```c
/*Input Output Dequeue*/
#include<stdio.h>
#include<stdlib.h>
#define Size 5
int deque_arr[Size];
int front = -1;
int rear = -1;
void insert_rear()
{
    int added_item;
    if((front == 0 && rear == Size-1) || (front == rear+1))
    {   printf("Queue Overflow\n\n");
        return;}
    if (front == -1)
    {   front = 0;
        rear = 0;}
    else
    if(rear == Size-1)
        rear = 0;
    else
        rear = rear+1;

    printf("Enter the element : ");
    scanf("%d", &added_item);
    deque_arr[rear] = added_item ;
}
void insert_front()
{   int added_item;
    if((front == 0 && rear == Size-1) || (front == rear+1))
    {   printf("Queue Overflow\n\n");
        return;  }
    if (front == -1)
    {   front = 0;
        rear = 0;     }
```

```
933     else
934     if(front== 0)
935         front=Size-1;
936     else
937         front=front-1;
938     printf("Enter the element : ");
939     scanf("%d", &added_item);
940     deque_arr[front] = added_item ;
941 }
942 void delete_front()
943 {   if (front == -1)
944     {   printf("Queue Underflow\n\n");
945         return ;
946     }
947     printf("Element deleted from queue is : %d\n",deque_arr[front]);
948     if(front == rear)
949     {   front = -1;
950         rear=-1;
951     }
952     else
953         if(front == Size-1)
954             front = 0;
955         else
956             front = front+1;
957 }
958 void delete_rear()
959 {
960     if (front == -1)
961     {
962         printf("Queue Underflow\n\n");
963         return ;
964     }
965     printf("Element deleted from queue is : %d\n",deque_arr[rear]);
```

```
965     printf("Element deleted from queue is : %d\n",deque_arr[rear]);
966     if(front == rear)
967     {
968         front = -1;
969         rear=-1;
970     }
971     else
972         if(rear == 0)
973             rear=Size-1;
974         else
975             rear=rear-1;
976 }
977 void display_queue()
978 {
979     int front_pos = front,rear_pos = rear;
980
981     if(front == -1)
982     {   printf("Queue is empty\n\n");
983         return;
984     }
985     printf("Queue elements :\n");
986     if( front_pos <= rear_pos )
987     {
988         while(front_pos <= rear_pos)
989         {
990             printf("%d ",deque_arr[front_pos]);
991             front_pos++;
992         }
993     }
994     else
995     {
996         while(front_pos <= Size-1)
997         {   printf("%d ",deque_arr[front_pos]);
998             front_pos++;
```

```
        }
        front_pos = 0;
        while(front_pos <= rear_pos)
        {
            printf("%d ",deque_arr[front_pos]);
            front_pos++;
        }
    }
    printf("\n");
}
void input_que()
{   int choice;
    do
    {   printf("1.Insert at rear\n");
        printf("2.Delete from front\n");
        printf("3.Delete from rear\n");
        printf("4.Display\n");
