ANVITA KUMAR
C-22
Roll No.: 2104097

```
//Write a menu driven code to implement Linear Queue ADT using arrays

#include <stdio.h>

#include <stdlib.h>

#define MAX 10 // Changing this value will change length of array

int queue[MAX];

int front = -1, rear = -1;

void Enqueue(void);

int Dequeue(void);

int GetFront(void);

int GetRear(void);

void size(void);

void display(void);

int main()

{

  int option, val;

  do {

    printf("\n\n****List of Operations****");

    printf("\n 1. Enqueue");

    printf("\n 2. Dequeue");

    printf("\n 3. Get Front");

    printf("\n 4. Get Rear");

    printf("\n 5. Size");

    printf("\n 6. Display");

    printf("\n 7. EXIT");

    printf("\n Enter your option: ");

    scanf("%d", &option);

    switch (option) {

    case 1:

      Enqueue();

      break;

    case 2:
      val = Dequeue();
      if (val != -1)
          printf("\n The number deleted is: %d", val);
      break;
    case 3:
      val = GetFront();
      if (val != -1)
          printf("\n The first value in queue is: %d", val);
      break;
    case 4:
      val = GetRear();
      if (val != -1)
          printf("\n The last value in queue is: %d", val);
      break;
    case 5:
      size();
      break;
    case 6:
      display();
      break;
    case 7:
      printf("\n\tEXIT POINT");
      break;
    }
  } while (option != 7);
  return 0;
}
int isEmpty() {
  return (front == -1 && rear == -1);
}
int isFull() {
    return rear == MAX - 1;
}
void Enqueue()
{
    int num;
    printf("\n Enter the number to be inserted in the queue: ");
    scanf("%d", &num);
    if (isFull())
        printf("\n OVERFLOW");
    else if (front == -1 && rear == -1)
        front = rear = 0;
    else
        rear++;
    queue[rear] = num;
}
int Dequeue()
{
    int val;
    if (isEmpty())
    {
        printf("\n UNDERFLOW");
        return -1;
    }
    else
    {
        val = queue[front];
        if (front == rear) {
            front = rear = -1;
        }
        else {
            front++;
        }

        return val;

    }

}

int GetFront()

{

    if (isEmpty()) {

        printf("\nQUEUE IS EMPTY");

        return -1;

    }

    else {

        return queue[front];

    }

}

int GetRear(void)

{

    if (isEmpty()) {

        printf("\nQUEUE IS EMPTY");

        return -1;

    }

    else {

        return queue[rear];

    }

}

void size(void)

{

    int count=0;

    int i;

    if(front > -1 && rear > -1)

    {

        printf("The number of elements in queue: ");
        for(i=front; i<=rear; i++) {

            count++;

        }

        printf("%d\n",count);

    }

    else

    {

        printf("\n The Queue is empty");

    }

}

void display()

{

    int i;

    printf("\n");

    if (isEmpty())

        printf("\nQUEUE IS EMPTY");

    else

    {

        printf("\nThe Linear Queue is: ");

        for (i=front; i<=rear; i++)

            printf("\t%d", queue[i]);

    }

}
```

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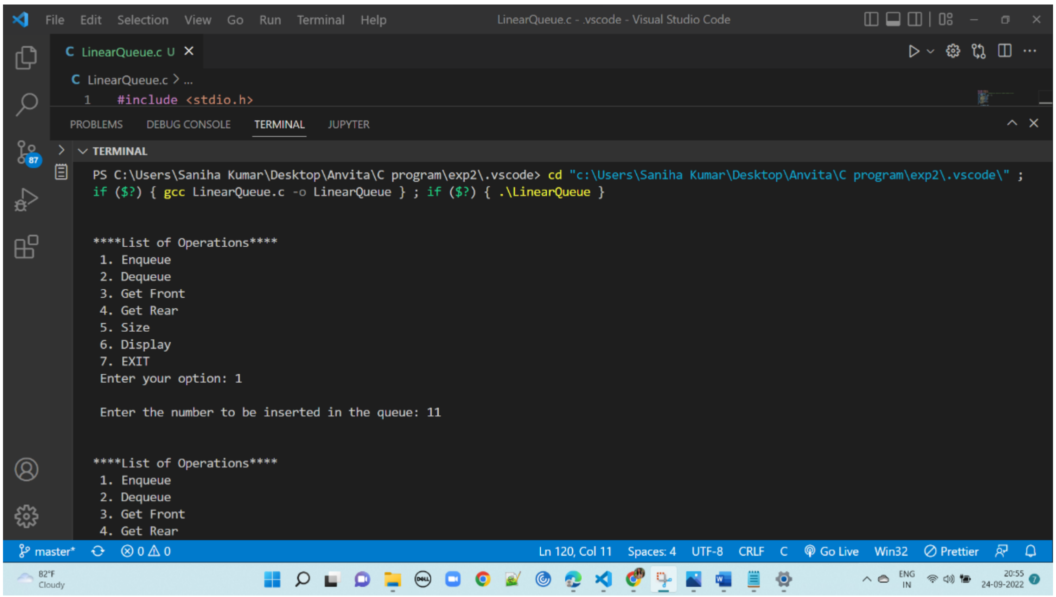


