

**EXERCISE - 5**

There is a garage where the access road can accommodate any number of trucks at one time. The garage is built in such a way that only the last truck entered can be moved out. Each of the trucks is identified by a positive integer (a truck\_id). Implement dynamically to handle truck moves, allowing for the following commands:

i) On\_road (truck\_id); ii) Enter\_garage (truck\_id);  
iii) Exit\_garage (truck\_id); iv) Show\_trucks (garage or road);

If an attempt is made to get a truck out which is not the closest to the garage entry, the error message "Truck x cannot be moved" should be displayed.

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
    int id;
    int s;
    float time;
    struct node *next;
};
struct node *top=NULL,*delay=NULL;
int isempty()
{
    if(top==NULL)
        return 1;
    else
        return 0;
}

void push()
{
    struct node *temp;
    temp=(struct node *)malloc(sizeof(struct node));
    printf("Enter Truck ID\n");
    scanf("%d",&temp->id);
    printf("Enter Service No.\n");
```

```

scanf("%d",&temp->s);
printf("Enter time required for a each service\n");
scanf("%f",&temp->time);
if (isempty())
{
    temp->next=NULL;
    top=temp;
}
else
{
    temp->next=top;
    top=temp;
}
}
void pop()
{
    struct node *temp;
    int x,y;
    float z;
    if(isempty())
    printf("There are no trucks, the garage is empty\n");
    else
    {
        x=top->id;
        y=top->s;
        z=top->time;
        temp=top;
        top=temp->next;
        free(temp);
        printf("The truck with id %d, serice no. %d, time
required %f is serviced and can go out\n",x,y,z);
    }
}
float max()
{
    struct node *temp;
    float max=temp->time;
    temp=temp;
    while(temp->next!=NULL)
    {
        if(temp->time>=max)
        max=temp->time;
        temp=temp->next;
    }
    if(temp->time>max)
    max=temp->time;
    return(max);
}

```

```

}
void display()
{
    struct node *temp=top;
    if(isempty())
        printf("garage is empty\n");
    else
    {
        while(temp->next!=NULL)
        {

            printf("There is a truck with id %d, service no. %d,
time required %f in the garage\n\n",temp->id,temp->s,temp-
>time);
            temp=temp->next;
        }
        printf("There is a truck with id %d, service no. %d, time
required %f in the garage\n\n",temp->id,temp->s,temp->time);
    }
}

void display1()
{
    struct node *temp=delay;
    if(delay==NULL)
        printf("there is no truck whose service is postponed");
    else
    {
        while(temp->next!=NULL)
        {
            printf("There is a truck with id %d, service no. %d,
time required %f in the garage\n\n",temp->id,temp->s,temp-
>time);
            temp=temp->next;
        }
        printf("There is a truck with id %d, service no. %d, time
required %f in the garage\n\n",temp->id,temp->s,temp->time);
    }
}

int main()
{
    struct node *temp1;
    int ch;
    float m;
    while(ch!=6)
    {

```

```

    printf("1-Toallow the entry of trucks one by one(push)\n");
    printf("2-Exit of trucks near the entry gate with all
conditions applied(pop)\n");
    printf("3-Display the details of the trucks in the
garage(left to be serviced)\n");
    printf("4-display the details of the trucks whose service
has been postponed\n");
    printf("5-display the details of the truck near the entry
gate\n");
    printf("6-exit\n");
    scanf("%d",&ch);
    switch(ch)
    {
        case 1:
            push();
            break;
        case 2:
            printf("only the truck near the gate is
serviced\n");
            m=max();
            if(top->time!=m)
            {
                if(top->s<=3)
                    printf("Service is FREE, no charge required\n");
                else if(top->s>3)
                    printf("Service is CHARGABLE.\nCharge depends on
the type of servicing\n");
                pop();
            }
            else if(top->time==m)
            {
                printf("This truck requires the maximum time for
service so its service is postponed to the last\n");
                temp1=top;
                top=top->next;
                if(delay==NULL)
                {
                    delay=temp1;
                    delay->next=NULL;
                }
                else
                {
                    temp1->next=delay;
                    delay=temp1;
                }
            }
    }

```

```

        break;
    case 3:
        display();
        break;
    case 4:
        display1();
        break;
    case 5:
        printf("The details of the truck which entered the
garage at last are:\n");
        printf("ID:%d\nSERVICE NO.:%d\nTIME REQD.:%f\n",top-
>id,top->s,top->time);
        break;
    case 6:
        break;

