beauty

Language C

Input

6
4
7
9
.....
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 4
Item Deleted at the rear-end is : 9
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:insert_pos
6:display_list
7:Exit
Enter the choice: 4
Item Deleted at the rear-end is : 7

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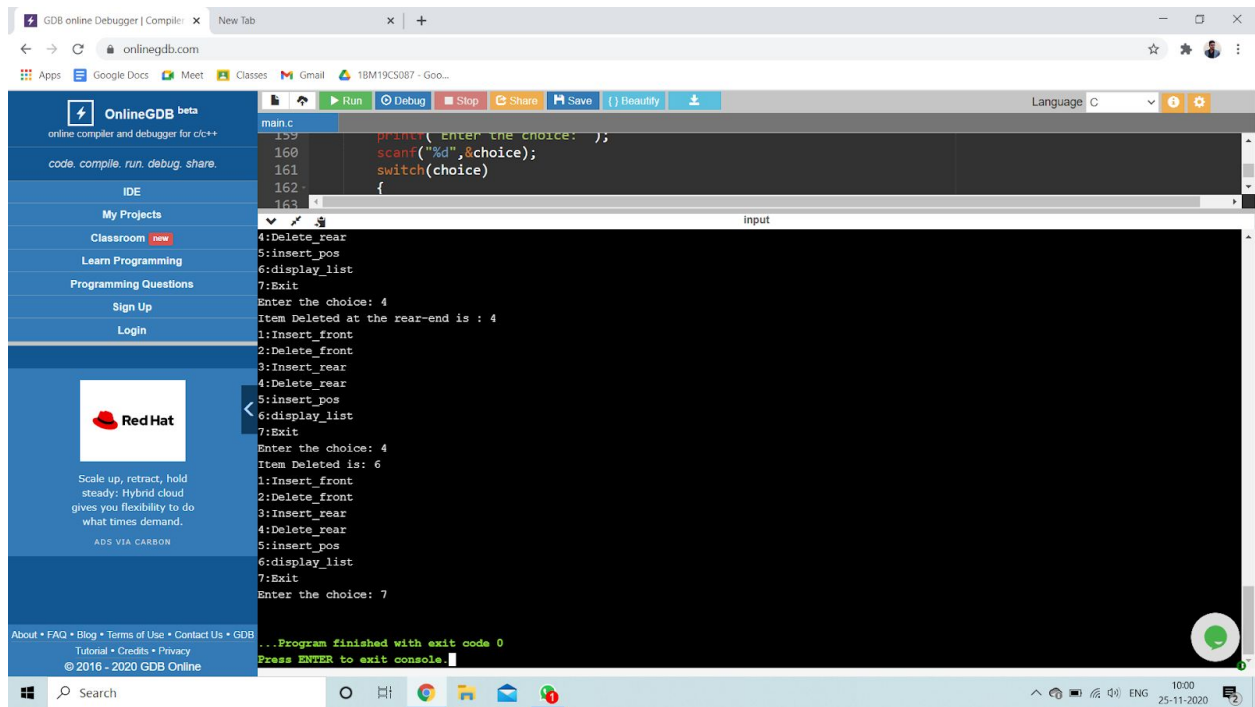
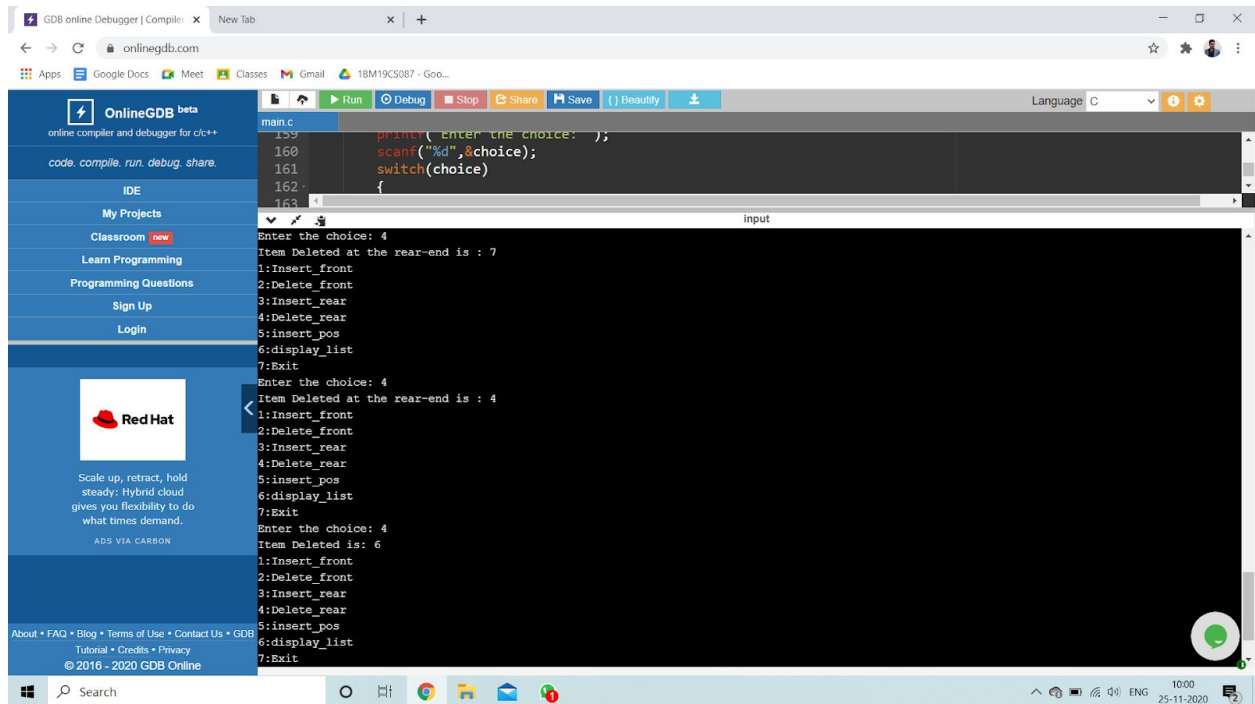
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EXECUTION:-

