CSE 2003

DATA STRUCTURES AND ALGORITHMS

Lab Assessment – 3

L19+L20 | SJT317

FALL SEMESTER 2020-21

by

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Question 1

Problem:

WAP to implement linear queue using array and linked list.

Code, SS & CMD:

Using Linked list:

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

// A linked list (LL) node to store a queue entry
struct QNode {
    int key;
    struct QNode* next;
};

// The queue, front stores the front node of LL and rear stores the
// last node of LL
struct Queue {
    struct QNode *front, *rear;
};

// A utility function to create a new linked list node.
struct QNode* newNode(int k)
{
    struct QNode* temp = (struct QNode*)malloc(sizeof(struct QNode));
    temp->key = k;
    temp->next = NULL;
    return temp;
}

// A utility function to create an empty queue
struct Queue* createQueue()
{
    struct Queue* q = (struct Queue*)malloc(sizeof(struct Queue));
    q->front = q->rear = NULL;
    return q;
}

// The function to add a key k to q
void enQueue(struct Queue* q, int k)
{
    // Create a new LL node
    struct QNode* temp = newNode(k);

    // If queue is empty, then new node is front and rear both
    if (q->rear == NULL) {
        q->front = q->rear = temp;
        return;
    }

    // Add the new node at the end of queue and change rear
    q->rear->next = temp;
    q->rear = temp;
}
```

```
// Function to remove a key from given queue q
void deQueue(struct Queue* q)
{
    // If queue is empty, return NULL.
    if (q->front == NULL)
        return;

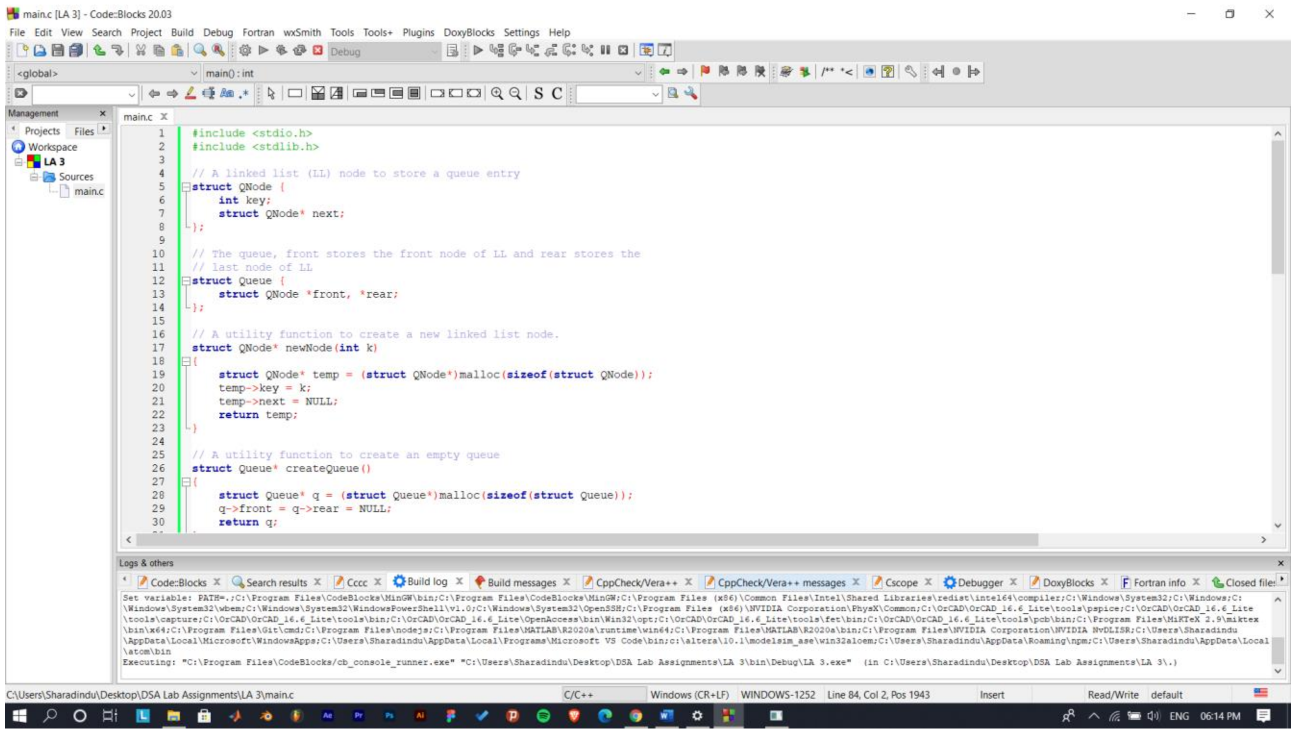
    // Store previous front and move front one node ahead
    struct QNode* temp = q->front;

    q->front = q->front->next;

    // If front becomes NULL, then change rear also as NULL
    if (q->front == NULL)
        q->rear = NULL;