        printf("5.Quit\n");
        printf("Enter your choice : ");
        scanf("%d",&choice);

        switch(choice)
        {   case 1:
            insert_rear();
            break;
         case 2:
            delete_front();
            break;
         case 3:
            delete_rear();
            break;
         case 4:
            display_queue();
            break;
```

```
1032            break;
1033         case 5:exit(0);
1034         default:printf("Wrong choice\n\n");
1035        }
1036    }while(choice!=5);
1037 }
1038 void output_que()
1039 {   int choice;
1040     do
1041     {   printf("1.Insert at rear\n");
1042         printf("2.Insert at front\n");
1043         printf("3.Delete from front\n");
1044         printf("4.Display\n");
1045         printf("5.Quit\n");
1046         printf("Enter your choice : ");
1047         scanf("%d",&choice);
1048         switch(choice)
1049         {
1050          case 1:
1051             insert_rear();
1052             break;
1053          case 2:
1054             insert_front();
1055             break;
1056          case 3:
1057             delete_front();
1058             break;
1059          case 4:
1060             display_queue();
1061             break;
1062          case 5:exit(0);
1063          default:
1064             printf("Wrong choice\n\n");
1065        }
```

```
1065            }
1066        }while(choice!=5);
1067    }
1068    int main()
1069    {   int choice;
1070        printf("1.Input restricted dequeue\n");
1071        printf("2.Output restricted dequeue\n");
1072        printf("3.Exit\n");
1073        printf("Enter your choice : ");
1074        scanf("%d",&choice);
1075        switch(choice)
1076        {
1077         case 1 :input_que();
1078            break;
1079         case 2:output_que();
1080            break;
1081         case 3:exit(0);
1082         default:printf("Wrong choice\n\n");
1083        }
1084        return 0;
1085    }
```

"C:\Users\Shreshtha Aggarwal\Desktop\1stpro\bin\Debug\1stpro.exe"

```
1.Input restricted dequeue
2.Output restricted dequeue
3.Exit
Enter your choice : 1
1.Insert at rear
2.Delete from front
3.Delete from rear
4.Display
5.Quit
Enter your choice : 1
Enter the element : 23
1.Insert at rear
2.Delete from front
3.Delete from rear
4.Display
5.Quit
Enter your choice : 1
Enter the element : 65
1.Insert at rear
2.Delete from front
3.Delete from rear
4.Display
5.Quit
Enter your choice : 3
Element deleted from queue is : 65
1.Insert at rear
2.Delete from front
3.Delete from rear
4.Display
5.Quit
Enter your choice : 4
Queue elements :
23
1.Insert at rear
2.Delete from front
3.Delete from rear
4.Display
5.Quit
Enter your choice : 5

Process returned 0 (0x0)   execution time : 18.298 s
Press any key to continue.
```

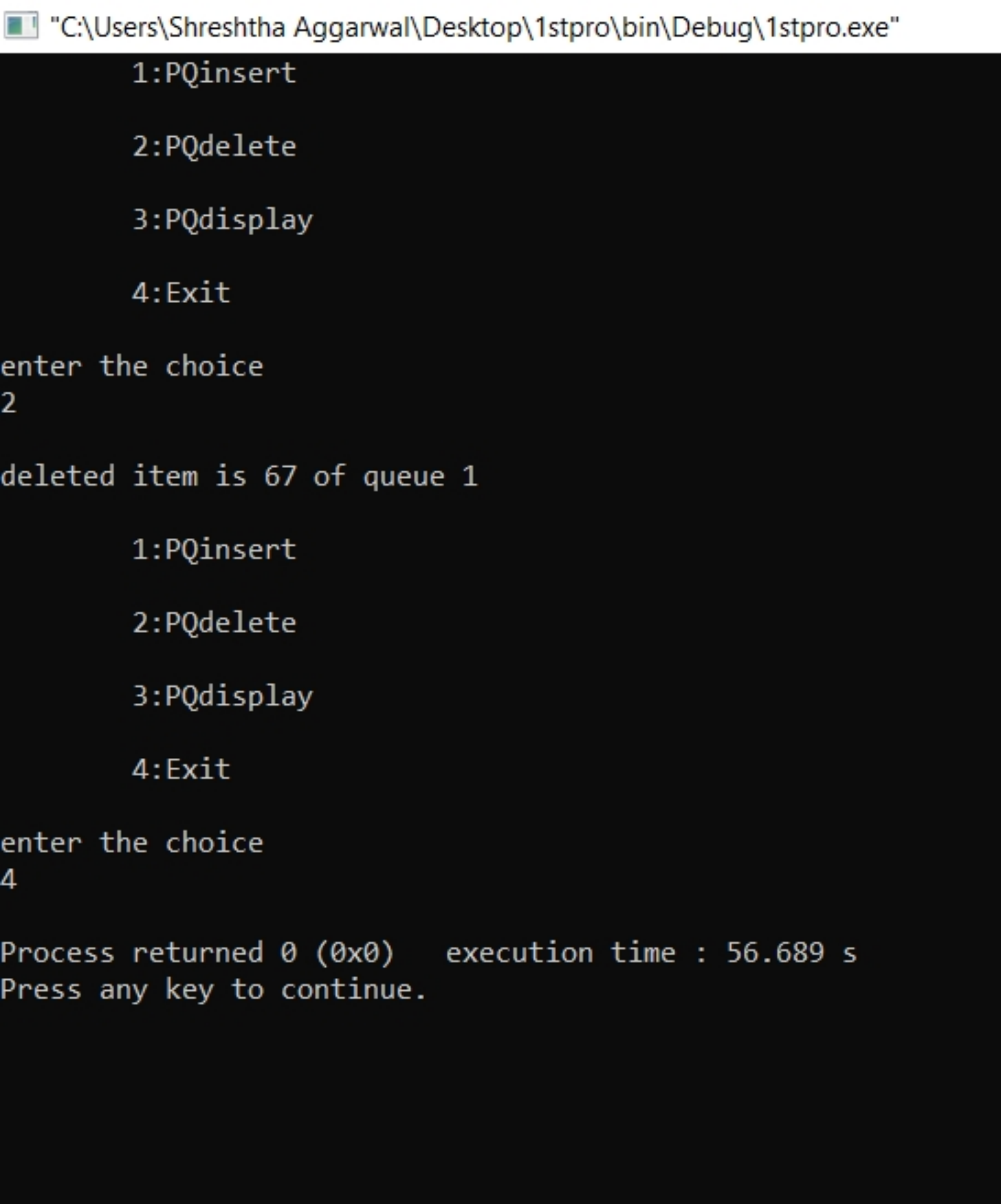
```c