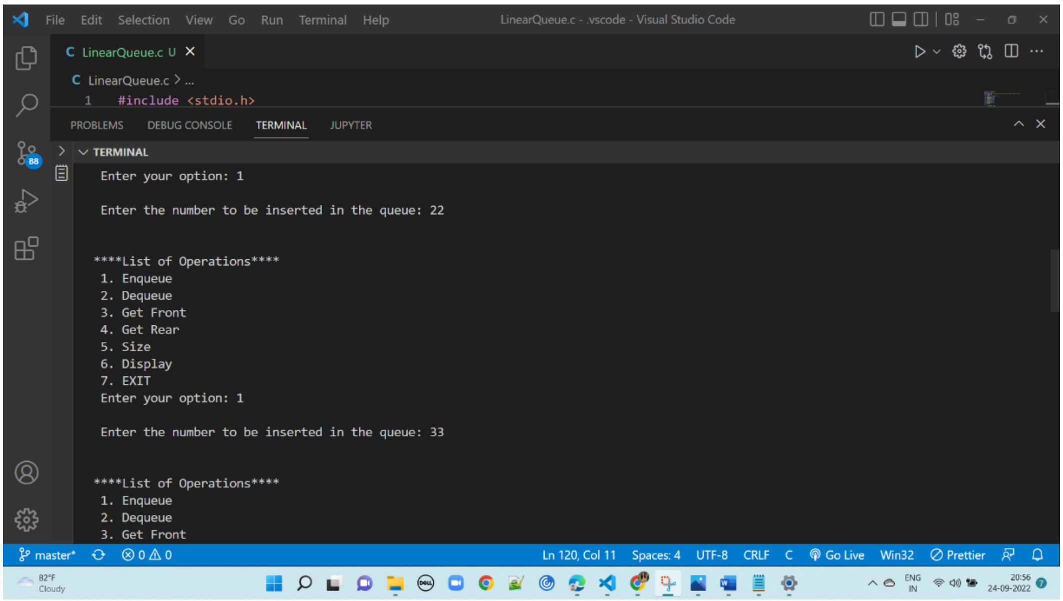
```
#include <stdio.h>
```

```
PS C:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode> cd "c:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode\" ;
if ($?) { gcc LinearQueue.c -o LinearQueue } ; if ($?) { .\LinearQueue }


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 1

 Enter the number to be inserted in the queue: 11


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
```



```
#include <stdio.h>
```

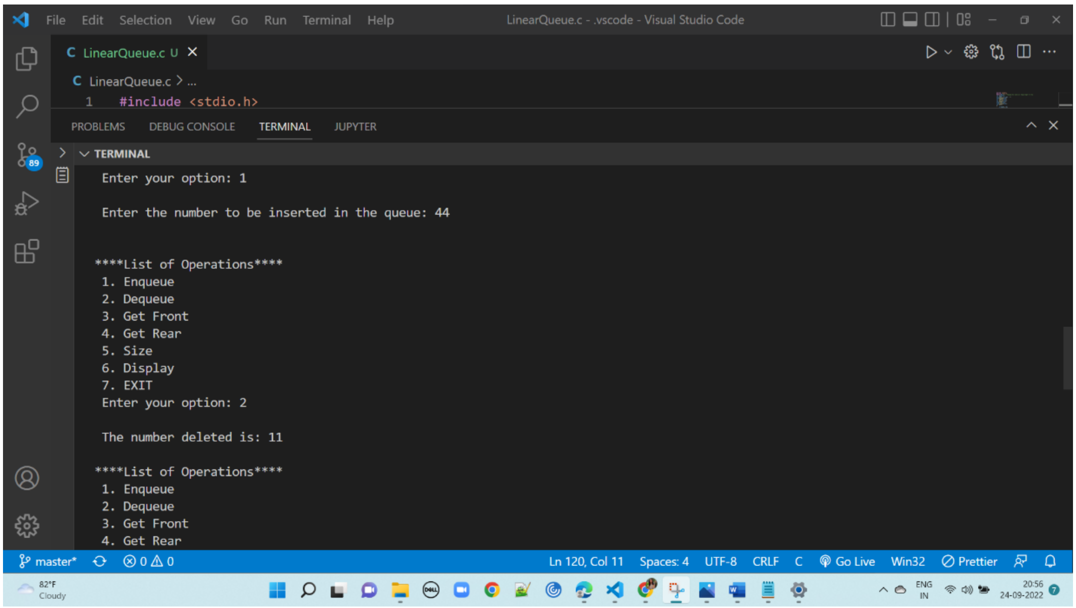
```
 Enter your option: 1

 Enter the number to be inserted in the queue: 22


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 1

 Enter the number to be inserted in the queue: 33


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
```



```
#include <stdio.h>
```

```
 Enter your option: 1

 Enter the number to be inserted in the queue: 44


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 2

 The number deleted is: 11

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
```