    free(temp);
}

// Driver Program to test anove functions
int main()
{
    struct Queue* q = createQueue();
    enQueue(q, 10);
    enQueue(q, 20);
    deQueue(q);
    deQueue(q);
    enQueue(q, 30);
    enQueue(q, 40);
    enQueue(q, 50);
    deQueue(q);
    printf("Queue Front : %d \n", q->front->key);
    printf("Queue Rear : %d", q->rear->key);
    return 0;
}
```


main.c [LA 3] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Debug
<global>
main() : int
Management
Projects Files
Workspace
LA 3
Sources
main.c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscope Debugger DoxyBlocks Fortran info Closed files

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// The queue, front stores the front node of LL and rear stores the
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struct Queue {
    struct QNode *front, *rear;
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{
    struct QNode* temp = (struct QNode*)malloc(sizeof(struct QNode));
    temp->key = k;
    temp->next = NULL;
    return temp;
}

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struct Queue* createQueue()
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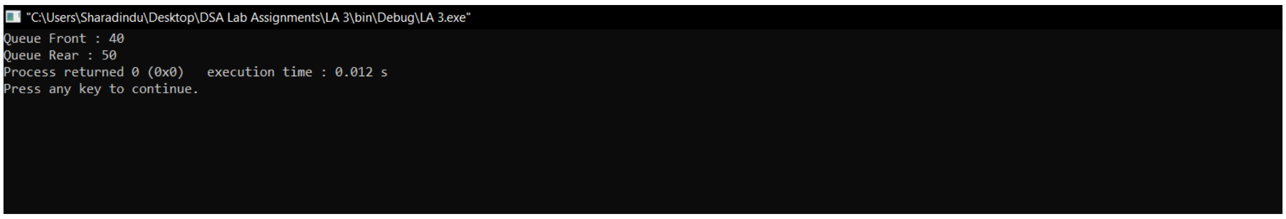
    struct Queue* q = (struct Queue*)malloc(sizeof(struct Queue));
    q->front = q->rear = NULL;
    return q;
```

```
Set variable: PATH=.;C:\Program Files\CodeBlocks\MinGW\bin;C:\Program Files\CodeBlocks\MinGW;C:\Program Files (x86)\Common Files\Intel\Shared Libraries\redist\intel64\compiler;C:\Windows\System32;C:\Windows;C:
\Windows\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite
\tools\capture;C:\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex
\bin\x64;C:\Program Files\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu
\AppData\Local\Microsoft\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local
\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\.)
```



```
"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"
Queue Front : 40
Queue Rear : 50
Process returned 0 (0x0)   execution time : 0.012 s
Press any key to continue.
```

Using Array:

```
#include <stdio.h>

#define MAX 50

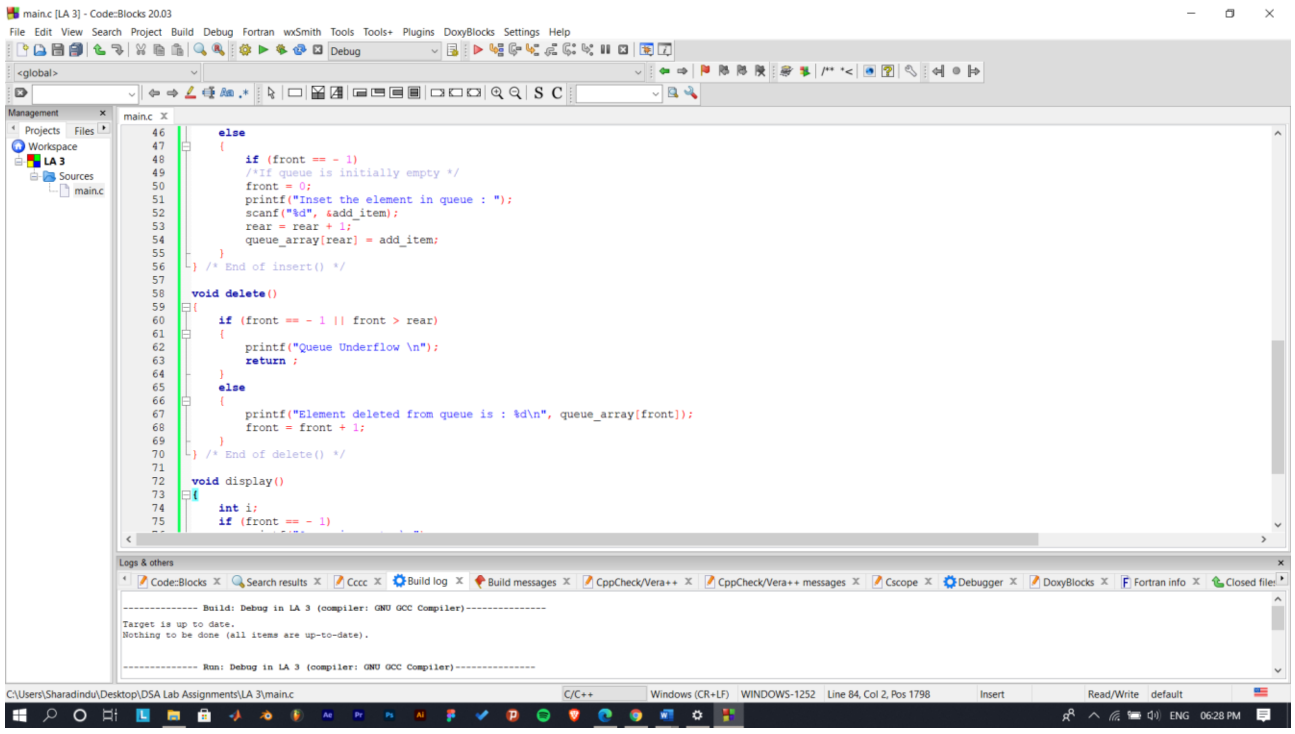
void insert();
void delete();
void display();
int queue_array[MAX];
int rear = - 1;
int front = - 1;
main()
{
    int choice;
    while (1)
    {
        printf("1.Insert element to queue \n");
        printf("2.Delete element from queue \n");
        printf("3.Display all elements of queue \n");
        printf("4.Quit \n");
        printf("Enter your choice : ");
        scanf("%d", &choice);
        switch (choice)
        {
            case 1:
            insert();
            break;
            case 2:
            delete();
            break;
            case 3:
            display();
            break;
            case 4:
            exit(1);
            default:
            printf("Wrong choice \n");
        } /* End of switch */
    } /* End of while */
} /* End of main() */

void insert()
{
    int add_item;
    if (rear == MAX - 1)
    printf("Queue Overflow \n");
    else
    {
        if (front == - 1)
        /*If queue is initially empty */
        front = 0;
        printf("Inset the element in queue : ");
```

```
            scanf("%d", &add_item);
            rear = rear + 1;
            queue_array[rear] = add_item;
        }
} /* End of insert() */

void delete()
{
    if (front == - 1 || front > rear)
    {
        printf("Queue Underflow \n");
        return ;
    }
    else
    {
        printf("Element deleted from queue is : %d\n", queue_array[front]);
        front = front + 1;
    }
} /* End of delete() */

void display()
{
    int i;
    if (front == - 1)
        printf("Queue is empty \n");
    else
    {
        printf("Queue is : \n");
        for (i = front; i <= rear; i++)
            printf("%d ", queue_array[i]);
        printf("\n");
    }
}
```