/*Multiple Priority Queue*/
#include<stdio.h>
#include<stdlib.h>
#define N 3
int queue[3][N];
int front[3]={0,0,0};
int rear[3]={-1,-1,-1};
int item,pr;
void pqinsert(int pr)
{
     if(rear[pr]==N-1)
        printf("\n Queue overflow\n");
     else
     {
         printf("\nenter the item\n");
         scanf("%d",&item);
         rear[pr]++;
         queue[pr][rear[pr]]=item;
     }
     return;
}
void pqdelete()
{
    int i;
    for(i=0;i<3;i++)
    {
      if(rear[i]==front[i]-1)
       printf("\nqueue %d empty\n",i+1);
      else
      {
       printf("\ndeleted item is %d of queue %d\n",queue[i][front[i]],i+1);
       front[i]++;
       return;
      }
```

```
1221        }
1222       }
1223  }
1224  void display()
1225  {
1226      int i,j;
1227      for(i=0;i<3;i++)
1228      {
1229      if(rear[i]==front[i]-1)
1230        printf("\nqueue %d empty\n",i+1);
1231      else
1232        {
1233        printf("\nQUEUE %d:",i+1);
1234        for(j=front[i];j<=rear[i];j++)
1235          printf("%d\t",queue[i][j]);
1236        }
1237      }
1238      return;
1239  }
1240  int main()
1241  {
1242      int ch;
1243      while(1)
1244      {
1245          printf("\n\t1:PQinsert\n");
1246          printf("\n\t2:PQdelete\n");
1247          printf("\n\t3:PQdisplay\n");
1248          printf("\n\t4:Exit\n");
1249          printf("\nenter the choice\n");
1250          scanf("%d",&ch);
1251          switch(ch)
1252          {
1253           case 1:printf("\nenter the priority number\n");
1254                  scanf("%d",&pr);
```

```
1254                    scanf("%d",&pr);
1255                    if(pr>0 && pr<4)
1256                     pqinsert(pr-1);
1257                    else
1258                     printf("\nonly 3 priority exists 1 2 3\n");
1259                    break;
1260            case 2:pqdelete();
1261                    break;
1262            case 3:display();
1263                    break;
1264            case 4:exit(0);
1265           }
1266    }
1267    return 0;
1268 }
1269
1270
1271
1272
1273
```

"C:\Users\Shreshtha Aggarwal\Desktop\1stpro\bin\Debug\1stpro.exe"

```
        1:PQinsert

        2:PQdelete

        3:PQdisplay

        4:Exit

enter the choice
1

enter the priority number
2

enter the item
45

        1:PQinsert

        2:PQdelete

        3:PQdisplay

        4:Exit

enter the choice
1

enter the priority number
1

enter the item
67

        1:PQinsert

        2:PQdelete

        3:PQdisplay

        4:Exit

enter the choice
3

QUEUE 1:67
QUEUE 2:45
queue 3 empty
```


"C:\Users\Shreshtha Aggarwal\Desktop\1stpro\bin\Debug\1stpro.exe"
1:PQinsert
2:PQdelete
3:PQdisplay
4:Exit
enter the choice
2
deleted item is 67 of queue 1
1:PQinsert
2:PQdelete
3:PQdisplay
4:Exit
enter the choice
4
Process returned 0 (0x0) execution time : 56.689 s
Press any key to continue.