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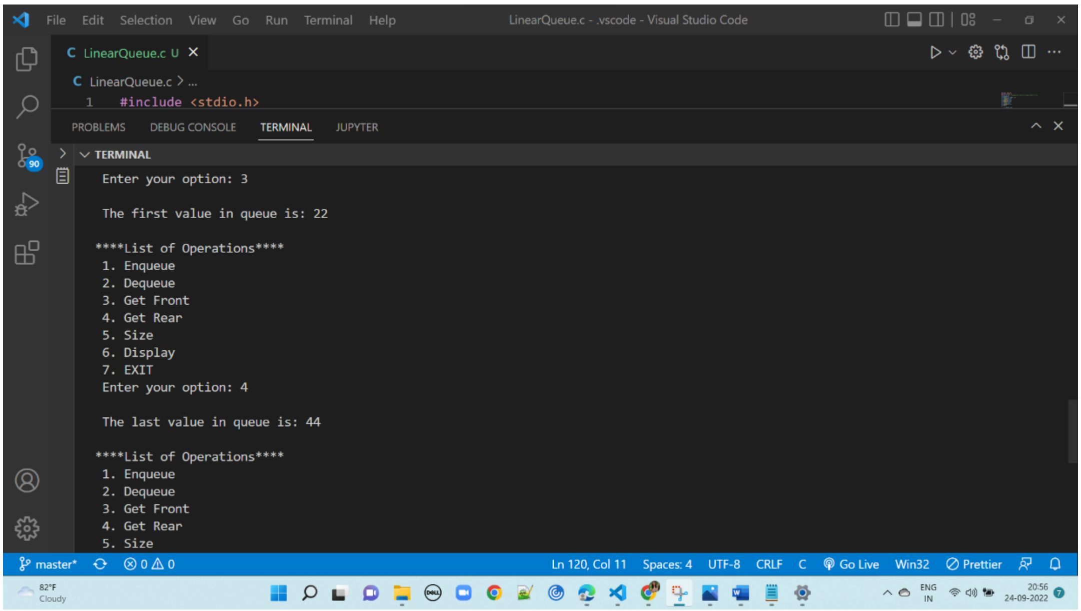

File Edit Selection View Go Run Terminal Help
LinearQueue.c - .vscode - Visual Studio Code
LinearQueue.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
master* ⊗ 0 ⚠ 0 Ln 120, Col 11 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
82°F Cloudy
20:56 24-09-2022

```
#include <stdio.h>
```