main.c [LA 3] - Code::Blocks 20.03

```
    else
    {
        if (front == - 1)
        /*If queue is initially empty */
        front = 0;
        printf("Inset the element in queue : ");
        scanf("%d", &add_item);
        rear = rear + 1;
        queue_array[rear] = add_item;
    }
} /* End of insert() */

void delete()
{
    if (front == - 1 || front > rear)
    {
        printf("Queue Underflow \n");
        return ;
    }
    else
    {
        printf("Element deleted from queue is : %d\n", queue_array[front]);
        front = front + 1;
    }
} /* End of delete() */

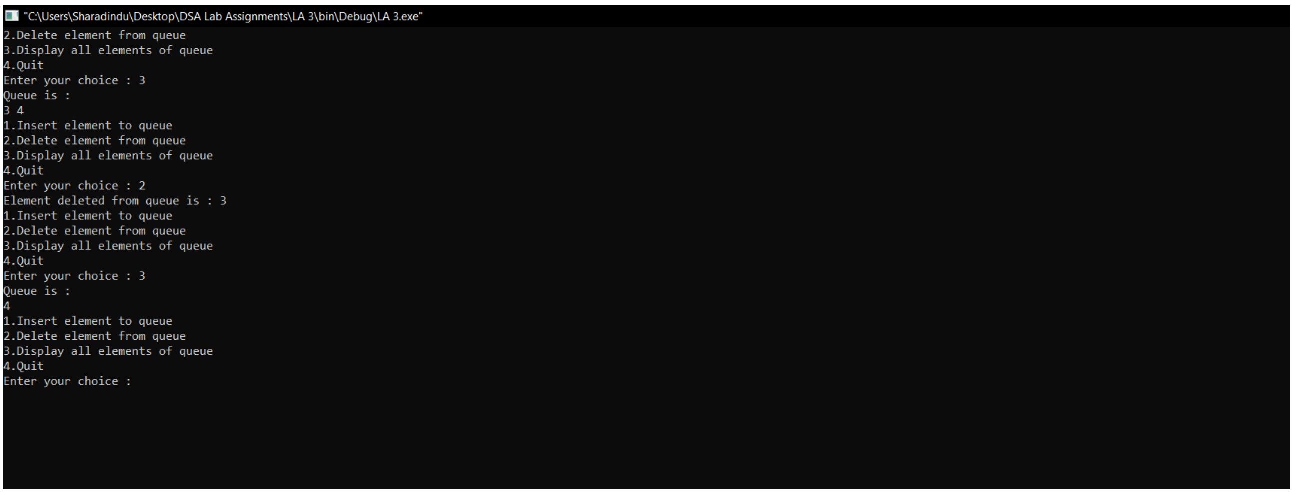
void display()
{
    int i;
    if (front == - 1)
```

```
-------------- Build: Debug in LA 3 (compiler: GNU GCC Compiler)---------------

Target is up to date.
Nothing to be done (all items are up-to-date).


-------------- Run: Debug in LA 3 (compiler: GNU GCC Compiler)---------------
```

C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c | C/C++ | Windows (CR+LF) | WINDOWS-1252 | Line 84, Col 2, Pos 1798 | Insert | Read/Write | default


```
"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"
2.Delete element from queue
3.Display all elements of queue
4.Quit
Enter your choice : 3
Queue is :
3 4
1.Insert element to queue
2.Delete element from queue
3.Display all elements of queue
4.Quit
Enter your choice : 2
Element deleted from queue is : 3
1.Insert element to queue
2.Delete element from queue
3.Display all elements of queue
4.Quit
Enter your choice : 3
Queue is :
4
1.Insert element to queue
2.Delete element from queue
3.Display all elements of queue
4.Quit
Enter your choice :
```

Question 2

Problem:

WAP to implement circular queue using array and linked list.

Code, SS & CMD:

