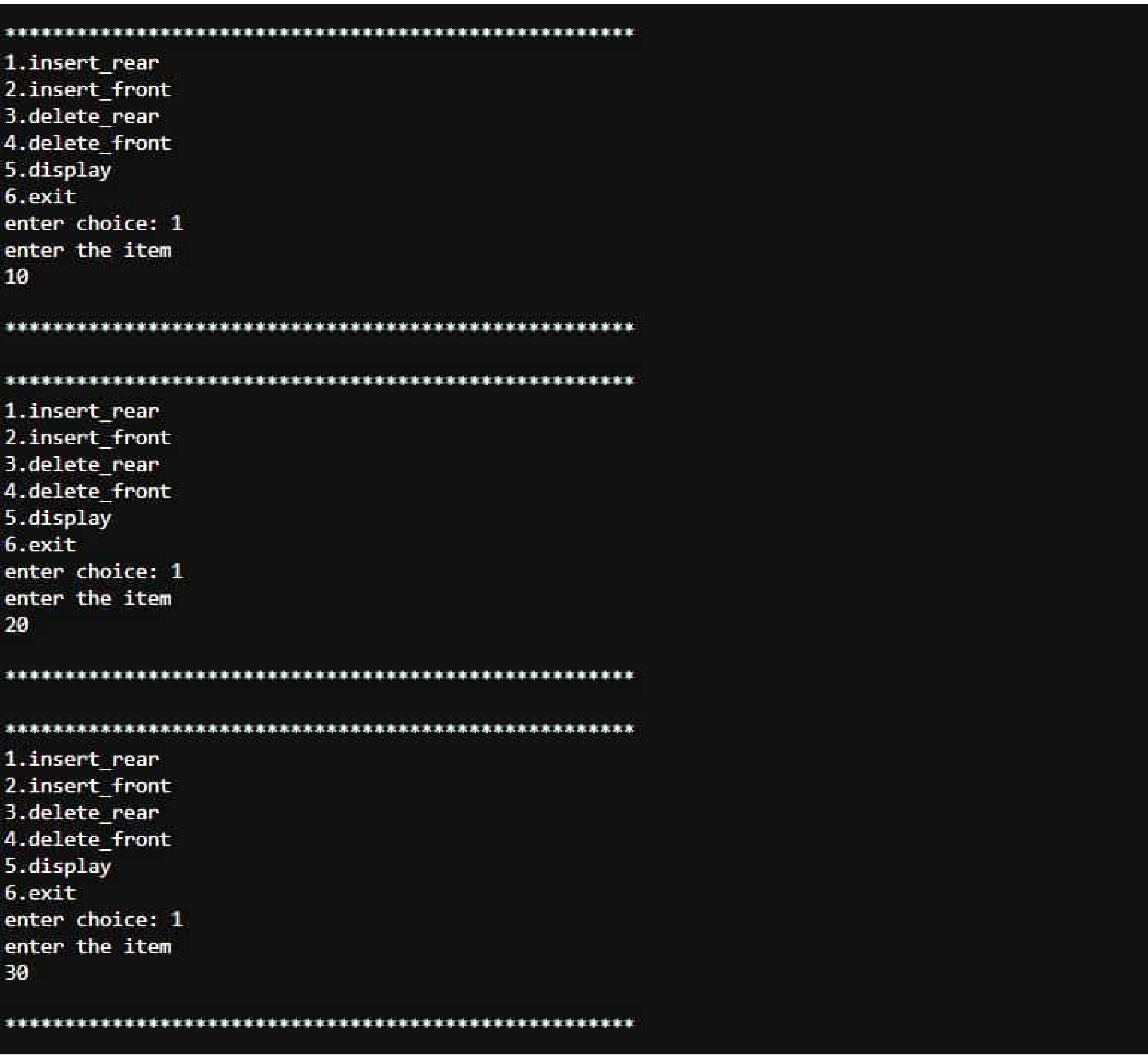
Double ended queue :-