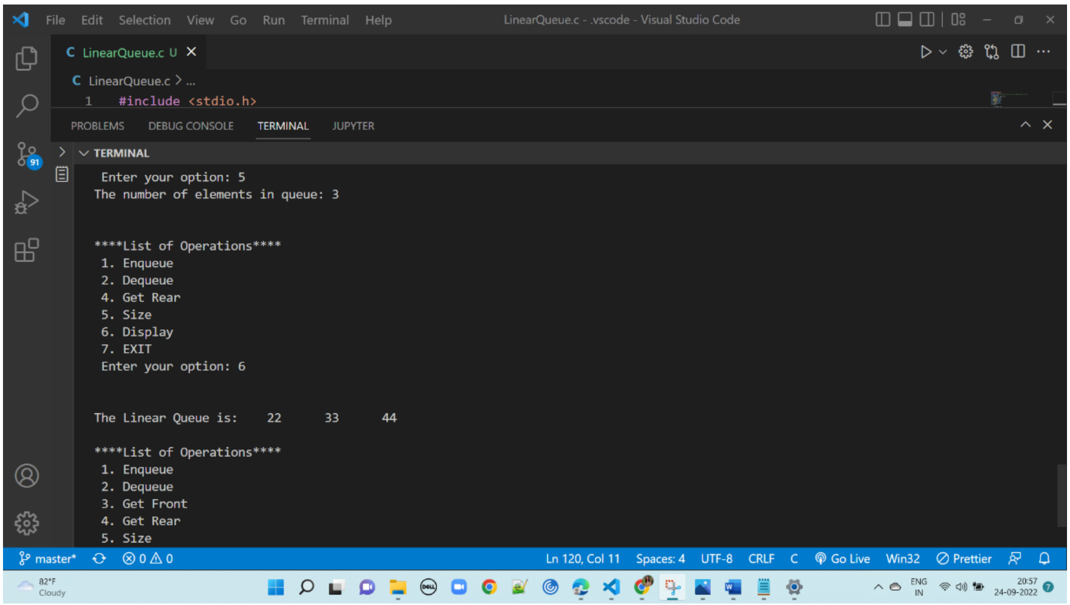
```
 Enter your option: 3

 The first value in queue is: 22

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 4

 The last value in queue is: 44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
```


File Edit Selection View Go Run Terminal Help
LinearQueue.c - .vscode - Visual Studio Code
LinearQueue.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
master* ⊗ 0 ⚠ 0 Ln 120, Col 11 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
82°F Cloudy
20:57 24-09-2022

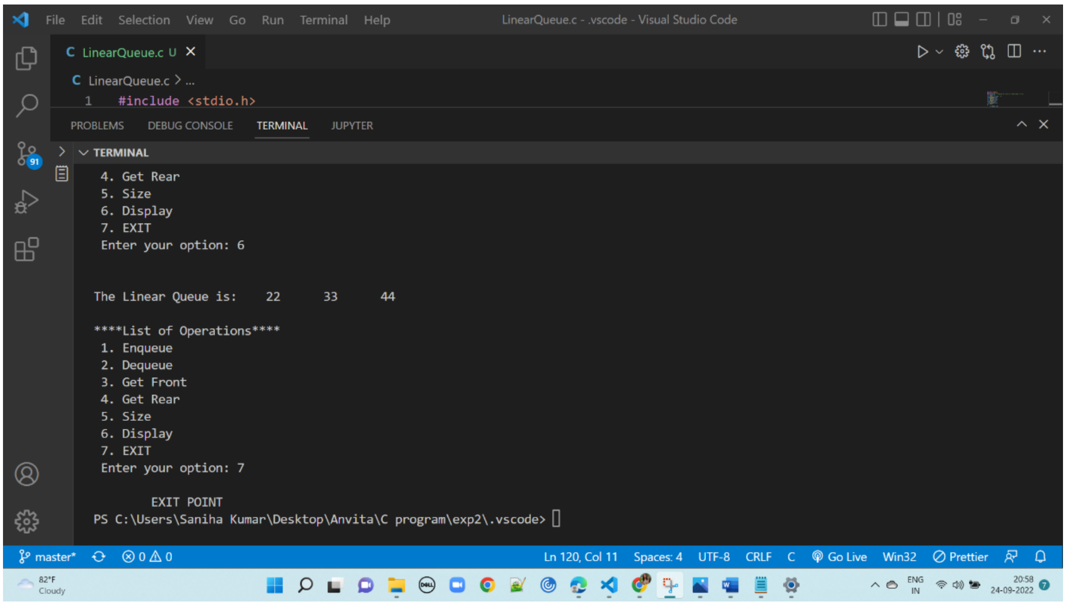
```
#include <stdio.h>
```

```
 Enter your option: 5
The number of elements in queue: 3


****List of Operations****
 1. Enqueue
 2. Dequeue
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 6


The Linear Queue is:    22      33      44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
```


File Edit Selection View Go Run Terminal Help
LinearQueue.c - .vscode - Visual Studio Code
LinearQueue.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
master* ⊗ 0 ⚠ 0 Ln 120, Col 11 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
82°F Cloudy
20:58 24-09-2022

```
#include <stdio.h>
```

```
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 6


The Linear Queue is:    22      33      44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 7

        EXIT POINT
PS C:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode> 
```