Using Array:

```
# include<stdio.h>
# define MAX 5

int cqueue_arr[MAX];
int front = -1;
int rear = -1;


void insert(int item)
{
      if((front == 0 && rear == MAX-1) || (front == rear+1))
      {
            printf("Queue Overflow \n");
            return;
      }
      if (front == -1)  /*If queue is empty */
      {
            front = 0;
            rear = 0;
      }
      else
      {
            if(rear == MAX-1) /*rear is at last position of queue */
                  rear = 0;
            else
                  rear = rear+1;
      }
      cqueue_arr[rear] = item ;
}

void del()
{
      if (front == -1)
      {
            printf("Queue Underflow\n");
            return ;
      }
      printf("Element deleted from queue is : %d\n",cqueue_arr[front]);
      if(front == rear) /* queue has only one element */
      {
            front = -1;
            rear=-1;
      }
      else
      {
            if(front == MAX-1)
```

```
                    front = 0;
                else
                    front = front+1;
        }
}
/*End of del() */


void display()
{
        int front_pos = front,rear_pos = rear;
        if(front == -1)
        {
                printf("Queue is empty\n");
                return;
        }
        printf("Queue elements :\n");
        if( front_pos <= rear_pos )
                while(front_pos <= rear_pos)
                {
                        printf("%d ",cqueue_arr[front_pos]);
                        front_pos++;
                }
        else
        {
                while(front_pos <= MAX-1)
                {
                        printf("%d ",cqueue_arr[front_pos]);
                        front_pos++;
                }
                front_pos = 0;
                while(front_pos <= rear_pos)
                {
                        printf("%d ",cqueue_arr[front_pos]);
                        front_pos++;
                }
        }
        printf("\n");
}



int main()
{
        int choice,item;
        do
        {
                printf("1.Insert\n");
                printf("2.Delete\n");
                printf("3.Display\n");
                printf("4.Quit\n");

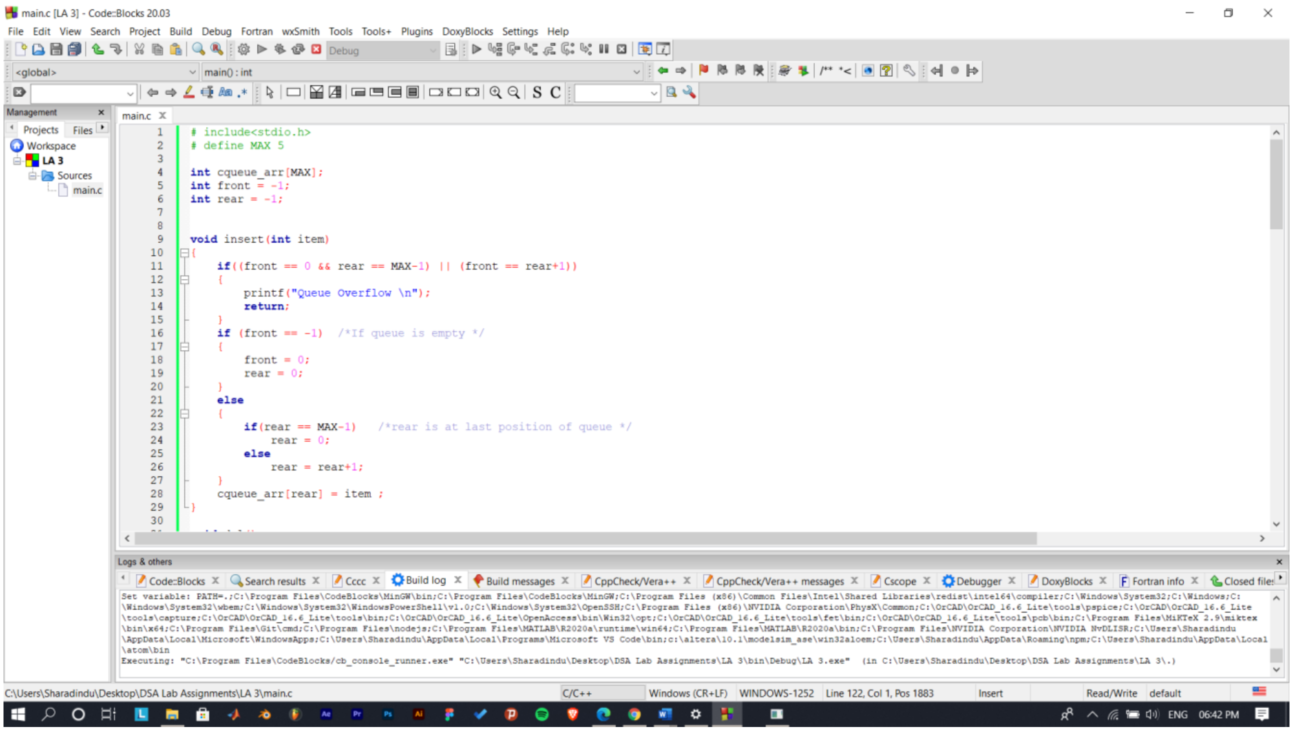
                printf("Enter your choice : ");
                scanf("%d",&choice);

                switch(choice)
                {
                        case 1 :
                                printf("Input the element for insertion in queue : ");
                                scanf("%d", &item);

                                insert(item);
                                break;
                        case 2 :
```

```
                        del();
                        break;
                case 3:
                        display();
                        break;
                case 4:
                        break;
                        default:
                        printf("Wrong choice\n");
            }
        }while(choice!=4);

        return 0;
}
```



main.c [LA 3] - Code::Blocks 20.03

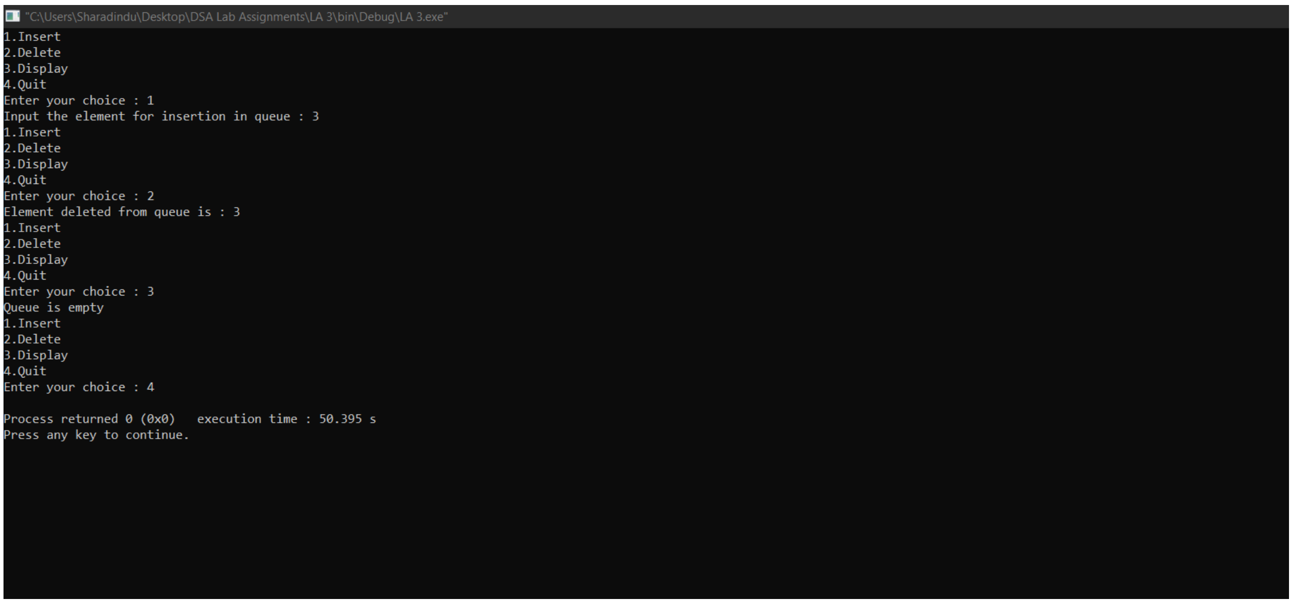
```
# include<stdio.h>
# define MAX 5

int cqueue_arr[MAX];
int front = -1;
int rear = -1;


void insert(int item)
{
    if((front == 0 && rear == MAX-1) || (front == rear+1))
    {
        printf("Queue Overflow \n");
        return;
    }
    if (front == -1)  /*If queue is empty */
    {
        front = 0;
        rear = 0;
    }
    else
    {
        if(rear == MAX-1)   /*rear is at last position of queue */
            rear = 0;
        else
            rear = rear+1;
    }
    cqueue_arr[rear] = item ;
}
```

```
Set variable: PATH=.;C:\Program Files\CodeBlocks\MinGW\bin;C:\Program Files\CodeBlocks\MinGW;C:\Program Files (x86)\Common Files\Intel\Shared Libraries\redist\intel64\compiler;C:\Windows\System32;C:\Windows;C:
\Windows\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite
\tools\capture;C:\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex
\bin\x64;C:\Program Files\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu
\AppData\Local\Microsoft\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local
\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\.)
```

