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Subject: Data Structures and Algorithms.

Practical: 3 A bus has a capacity of 30 passengers. There is single door for entry in bus and two doors for exit. Passengers can occupy seats in front or rear sections of bus on first in first out basis. The entry door automatically gets closed when bus is full and alarms for the same. Passengers once occupied the seat are not asked to change it. Identify the best data structure that can be used and implement the program.

Code:

```
#include<stdio.h>
#include<stdlib.h>
#define max 30
int queue[max];
int f1=-1,r1=-1;
int f2=max,r2=max;
int countleft=0;
int countright=0;
int result=0;



void insert_left(int n)
{
    if(r1+1==r2)
    {
       printf("The Bus Is Full\n");
```

```
    }
    else
    {
       if(f1==-1 && r1==-1)
       {
          f1=0;
          r1=0;
       }

       else
       {
          r1++;
       }

      queue[r1]=n;

    }
}



void delete_left()
{   f1=0;
   if(f1=-1 && r1==-1)
   {
```

```
        printf("The Left Side Bus Is Empty");
    }

   else
   { printf("The passenger number exited from left side are \n");
       //   while(f1!=r1)
       //   {
       //       printf("%d ",queue[f1]);

       //       f1++;
       //   }
        do
      {
          printf("%d ",queue[f1]);
           f1++;
      }
      while(f1!=r2);
   }

 //  delete_right();



}

void insert_right(int n)
```

```
{
   if(r1+1==r2)
   {
      printf("The Bus Is Full\n");
   }
   else
   {
    if (f2==max && r2==max)
    {
       f2--;
       r2--;
    }
    else
    {
       r2--;
    }
    queue[r2]=n;
   }
}

void delete_right()
{
   if (f2==max-1 && r2==max-1)
   {
      printf("The Right Side Bus Is Empty");
```