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```
//Write a menu driven code to implement Circular Queue ADT using arrays
#include <stdio.h>
#include <stdlib.h>
#define MAX 10
int queue[MAX];
int front = -1, rear = -1;
void Enqueue(void);
int Dequeue(void);
int GetFront(void);
int GetRear(void);
void size(void);
void display(void);
int main()
{
    int option, val;
    do {
        printf("\n\n****List of Operations****");
        printf("\n 1. Enqueue");
        printf("\n 2. Dequeue");
        printf("\n 3. Get Front");
        printf("\n 4. Get Rear");
        printf("\n 5. Size");
        printf("\n 6. Display");
        printf("\n 7. EXIT");
        printf("\n Enter your option: ");
        scanf("%d", &option);
        switch (option) {
        case 1:
            Enqueue();
            break;
        case 2:
            val = Dequeue();
            if (val != -1)
                printf("\n The number deleted is: %d", val);
            break;
        case 3:
            val = GetFront();
            if (val != -1)
                printf("\n The first value in queue is: %d", val);
            break;
        case 4:
            val = GetRear();
            if (val != -1)
                printf("\n The last value in queue is: %d", val);
            break;
        case 5:
            size();
            break;
        case 6:
            display();
            break;
        case 7:
            printf("\n\tEXIT POINT");
            break;
        }
    } while (option != 7);
    return 0;
}
int isEmpty() {
    return (front == -1 && rear == -1);
}
int isFull() {
    return (front == 0 && rear == MAX-1);

}

void Enqueue()

{

    int num;

    printf("\n Enter the number to be inserted in the queue : ");

    scanf("%d", &num);

    if (isFull())

        printf("\n OVERFLOW");

    else if (isEmpty()) {

        front = rear = 0;

        queue[rear] = num;

    }

    else if (front != 0 && rear == MAX-1) {

        rear = 0;

        queue[rear] = num;

    }

    else {

        rear++;

        queue[rear] = num;

    }

}

int Dequeue()

{

    int val;

    if (isEmpty()) {

        printf("\n UNDERFLOW");

        return -1;

    }

    else {

        val = queue[front];
```

```
      if (front == rear)
         front = rear =-1;
      else if(front == MAX-1)
         front=0;
      else
         front++;
   }
   return val;
}
int GetFront()
{
   if (isEmpty()) {
      printf("\n QUEUE IS EMPTY");
      return -1;
   }
   else {
      return queue[front];
   }
}
int GetRear(void)
{
   if (isEmpty()) {
      printf("\nQUEUE IS EMPTY");
      return -1;
   }
   else {
      return queue[rear];
   }
}
void size(void) {
   int count=0;
```