C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c | C/C++ | Windows (CR+LF) | WINDOWS-1252 | Line 122, Col 1, Pos 1883 | Insert | Read/Write | default



"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"

```
1.Insert
2.Delete
3.Display
4.Quit
Enter your choice : 1
Input the element for insertion in queue : 3
1.Insert
2.Delete
3.Display
4.Quit
Enter your choice : 2
Element deleted from queue is : 3
1.Insert
2.Delete
3.Display
4.Quit
Enter your choice : 3
Queue is empty
1.Insert
2.Delete
3.Display
4.Quit
Enter your choice : 4

Process returned 0 (0x0)   execution time : 50.395 s
Press any key to continue.
```

Using Linked List:

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

/* structure containing a data part and link part */
struct node
{
    int data ;
    struct node * link ;
} ;

void addcirq ( struct node **, struct node **, int ) ;
int delcirq ( struct node **, struct node ** ) ;
void cirq_display ( struct node * ) ;

int main( )
{
    struct node *front, *rear ;

    front = rear = NULL ;

    addcirq ( &front, &rear, 10 ) ;
    addcirq ( &front, &rear, 17 ) ;
    addcirq ( &front, &rear, 18 ) ;
    addcirq ( &front, &rear, 5 ) ;
    addcirq ( &front, &rear, 30 ) ;
    addcirq ( &front, &rear, 15 ) ;

    // clrscr();

    printf ("Before deletion:\n" ) ;
    cirq_display ( front ) ;

    delcirq ( &front, &rear ) ;
    delcirq ( &front, &rear ) ;
    delcirq ( &front, &rear ) ;

    printf ( "\n\nAfter deletion:\n" ) ;
    cirq_display ( front ) ;
    return 0;
}

/* adds a new element at the end of queue */
void addcirq ( struct node **f, struct node **r, int item )
{
    struct node *q ;

    /* create new node */

    q=(struct node *)malloc(sizeof(struct node));
    q -> data = item ;

    /* if the queue is empty */
    if ( *f == NULL )
        *f = q ;
    else
        ( *r ) -> link = q ;

    *r = q ;
    ( *r ) -> link = *f ;
}
```

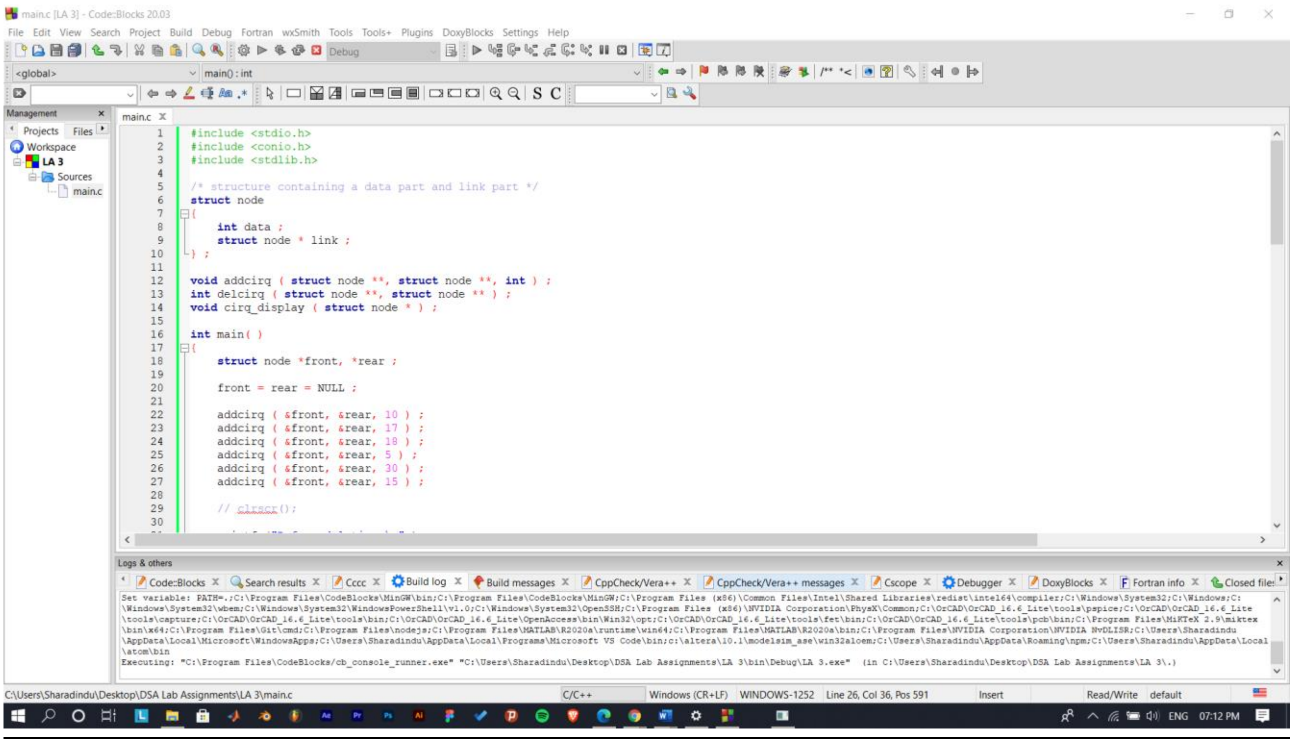
```
/* removes an element from front of queue */
int delcirq ( struct node **f, struct node **r )
{
    struct node *q ;
    int item ;