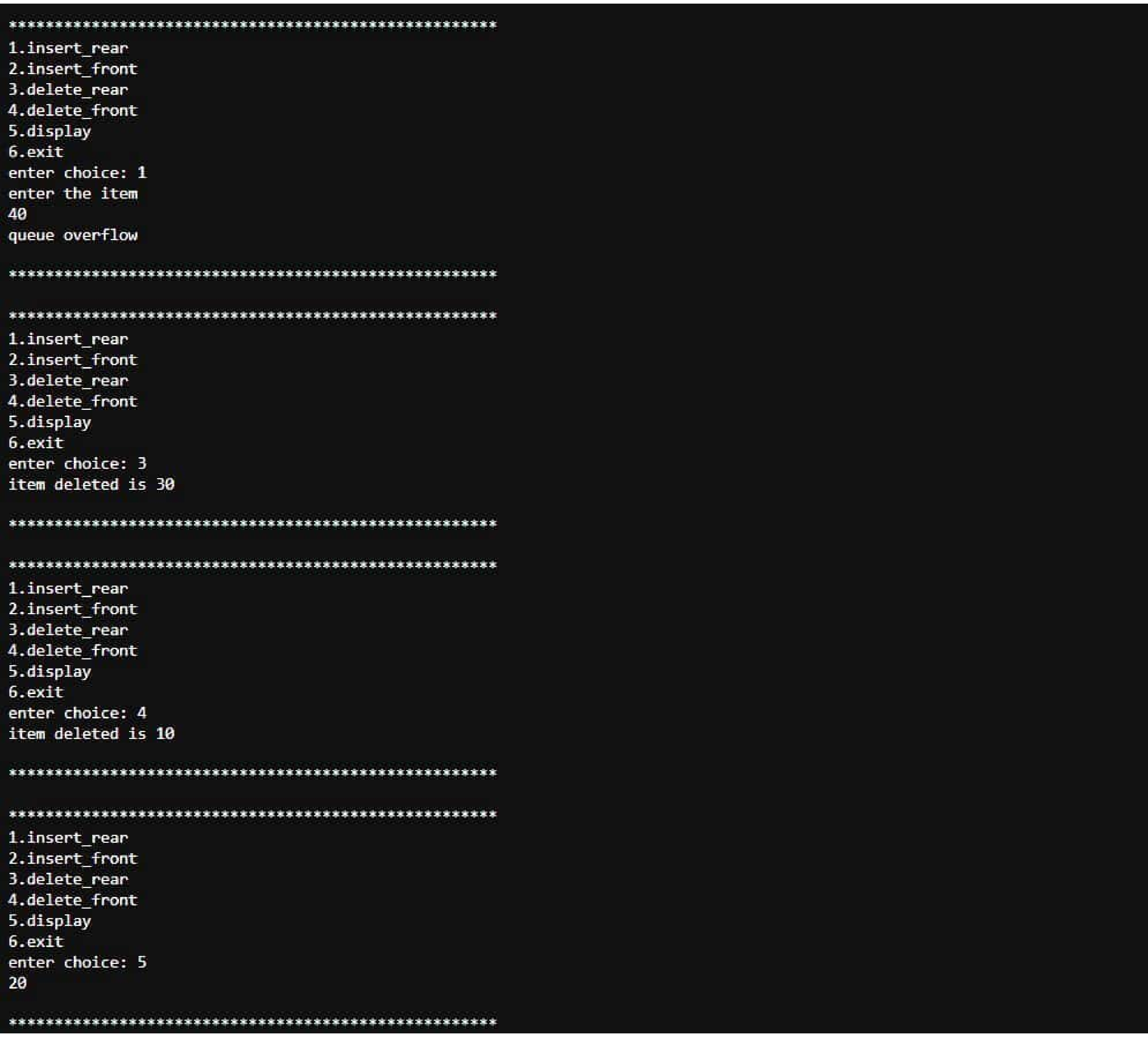
```
#include<stdio.h>.