```
    int i;
    if(front > -1 && rear > -1) {
        printf("The number of elements in queue: ");
        for(i=front; i<=rear; i++) {
            count++;
        }
        printf("%d\n",count);
    }
    else {
        printf("\n The Queue is empty");
    }
}
void display() {
    int i;
    printf("\n");
    if (isEmpty())
        printf("\n QUEUE IS EMPTY");
    else {
        printf("\nThe Circular Queue is: ");
        if (front < rear) {
            for (i = front; i <= rear; i++)
                printf("\t %d", queue[i]);
        }
        else {
            for (i = front; i < MAX-1; i++)
                printf("\t %d", queue[i]);
            for (i = 0; i <= rear; i++)
                printf("\t %d", queue[i]);
        }
    }
}
```

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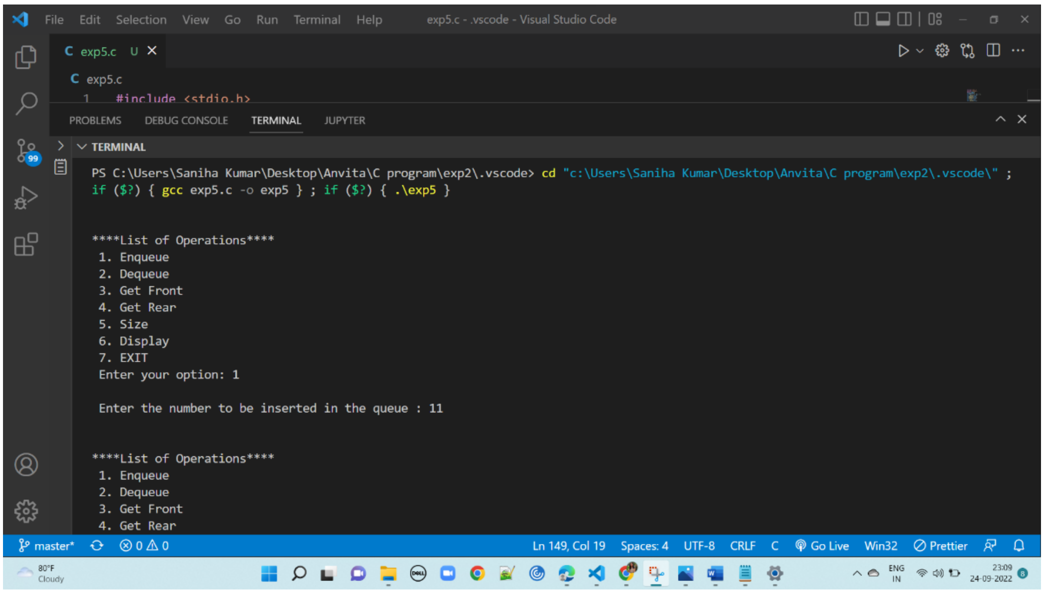
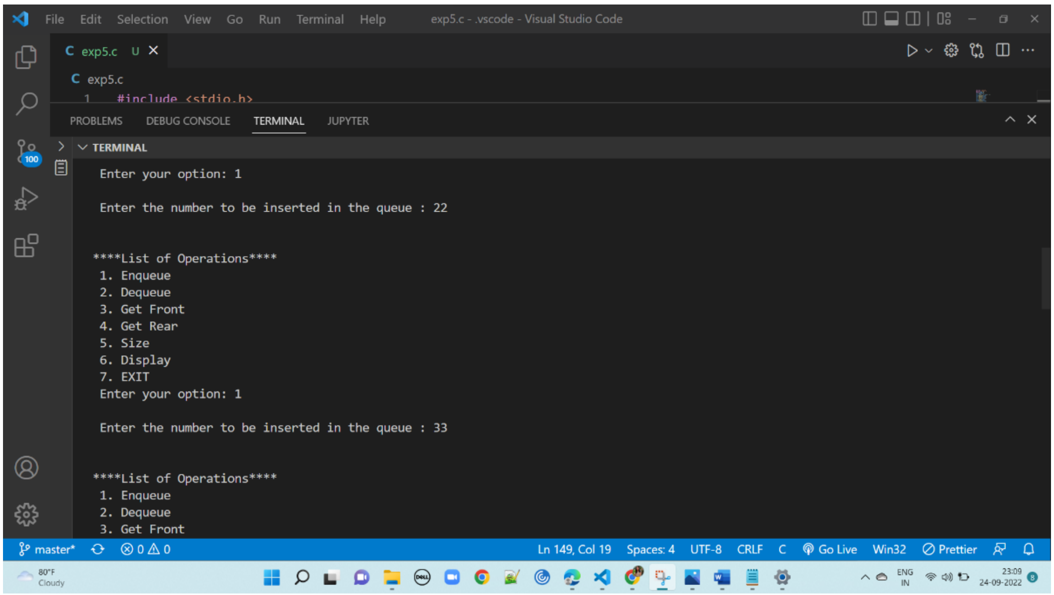


```
PS C:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode> cd "c:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode\" ;
if ($?) { gcc exp5.c -o exp5 } ; if ($?) { .\exp5 }


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 1

 Enter the number to be inserted in the queue : 11


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
```



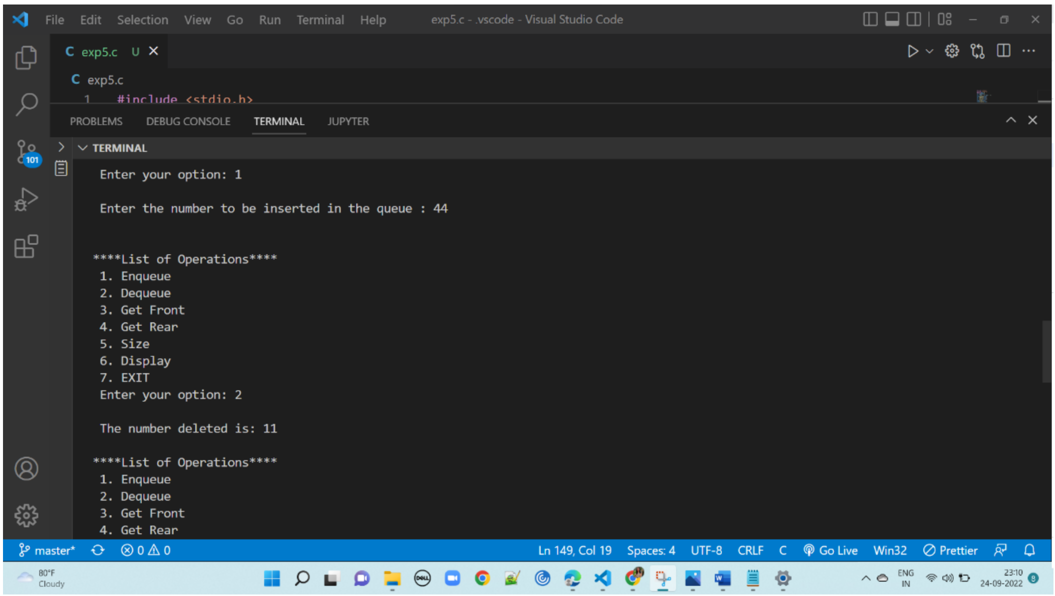
```
 Enter your option: 1