    /* if queue is empty */
    if ( *f == NULL )
        printf ( "queue is empty" ) ;
    else
    {
        if ( *f == *r )
        {
            item = ( *f ) -> data ;
            free ( *f ) ;
            *f = NULL ;
            *r = NULL ;
        }
        else
        {
            /* delete the node */
            q = *f ;
            item = q -> data ;
            *f = ( *f ) -> link ;
            ( *r ) -> link = *f ;
            free ( q ) ;
        }
        return ( item ) ;
    }
    return 0 ;
}

/* displays whole of the queue */
void cirq_display ( struct node *f )
{
    struct node *q = f, *p = NULL ;

    /* traverse the entire linked list */
    while ( q != p )
    {
        printf ( "%d\t", q -> data ) ;

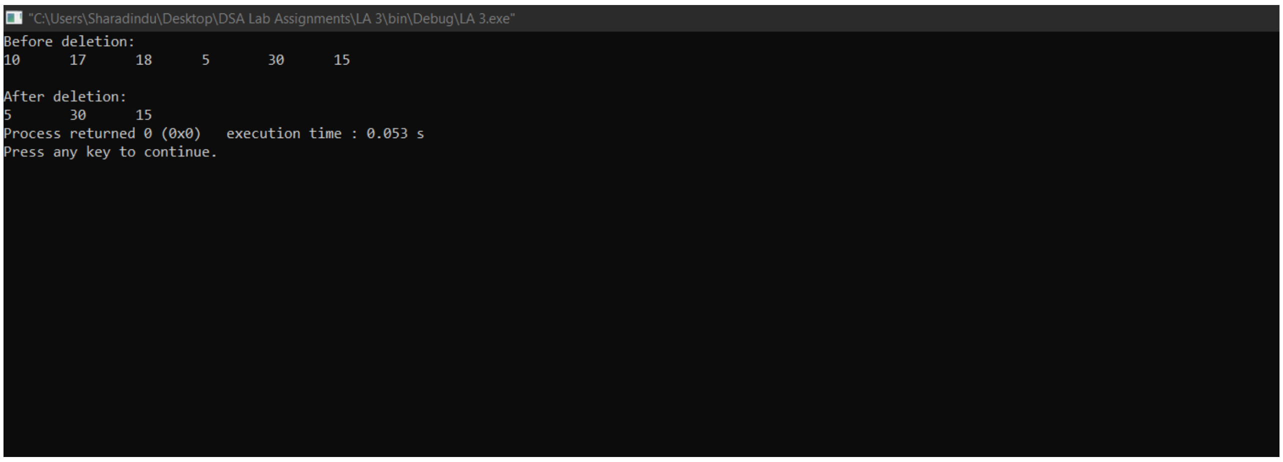
        q = q -> link ;
        p = f ;
    }
}
```


main.c [LA 3] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Files
Workspace
LA 3
Sources
main.c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscope Debugger DoxyBlocks Fortran info Closed files

```c
#include <stdio.h>
#include <conio.h>
#include <stdlib.h>

/* structure containing a data part and link part */
struct node
{
    int data ;
    struct node * link ;
} ;

void addcirq ( struct node **, struct node **, int ) ;
int delcirq ( struct node **, struct node ** ) ;
void cirq_display ( struct node * ) ;

int main( )
{
    struct node *front, *rear ;

    front = rear = NULL ;

    addcirq ( &front, &rear, 10 ) ;
    addcirq ( &front, &rear, 17 ) ;
    addcirq ( &front, &rear, 18 ) ;
    addcirq ( &front, &rear, 5 ) ;
    addcirq ( &front, &rear, 30 ) ;
    addcirq ( &front, &rear, 15 ) ;

    // clrscr();
```

```
Set variable: PATH=.;C:\Program Files\CodeBlocks\MinGW\bin;C:\Program Files\CodeBlocks\MinGW;C:\Program Files (x86)\Common Files\Intel\Shared Libraries\redist\intel64\compiler;C:\Windows\System32;C:\Windows;C:
\Windows\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite
\tools\capture;C:\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex
\bin\x64;C:\Program Files\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu
\AppData\Local\Microsoft\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local
\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\.)
```

C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 26, Col 36, Pos 591
Insert
Read/Write
default
ENG
07:12 PM