}
}
}

```

The screenshot shows a C code editor with the following code:

```

1  #include<stdio.h>
2  #include<stdlib.h>
3  struct node
4  {
5      int id;
6      int s;
7      float time;
8      struct node *next;
9  };
10 struct node *top=NULL,*delay=NULL;
11 int isempty()
12 {
13     if(top==NULL)
14         return 1;
15     else
16         return 0;
17 }
18
19 void push()
20 {
21     struct node *temp;
22     temp=(struct node *)malloc(sizeof(struct node));
23     printf("Enter Truck ID\n");
24     scanf("%d",&temp->id);
25     printf("Enter Service No.\n");
26     scanf("%d",&temp->s);
27     printf("Enter time required for a each service\n");
28     scanf("%f",&temp->time);
29     if (isempty())
30     {
31         temp->next=NULL;

```

The editor interface includes a menu bar (File, Edit, View, Search, Project, Build, Debug, Fortran, wsSmith, Tools, Tools+, Plugins, DoxyBlocks, Settings, Help), a toolbar, and a sidebar with 'Projects' and 'Workspace' tabs. The status bar at the bottom shows 'C:\Users\Rites\Documents\17BIT0028.c', 'Windows (CR+LF)', 'default', 'Line 107, Column 2', 'Insert', 'Read/Write', 'default', and the date '20-Feb-18'.

17BIT0028.c - Code::Blocks 16.01

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help

<global> man():int

Management

Projects Symbols Files

Workspace

```
29 if (isempty())
30 {
31     temp->next=NULL;
32     top=temp;
33 }
34 else
35 {
36     temp->next=top;
37     top=temp;
38 }
39
40 void pop()
41 {
42     struct node *temp;
43     int x,y;
44     float z;
45     if (isempty())
46         printf("There are no trucks, the garage is empty\n");
47     else
48     {
49         x=top->id;
50         y=top->s;
51         z=top->time;
52         temp=top;
53         top=temp->next;
54         free(temp);
55         printf("The truck with id %d, service no. %d, time required %f is serviced and can go out\n",x,y,z);
56     }
57 }
58
59 float max()
60 {
61     struct node *temp;
62     float max=temp->time;
63     temp=temp->next;
64     while(temp->next!=NULL)
65     {
66         if (temp->time>max)
67             max=temp->time;
68         temp=temp->next;
69     }
70     if (temp->time>max)
71         max=temp->time;
72     return (max);
73 }
74
75 void display()
76 {
77     struct node *temp=top;
78     if (isempty())
79         printf("garage is empty\n");
80     else
81     {
82         while(temp->next!=NULL)
83         {
84             printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
85             temp=temp->next;
86         }
87         printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
88     }
89 }
```

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17BIT0028.c - Code::Blocks 16.01

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<global> man():int

Management

Projects Symbols Files

Workspace

```
57 }
58
59 float max()
60 {
61     struct node *temp;
62     float max=temp->time;
63     temp=temp->next;
64     while(temp->next!=NULL)
65     {
66         if (temp->time>max)
67             max=temp->time;
68         temp=temp->next;
69     }
70     if (temp->time>max)
71         max=temp->time;
72     return (max);
73 }
74
75 void display()
76 {
77     struct node *temp=top;
78     if (isempty())
79         printf("garage is empty\n");
80     else
81     {
82         while(temp->next!=NULL)
83         {
84             printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
85             temp=temp->next;
86         }
87         printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
88     }
89 }
```

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17BIT0028.c - Code::Blocks 16.01

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DooxBlocks Settings Help

<global> main():int

Management

Projects Symbols Files

Workspace

```
85 }
86
87 printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
88
89
90 void display1()
91 {
92     struct node *temp=delay;
93     if(delay==NULL)
94         printf("there is no truck whose service is postponed");
95     else
96     {
97         while(temp->next!=NULL)
98         {
99             printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
100             temp=temp->next;
101         }
102         printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp->id,temp->s,temp->time);
103     }
104 }
105
106 int main()
107 {
108     struct node *temp1;
109     int ch;
110     float m;
111     while(ch!=6)
112     {
113         printf("1-Allow the entry of trucks one by one(push)\n");
114         printf("2-Exit of trucks near the entry gate with all conditions applied(pop)\n");
115         printf("3-Display the details of the trucks in the garage(left to be serviced)\n");
116     }
117 }
```

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<global> main():int

Management

Projects Symbols Files

Workspace