 Enter the number to be inserted in the queue : 22


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 1

 Enter the number to be inserted in the queue : 33


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
```



```
 Enter your option: 1

 Enter the number to be inserted in the queue : 44


****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 2

 The number deleted is: 11

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
```

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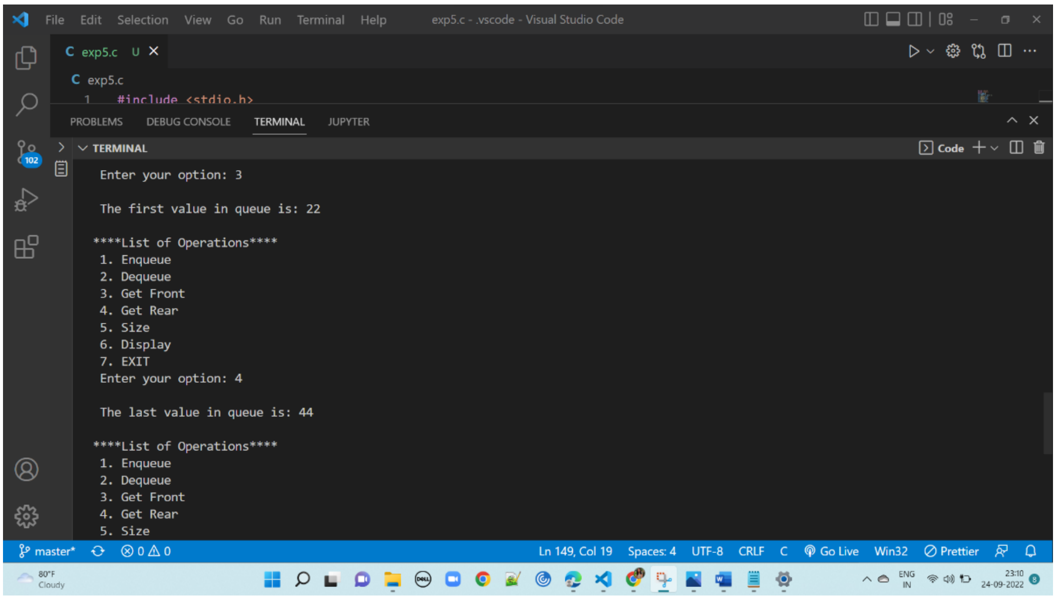

File Edit Selection View Go Run Terminal Help
exp5.c - .vscode - Visual Studio Code
exp5.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
TERMINAL
Code
master* ⊗ 0 ⚠ 0
Ln 149, Col 19 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
80°F Cloudy
23:10 24-09-2022

```
#include <stdio.h>
```

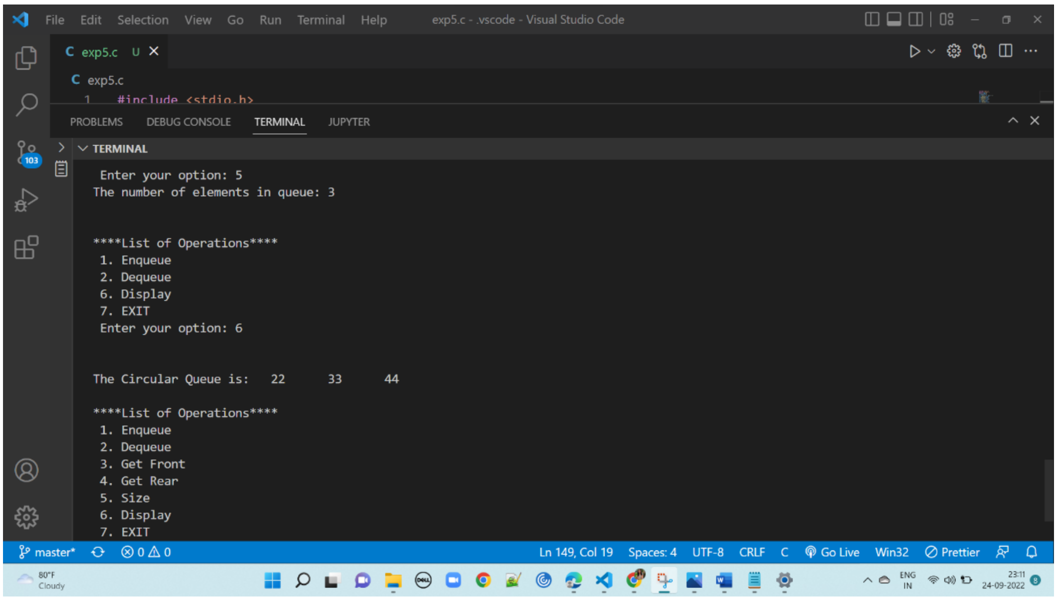
```
 Enter your option: 3