```
Before deletion:
10      17      18      5       30      15

After deletion:
5       30      15
Process returned 0 (0x0)   execution time : 0.053 s
Press any key to continue.
```

Question 3

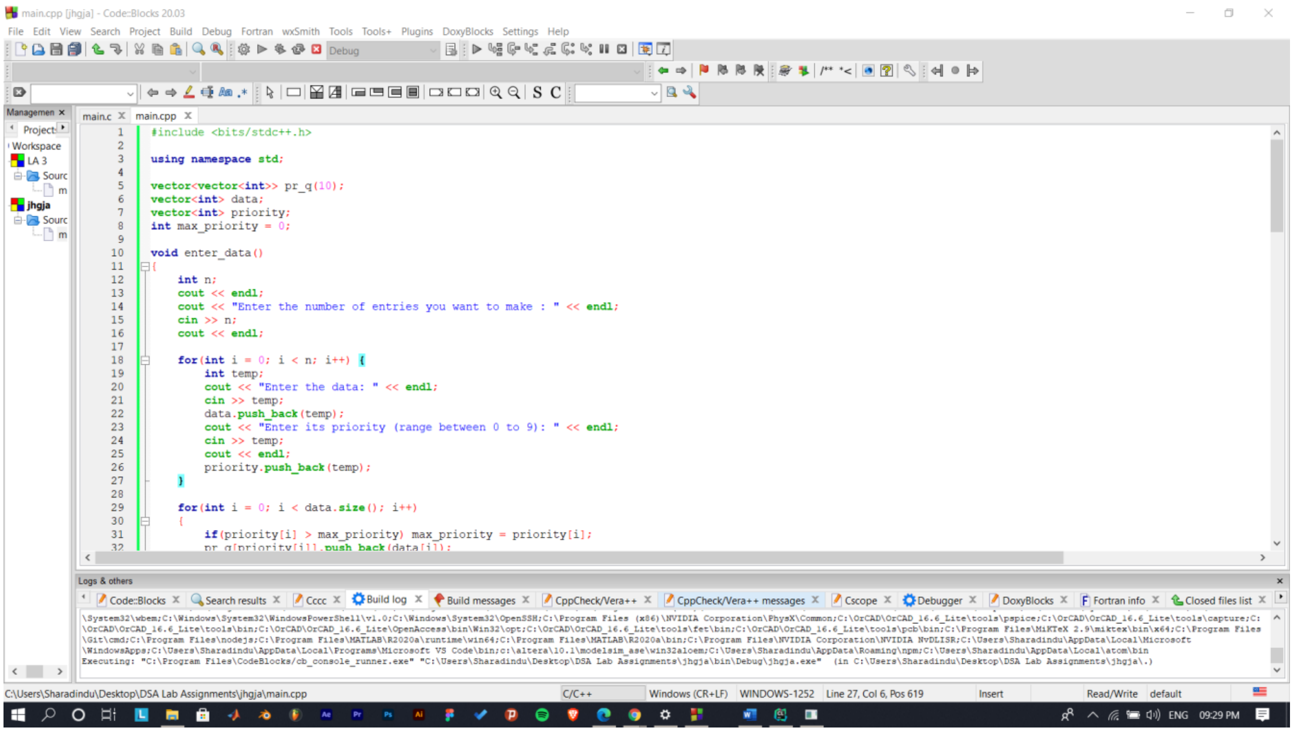
Problem:

WAP to declare a priority queue using two-dimensional array, store elements and priority. Display the elements according to priority from higher to lower.

Code:

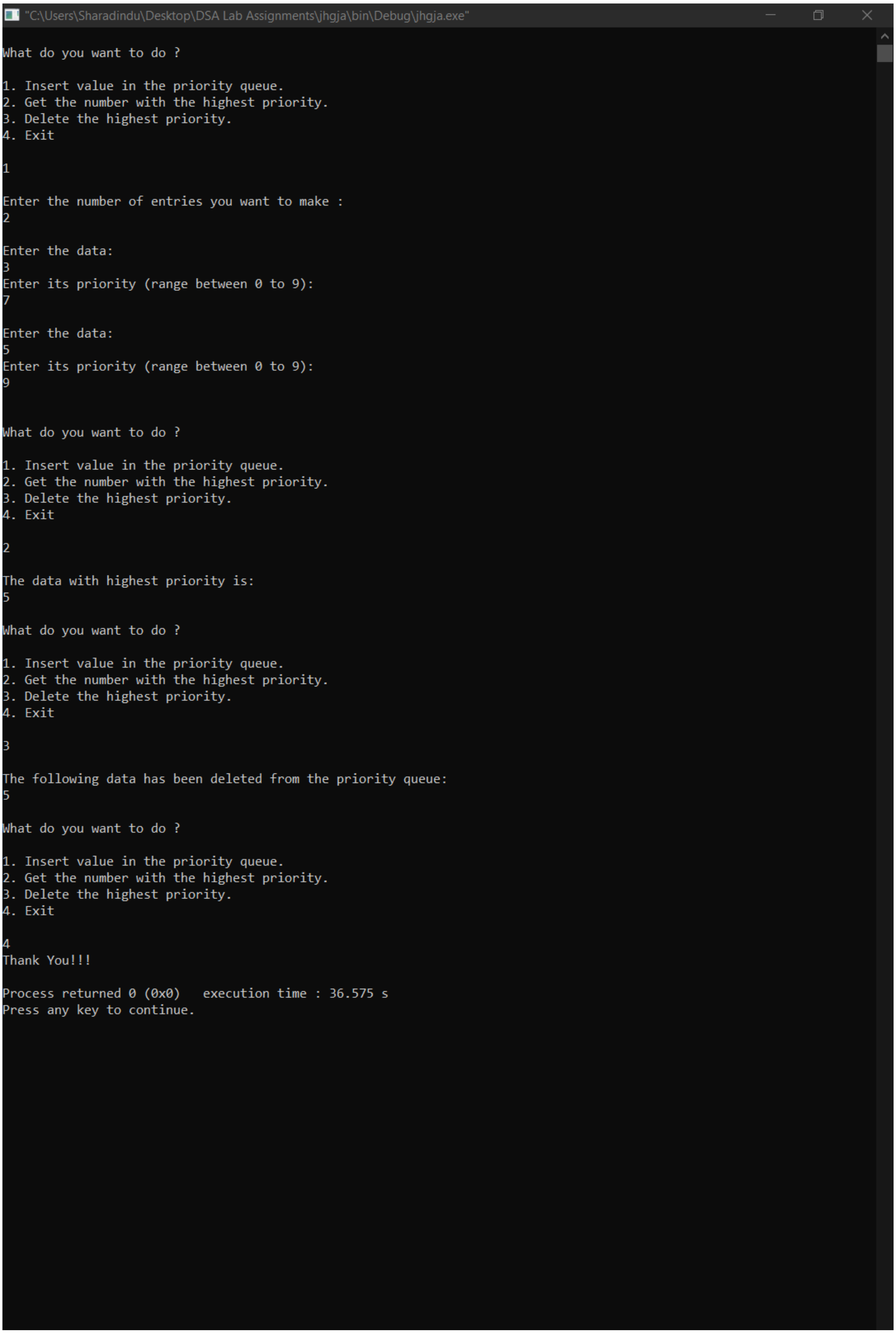
```
#include <bits/stdc++.h>
using namespace std;