#define qsize 5
int f=0, r=-1,ch;
int item ,q[10];
int isfull()
{ return (r==qsize-1)? 1:0;
}
int isempty()
{ return (f>r) ?1:0;
}
void insert_qrear ()
{
   if(isfull())
   {
      printf("queue Overflow\n");
      return;
   }
   r=r+1;
   q[r] =item;
}
void delete_ front()
{
   if(isempty())
   {
      printf("queue empty\n");
      return;
   }
   printf ("Item deleted is %d\n", q[(f)++]);
   if(f>r)
   {
      f=0;
      r=-1;
   }
```

```
void insert_front()
{
  if (f!=0)
   {
     f=f-1;
     q[f]=item;
     return;
   }
  else if ((f==0) && (r==-1))
  {
    q [++(r)] = item;
     return;
  }
  else
     printf("Insertion not possible \n");
}
void delet_~~front~~rear()
{
  if(isempty())
  {
    printf("queue is empty \n");
    return;
  }
  printf("item deleted is %d\n", q[(r)--]);
  if(f>r)
  {
     f=0;
     r=-1;
  }
}
void display()
{
  int i;
  if (isempty())
  {
    printf ("queue empty \n");
    return;
  }
```

```
        for(i=f;i<=r;i++)
            printf("%d\n",q[i]);
}
void main()
{
    for(;;)
    {
    printf("\n***** ** ***** ***** \n");
    printf("1. Insert_rear\n2. Insert_front\n3. delete rear \n4. delete front
            \n5. display \n6. exit \n");
    printf("Enter choice: ");
    switch(ch)
    {
      case 1: printf("Enter the ~~choice~~ item \n");
              scanf("%d",&item);
              insert_rear();
              break;
      case 2: printf("Enter the item: ");
              scanf("%d",&item);
              insert_front();