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```
main.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <conio.h>
4 struct node
5 {
6     int info;
7     struct node *link;
8 };
9
10 typedef struct node *NODE;
11 NODE getnode()
12 {
13     NODE x;
14     x=(NODE)malloc(sizeof(struct node));
15     if(x==NULL)
16     {
17         printf("Memory is full\n");
18         exit(0);
19     }
20     return x;
21 }
22
23 void freenode(NODE x)
24 {
25     free(x);
26 }
27
28 NODE insert_front(NODE first,int item)
29 {
```

input

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```
main.c
29 {
30     NODE temp;
31     temp=getnode();
32     temp->info=item;
33     temp->link=NULL;
34     if(first==NULL)
35     {
36         return temp;
37     }
38     temp->link=first;
39     first=temp;
40     return first;
41 }
42
43 NODE delete_front(NODE first)
44 {
45     NODE temp;
46     if(first==NULL)
47     {
48         printf("List is empty, Cannot Delete item\n");
49         return first;
50     }
51     temp=first;
52     temp=temp->link;
53     printf("Item Deleted at the front-end is: %d\n",first->info);
54     free(first);
55     return temp;
56 }
57 }
```

input

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```
main.c
56 }
57
58 NODE insert_rear(NODE first, int item)
59 {
60     NODE temp, cur;
61     temp = getnode();
62     temp->info = item;
63     temp->link = NULL;
64     if (first == NULL)
65         return temp;
66     cur = first;
67     while (cur->link != NULL)
68         cur = cur->link;
69     cur->link = temp;
70     return first;
71 }
72 NODE delete_rear(NODE first)
73 {
74     NODE cur, prev;
75     if (first == NULL)
76     {
77         printf("The List is Empty, Cannot Delete Item\n");
78         return first;
79     }
80     if (first->link == NULL)
81     {
82         printf("Item Deleted is: %d", first->info);
83         free(first);
84     }
```

input

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```
main.c
84     return NULL;
85 }
86 prev = NULL;
87 cur = first;
88 while (cur->link != NULL)
89 {
90     prev = cur;
91     cur = cur->link;
92 }
93 printf("Item Deleted at the rear-end is : %d", cur->info);
94 free(cur);
95 prev->link = NULL;
96 return first;
97 }
98
99 NODE insert_pos(int item, int pos, NODE first)
100 {
101     NODE temp;
102     NODE prev, cur;
103     int count;
104     temp = getnode();
105     temp->info = item;
106     temp->link = NULL;
107     if (first == NULL && pos == 1)
108         return temp;
109     if (first == NULL)
110     {
111         printf("Invalid Position\n");
112         return first;
```

input

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main.c

Run

Debug

Stop

Share

Save

Beautify

```
113 }
114 if(pos==1)
115 {
116     temp->link=first;
117     return temp;
118 }
119 count=1;
120 prev=NULL;
121 cur=first;
122 while(cur!=NULL && count!=pos)
123 {
124     prev=cur;
125     cur=cur->link;
126     count++;
127 }
128 if(count==pos)
129 {
130     prev->link=temp;
131     temp->link=cur;
132     return first;
133 }
134 printf("IP\n");
135 return first;
136 }
137
138 void display(NODE first)
139 {
140     NODE temp;
141     if(first==NULL)
142         return;
143     while(temp!=NULL)
144     {
145         printf("%d ", temp->data);
146         temp=temp->link;
147     }
148     printf("\n");
149 }
```

input

Language C

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main.c

```
140 NODE temp;
141 if(first==NULL)
142     printf("List is EMPTY , Cannot Display Items\n");
143     printf("\n*****\n");
144     for(temp=first;temp!=NULL;temp=temp->link)
145     {
146         printf("%d\n",temp->info);
147     }
148     printf("\n*****\n");
149 }
150 }
151
152 void main()
153 {
154     int item,choice,pos;
155     NODE first=NULL;
156     for(;;)
157     {
158         printf("\n1:Insert_front\n2:Delete_front\n3:Insert_rear\n4:Delete_rear\n5:insert_pos\n6:display_list\n7:Exit\n");
159         printf("Enter the choice: ");
160         scanf("%d",&choice);
161         switch(choice)
162         {
163             case 1:printf("Enter the item at front-end: ");
164                     scanf("%d",&item);
165                     first=insert_front(first,item);
166                     break;
167             case 2:first=delete_front(first);
168             break;
```

input

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main.c

```
159     printf("Enter the choice: ");
160     scanf("%d",&choice);
161     switch(choice)
162     {
163         case 1:printf("Enter the item at front-end: ");
164                 scanf("%d",&item);
165                 first=insert_front(first,item);
166                 break;
167         case 2:first=delete_front(first);
168                 break;
169         case 3:printf("Enter the item at rear-end: ");
170                 scanf("%d",&item);
171                 first=insert_rear(first,item);
172                 break;
173         case 4:first=delete_rear(first);
174                 break;
175         case 5:printf("Enter the position: ");
176                 scanf("%d",&pos);
177                 first=insert_pos(item,pos,first);
178                 break;
179         case 6:display(first);
180                 break;
181         default:exit(0);
182                 break;
183     }
184 }
185 }
186
187 }
```

input

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