 The first value in queue is: 22

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 4

 The last value in queue is: 44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
```


File Edit Selection View Go Run Terminal Help
exp5.c - .vscode - Visual Studio Code
exp5.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
TERMINAL
master* ⊗ 0 ⚠ 0
Ln 149, Col 19 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
80°F Cloudy
23:11 24-09-2022

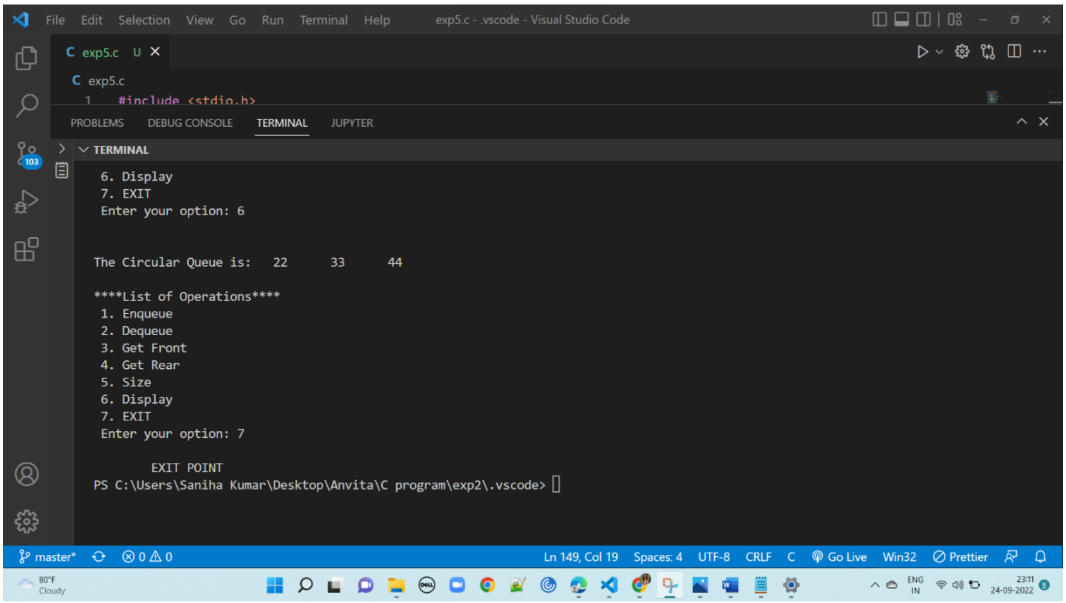
```
#include <stdio.h>
```

```
 Enter your option: 5
The number of elements in queue: 3


****List of Operations****
 1. Enqueue
 2. Dequeue
 6. Display
 7. EXIT
 Enter your option: 6


The Circular Queue is:   22      33      44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
```


File Edit Selection View Go Run Terminal Help
exp5.c - .vscode - Visual Studio Code
exp5.c U
PROBLEMS DEBUG CONSOLE TERMINAL JUPYTER
TERMINAL
master* ⊗ 0 ⚠ 0
Ln 149, Col 19 Spaces: 4 UTF-8 CRLF C Go Live Win32 Prettier
80°F Cloudy
23:11 24-09-2022

```
#include <stdio.h>
```

```
 6. Display
 7. EXIT
 Enter your option: 6


The Circular Queue is:   22      33      44

****List of Operations****
 1. Enqueue
 2. Dequeue
 3. Get Front
 4. Get Rear
 5. Size
 6. Display
 7. EXIT
 Enter your option: 7

        EXIT POINT
PS C:\Users\Saniha Kumar\Desktop\Anvita\C program\exp2\.vscode> 
```