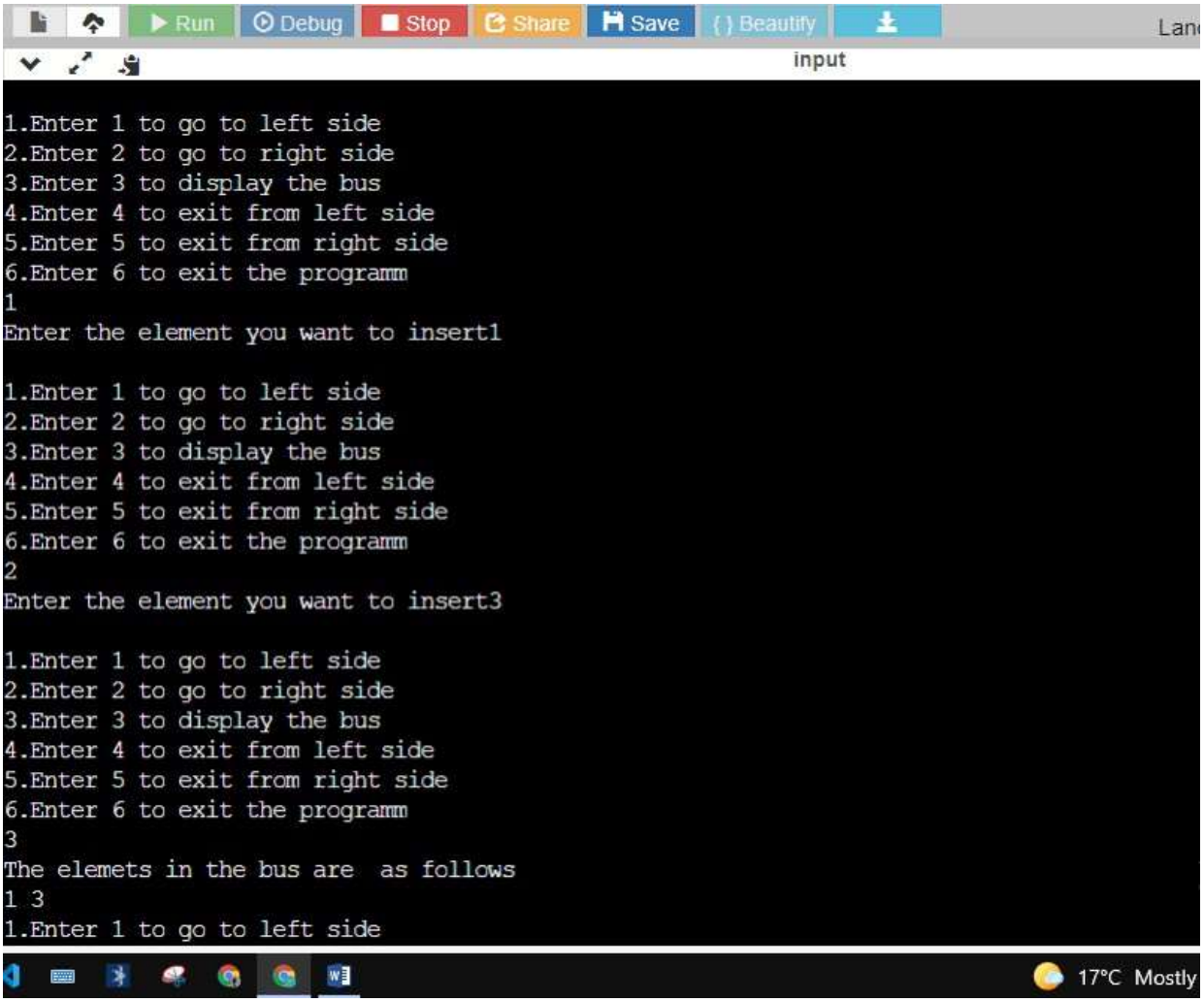
```
}
// else
// {
//     for (int i=f2;i>=r2;i--)
//     {
//           result=queue[f2];
//           //countright--;
//           printf("%d ",result);

//     }
// }
else
{ printf("The passenger exited from right side are\n");

  do
  {
      printf("%d ",queue[f2]);
      f2--;
  } while(f2!=r2);

  printf("%d ",queue[f2]); /// Last element not going out

    // while(f2!=r2)
    // {
    //     printf("%d ",queue[f2]);
```

```
        //     f2--;
        // }
    }
}

void display()
{
    // if(f1==-1 && r1==-1 && f2==max-1 && r2==max-1)
    // {
    //     printf("The Bus Is Empty\n");
    // }
    // else if(r1+1==r2)
    // {
    //     printf("The Bus Is Full");
    // }
    // else
   // {
        for(int i=f1;i<=r1;i++)
        {
            printf("%d ",queue[i]);
        }

        for (int i=r2;i<=f2;i++)
        {
            printf("%d ",queue[i]);
```

```
        }
    // }
}

int main()
{
    int ch,number;

    while(1)
    {
        printf("\n1.Enter 1 to go to left side\n");
        printf("2.Enter 2 to go to right side\n");
        printf("3.Enter 3 to display the bus\n");
        printf("4.Enter 4 to exit from left side\n");
        printf("5.Enter 5 to exit from right side\n");
        printf("6.Enter 6 to exit the programm\n");
        scanf("%d",&ch);

        switch(ch)
        {
            case 1: printf("Enter the element you want to insert");
                    scanf("%d",&number);
                    insert_left(number);
                    break;
            case 2: printf("Enter the element you want to insert");
```

```
            scanf("%d",&number);
            insert_right(number);
            break;
        case 3: printf("The elemets in the bus are as follows\n");
            display();
            break;
        case 4: delete_left();
            break;
        case 5: delete_right();
            break;
        case 6: exit(0);
      }

   }

   return 0;
}
```

Output:


Run
Debug
Stop
Share
Save
{ } Beautify
input
1.Enter 1 to go to left side
2.Enter 2 to go to right side
3.Enter 3 to display the bus
4.Enter 4 to exit from left side
5.Enter 5 to exit from right side
6.Enter 6 to exit the programm
1
Enter the element you want to insert1
1.Enter 1 to go to left side
2.Enter 2 to go to right side
3.Enter 3 to display the bus
4.Enter 4 to exit from left side
5.Enter 5 to exit from right side
6.Enter 6 to exit the programm
2
Enter the element you want to insert3
1.Enter 1 to go to left side
2.Enter 2 to go to right side
3.Enter 3 to display the bus
4.Enter 4 to exit from left side
5.Enter 5 to exit from right side
6.Enter 6 to exit the programm
3
The elemets in the bus are as follows
1 3
1.Enter 1 to go to left side
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