              break;
      case 3: delete_rear();
                break;
      case 4: delete_front();
                break;
      case 5: display();
                break;
      default: exit(0);
      }
      printf("\n** ** * ***** *****\n");
    }
}
```



```
*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 1
enter the item
10

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 1
enter the item
20

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 1
enter the item
30

*****************************************************
```



```
*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 1
enter the item
40
queue overflow

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 3
item deleted is 30

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 4
item deleted is 10

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_rear
4.delete_front
5.display
6.exit
enter choice: 5
20

*****************************************************
```

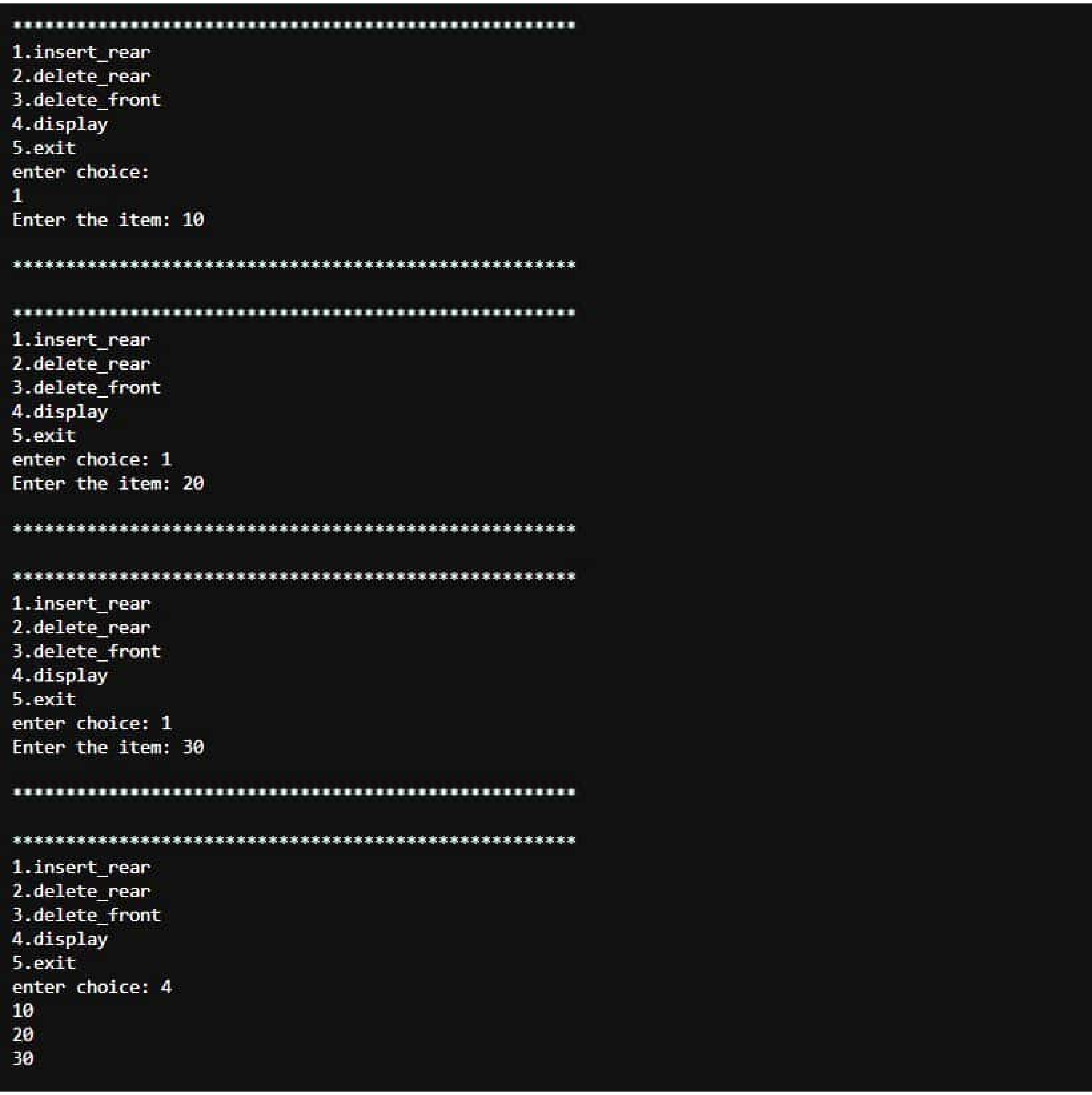
Input restricted DQ:-

```
#include <stdio.h>
# define qsize 5
int f=0, r=-1, ch;
int  item, q[10];
int is full()
 {
  return (r=qsize-1)? 1:0;
 }

int isempty()
 {
  return (f>r)? 1:0;
 }

int insert_rear()
{
 if (isfull())
  {

     printf("queue overflow\n");
     return;

  }

   r=r+1;
   q[r]=item;
}

void  delete_front()
{

 if(isempty())
  { printf("queue empty \n");
   return;
  }

 printf("item deleted is %d\n", q[f++]);
 if (f>r)
 {

   f=0;

   r=-1;

 }
}
```