```
113 printf("1-Allow the entry of trucks one by one(push)\n");
114 printf("2-Exit of trucks near the entry gate with all conditions applied(pop)\n");
115 printf("3-Display the details of the trucks in the garage(left to be serviced)\n");
116 printf("4-display the details of the trucks whose service has been postponed\n");
117 printf("5-display the details of the truck near the entry gate\n");
118 scanf("%d",&ch);
119 switch(ch)
120 {
121     case 1:
122         push();
123         break;
124     case 2:
125         printf("only the truck near the gate is serviced\n");
126         m=max();
127         if(top->time!=m)
128         {
129             if(top->s<=3)
130                 printf("Service is FREE, no charge required\n");
131             else if(top->s>3)
132                 printf("Service is CHARGABLE.\nCharge depends on the type of servicing\n");
133             pop();
134         }
135     else if(top->time==m)
136     {
137         printf("This truck requires the maximum time for service so its service is postponed to the last\n");
138         temp1=top;
139         top=temp->next;
140         if(delay==NULL)
141         {
142             printf("There is a truck with id %d, service no. %d, time required %f in the garage\n\n",temp1->id,temp1->s,temp1->time);
143         }
144     }
145 }
```

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17BIT0028.c - Code::Blocks 16.01

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<global> main():int

Management

Projects Symbols Files

Workspace

```
128         if(top->time!=m)
129         {
130             if(top->s<=3)
131                 printf("Service is FREE, no charge required\n");
132             else if(top->s>3)
133                 printf("Service is CHARGABLE.\nCharge depends on the type of servicing\n");
134             pop();
135         }
136     }
137     else if(top->time==m)
138     {
139         printf("This truck requires the maximum time for service so its service is postponed to the last\n");
140         templ=top;
141         top=top->next;
142         if(delay==NULL)
143         {
144             delay=templ;
145             delay->next=NULL;
146         }
147         else
148         {
149             templ->next=delay;
150             delay=templ;
151         }
152     }
153     break;
154 case 3:
155     display();
156     break;
157 case 4:
158     display1();
159     ...
```

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Windows (CR+LF) default Line 107, Column 2 Insert Read/Write default

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17BIT0028.c - Code::Blocks 16.01

File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help

<global> main():int

Management

Projects Symbols Files

Workspace

```
140         templ=top;
141         top=top->next;
142         if(delay==NULL)
143         {
144             delay=templ;
145             delay->next=NULL;
146         }
147         else
148         {
149             templ->next=delay;
150             delay=templ;
151         }
152     }
153     break;
154 case 3:
155     display();
156     break;
157 case 4:
158     display1();
159     break;
160 case 5:
161     printf("The details of the truck which entered the garage at last are:\n");
162     printf("ID:%d\nSERVICE NO.:%d\nTIME REQD.:%f\n",top->id,top->s,top->time);
163     break;
164 case 6:
165     break;
166 }
167 }
168 }
169 }
170 }
```

C:\Users\Rites\Documents\17BIT0028.c

Windows (CR+LF) default Line 107, Column 2 Insert Read/Write default

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## OUTPUT :

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
```

```
1
Enter Truck ID
0028
Enter Service No.
0029
Enter time required for a each service
30
```

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
```

```
1
Enter Truck ID
0001
Enter Service No.
0002
Enter time required for a each service
25
```

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
```

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
```

```
1
Enter Truck ID
0009
Enter Service No.
0010
Enter time required for a each service
35
```

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
```

```
2
only the truck near the gate is serviced
This truck requires the maximum time for service so its service is postponed to the last
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
3
There is a truck with id 1, service no. 2, time required 25.000000 in the garage
```

```
1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
3
There is a truck with id 1, service no. 2, time required 25.000000 in the garage

There is a truck with id 28, service no. 29, time required 30.000000 in the garage

1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
4
There is a truck with id 9, service no. 10, time required 35.000000 in the garage

1-To allow the entry of trucks one by one(push)
2-Exit of trucks near the entry gate with all conditions applied(pop)
3-Display the details of the trucks in the garage(left to be serviced)
4-display the details of the trucks whose service has been postponed
5-display the details of the truck near the entry gate
6-exit
5
The details of the truck which entered the garage at last are:
ID:1
SERVICE NO.:2
TIME REQD.:25.000000
```