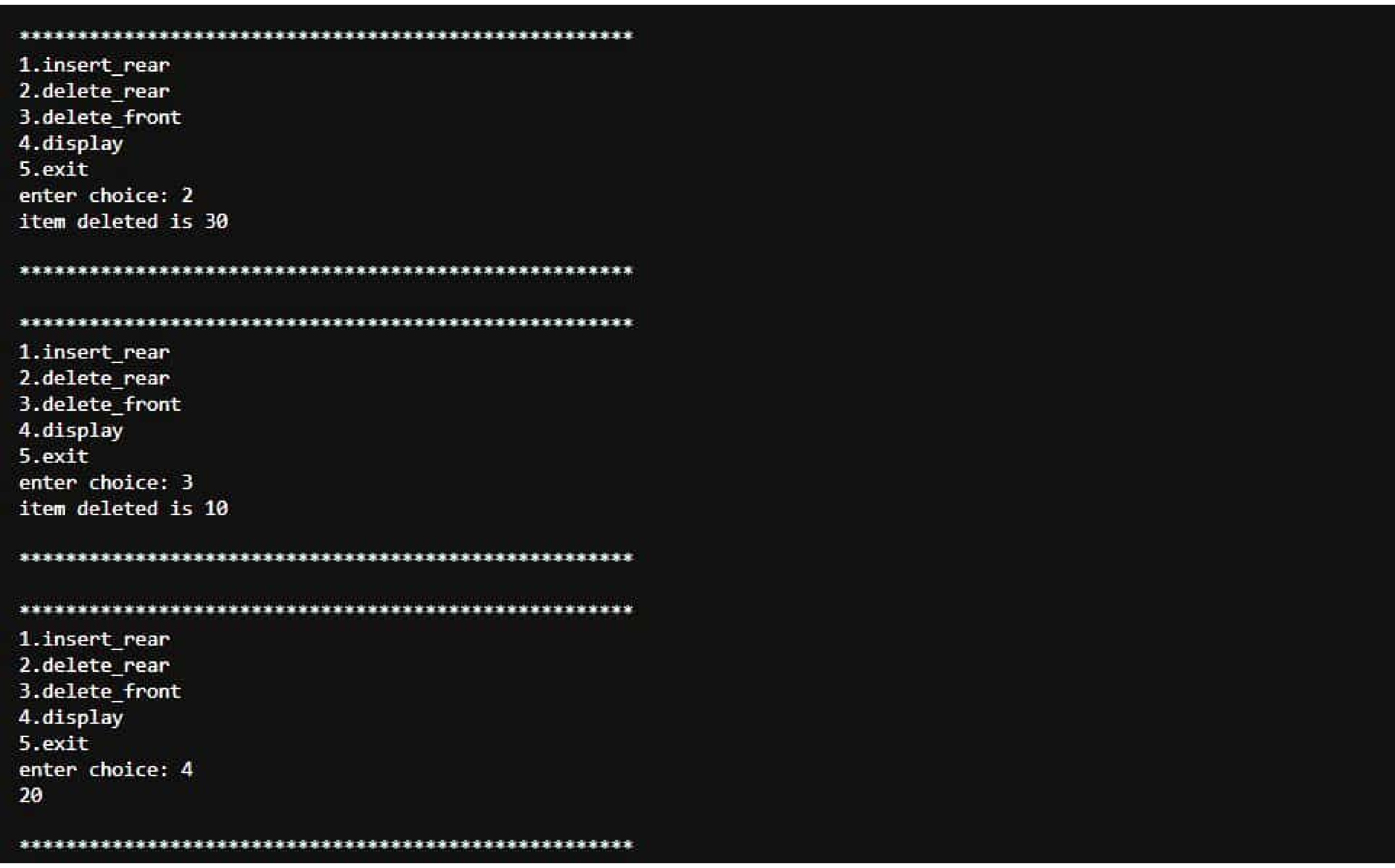
```
void delete~~front~~rear()
{
   if (isempty())
   {
      printf("queue is empty \n");
      return;
   }
  printf("item deleted is %d \n", q[r--]);
  if (f>r)
  {
     f=0;
     r=-1;
  }
}
void display()
{
   int i;
   if( isempty())
   {
     printf("queue empty \n");
     return;
   }
   for (i=f ; i<=r ; i++)
      printf("%d\n", q[i]);
}
void main()
{
  for (;;)
  {
    printf("\n * * * * * * * * * * \n");
    printf("1. insert_rear \n 2: delete_rear \n 3. delete_front \n 4: Display \n
          5. exit \n");
    printf("Enter choice:");
    scanf("%d", &ch);
    Switch (ch)
    {
```

```
case 1: printf("Enter the item: ");
        scanf("%d", &item);
        insert_rear();
       break;
case 2: delete_~~fr~~rear();
        break;
case 3: delete_front();
        break;
case 4: display ();
       break;
default : exit(0);
}
printf("\n x  x  x  x  x   x  x  x  x  \n");
}
}
```

Output restricted :-



```
*****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice:
1
Enter the item: 10

*****************************************************

*****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 1
Enter the item: 20

*****************************************************

*****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 1
Enter the item: 30

*****************************************************

*****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 4
10
20
30
```



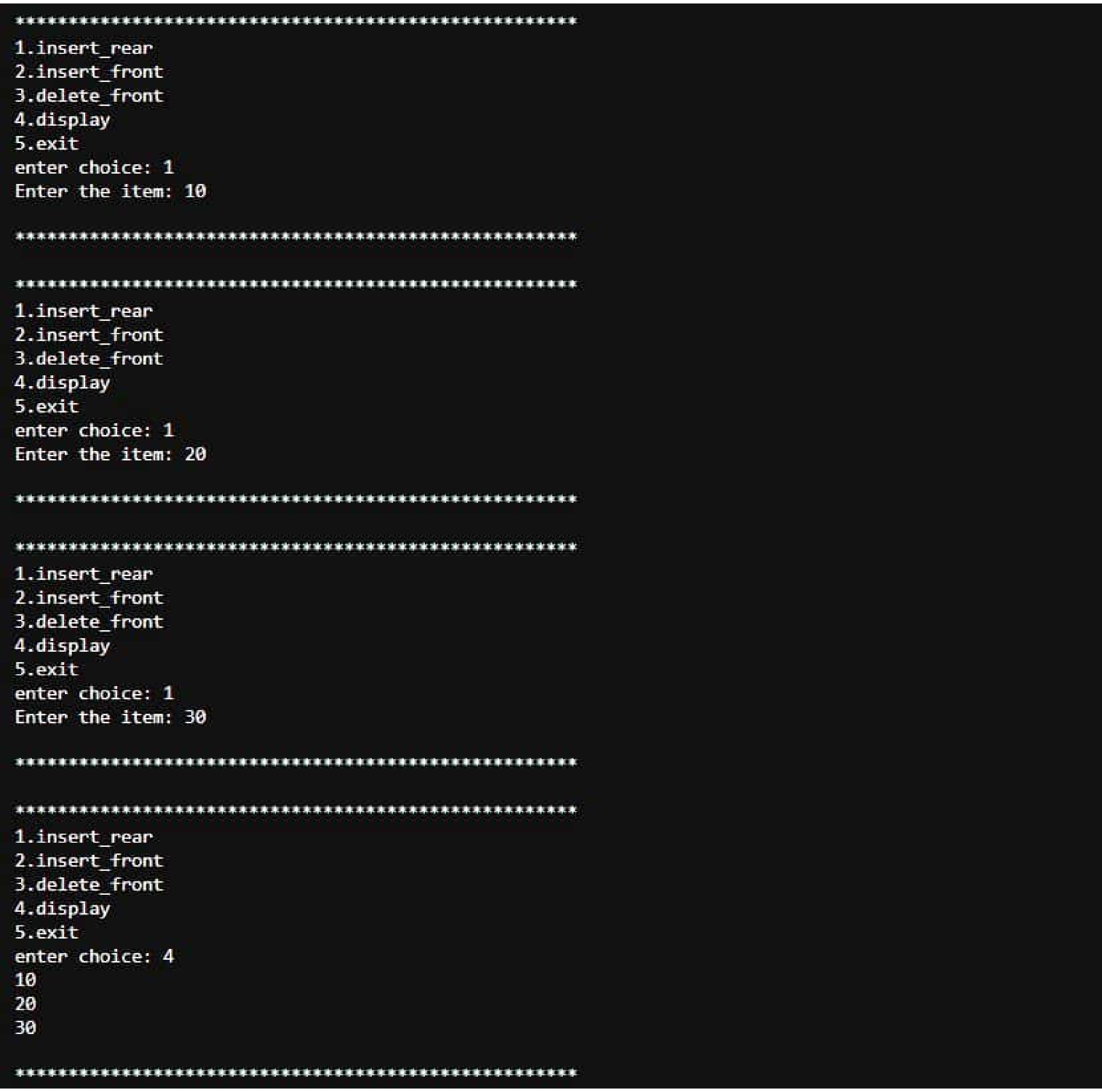
```
****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 2
item deleted is 30

****************************************************

****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 3
item deleted is 10

****************************************************

****************************************************
1.insert_rear
2.delete_rear
3.delete_front
4.display
5.exit
enter choice: 4
20

****************************************************
```

Output restricted:-

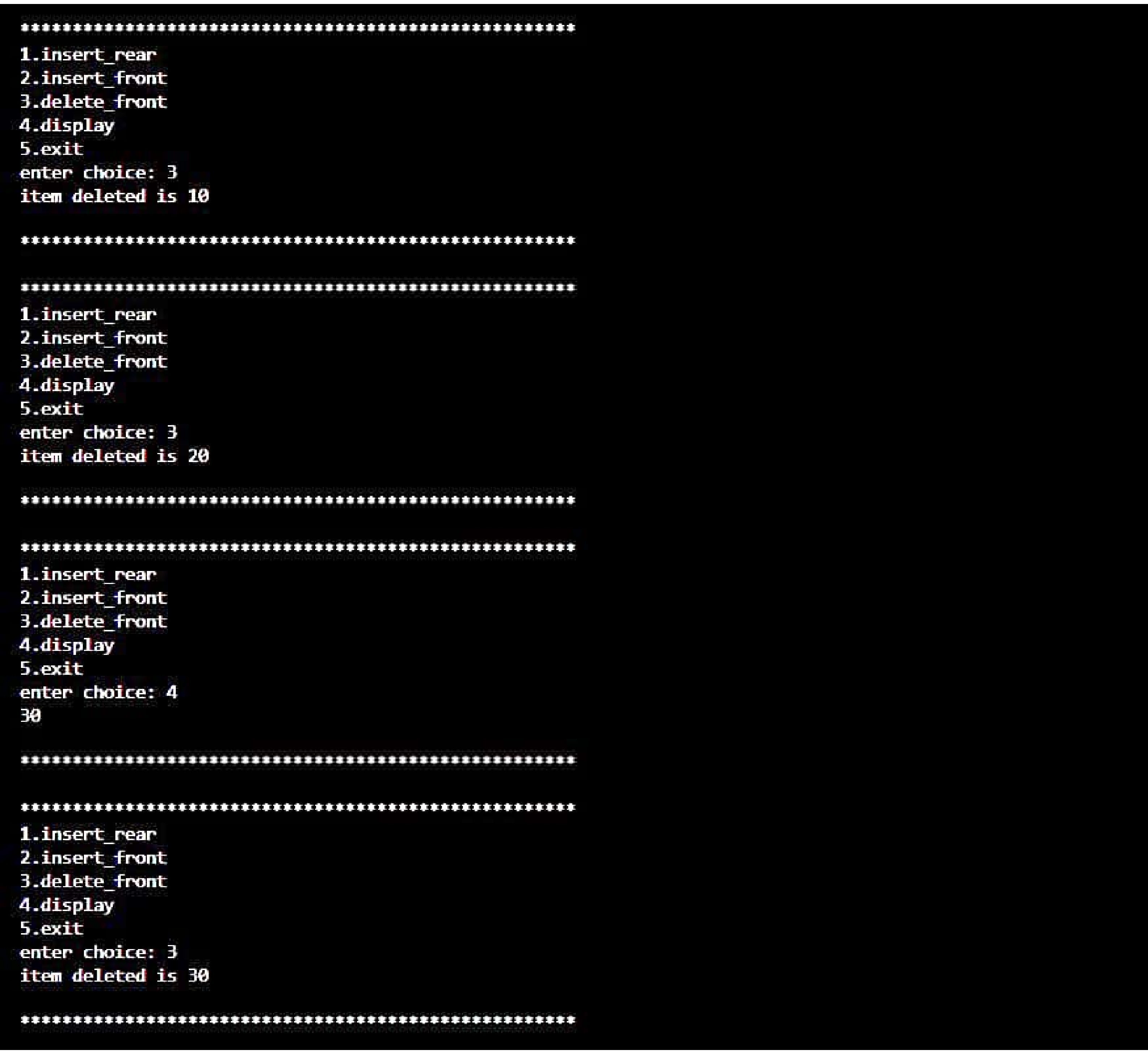
```
#include <stdio.h>
# define qsize 5
int f=0, r=-1, ch;
int item, q[10];
int isfull()
 {
   return (r==qsize-1)? 1:0;
 }

int isempty()
  {
   return(f>r)? 1:0;
  }

void insert_rear()
{

   if (isfull())
    {

      printf("queue overflow \n");
      return;
    }
   r=r+1;
   q[r]=item;
}
```

```
void delete_front ()
{
   if (isempty())
   {
     printf ("queue empty \n");
     return;
   }
   printf ("item deleted is %d\n", q[f++]);
   if (f>r)
   {
      f=0;
      r=-1;
   }
}
void insert_front ()
{
   if (f!=0)
   {
      f=f-1;
      q[f]= item;
      return;
   }
   else if ((f==0)&&(r==-1))
   {
      q[++r] = item;
      return;
   }
   else
      printf ("Insertion not possible\n");
}
void display ()
{
  int i;
  if (isempty())
  {
    printf("queue empty\n");
    return;
  }
  for (i=f; i<=r; i++)
    printf("%d\n", q[i]);
}
```

```
void main()
{
    for(;;)
    {
      printf("\n x x x  x x   x  x   x   x  x x \n");
      printf(" 1. insert_rear \n 2.insert_front \n 3.delete_front \n
             4.display \n 5.exit \n");
      printf ("enter  choice: ");
      scanf("%d", &ch);
      switch ~~(~~ (ch)
      {
       case 1:  printf("Enter the item: ");
                scanf ("%d", &item);
                insert_rear();
                break;
       case 2: printf(" Enter the item:  ");
               scanf("%d", &item);
               insert_ front();
               break;
       Case 3: delete_front();
               break;

       case 4: display();
               break;
      default : exit(0);
      }
      printf("\n  x x   x x   x  x  x  x   x  x  x  \n");
    }
}
```



```
*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 1
Enter the item: 10

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 1
Enter the item: 20

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 1
Enter the item: 30

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 4
10
20
30

*****************************************************
```



```
*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 3
item deleted is 10

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 3
item deleted is 20

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 4
30

*****************************************************

*****************************************************
1.insert_rear
2.insert_front
3.delete_front
4.display
5.exit
enter choice: 3
item deleted is 30

*****************************************************
```