vector<vector<int>> pr_q(10);
vector<int> data;
vector<int> priority;
int max_priority = 0;

void enter_data()
{
    int n;
    cout << endl;
    cout << "Enter the number of entries you want to make : " << endl;
    cin >> n;
    cout << endl;

    for(int i = 0; i < n; i++) {
        int temp;
        cout << "Enter the data: " << endl;
        cin >> temp;
        data.push_back(temp);
        cout << "Enter its priority (range between 0 to 9): " << endl;
        cin >> temp;
        cout << endl;
        priority.push_back(temp);
    }

    for(int i = 0; i < data.size(); i++)
    {
        if(priority[i] > max_priority) max_priority = priority[i];
        pr_q[priority[i]].push_back(data[i]);
    }

    data.clear();
    priority.clear();
}

void high_priority()
{
    if(max_priority == -1)
    {
        cout << endl;
        cout << "There is nothing in the priority queue. " << endl;
        return;
    }
    cout << endl;
    cout << "The data with highest priority is: " << endl;
    cout << pr_q[max_priority][0] << endl;
}

void delete_priority()
{
    if(max_priority == -1)
    {
        cout << endl;
        cout << "There is nothing in the priority queue to delete. " << endl;
        return;
    }

    if(pr_q[max_priority].size() == 1)
    {
        cout << endl;
        cout << "The following data has been deleted from the priority queue: "
<< endl;
        cout << pr_q[max_priority][0] << endl;
        bool flag = false;
        for(int i = 9; i >= 0; i--)
        {
            if(pr_q[i].size() != 0 && i < max_priority)
            {
                max_priority = i;
                flag = true;
            }
        }

        if(flag == false) max_priority = -1;
    }

    else
    {
        cout << endl;
        cout << "The following data has been deleted from the priority queue: "
<< endl;
        cout << pr_q[max_priority][0] << endl;
        for(int i = 0; i < pr_q[max_priority].size() - 1; i++)
        {
            pr_q[max_priority][i] = pr_q[max_priority][i+1];
        }

        pr_q[max_priority].erase(pr_q[max_priority].end() - 1);
    }

}

int main(void) {

    string op;

    while (true)
    {
        cout << endl;
        cout << "What do you want to do ?" << endl << endl;
        cout << "1. Insert value in the priority queue. " << endl;
        cout << "2. Get the number with the highest priority. " << endl;
        cout << "3. Delete the highest priority." << endl;
        cout << "4. Exit" << endl << endl;

        cin >> op;
        if(op == "1") {
            enter_data();
        }
        else if (op == "2")
        {
            high_priority();
        }
        else if (op == "3")
        {
            delete_priority();
        }
        else if (op == "4")
        {
            cout << "Thank You!!!" << endl;
            break;
        }
        else
        {
            cout << "I kindly request you to put valid option." << endl;
        }

    }

    return 0;
}
```

Screenshot of Code & CMD:



```
#include <bits/stdc++.h>

using namespace std;

vector<vector<int>> pr_q(10);
vector<int> data;
vector<int> priority;
int max_priority = 0;

void enter_data()
{
    int n;
    cout << endl;
    cout << "Enter the number of entries you want to make : " << endl;
    cin >> n;
    cout << endl;

    for(int i = 0; i < n; i++) {
        int temp;
        cout << "Enter the data: " << endl;
        cin >> temp;
        data.push_back(temp);
        cout << "Enter its priority (range between 0 to 9): " << endl;
        cin >> temp;
        cout << endl;
        priority.push_back(temp);
    }

    for(int i = 0; i < data.size(); i++)
    {
        if(priority[i] > max_priority) max_priority = priority[i];
```

```
\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite\tools\capture;C:
\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex\bin\x64;C:\Program Files
\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu\AppData\Local\Microsoft
\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\bin\Debug\jhgja.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\.)
```


"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\bin\Debug\jhgja.exe"

```
What do you want to do ?

1. Insert value in the priority queue.
2. Get the number with the highest priority.
3. Delete the highest priority.
4. Exit

1

Enter the number of entries you want to make :
2

Enter the data:
3
Enter its priority (range between 0 to 9):
7

Enter the data:
5
Enter its priority (range between 0 to 9):
9


What do you want to do ?

1. Insert value in the priority queue.
2. Get the number with the highest priority.
3. Delete the highest priority.
4. Exit

2

The data with highest priority is:
5

What do you want to do ?

1. Insert value in the priority queue.
2. Get the number with the highest priority.
3. Delete the highest priority.
4. Exit

3

The following data has been deleted from the priority queue:
5

What do you want to do ?

1. Insert value in the priority queue.
2. Get the number with the highest priority.
3. Delete the highest priority.
4. Exit

4
Thank You!!!

Process returned 0 (0x0)   execution time : 36.575 s
Press any key to continue.
```

Question 4

Problem:

A deque DQUE is to be implemented using a one-dimensional array of size N. Write functions to:

a. Insert and delete elements from DQUE at either ends.
b. Implement DQUE as input restricted deque.
c. Implement DQUE as output restricted deque.

Code & Input:

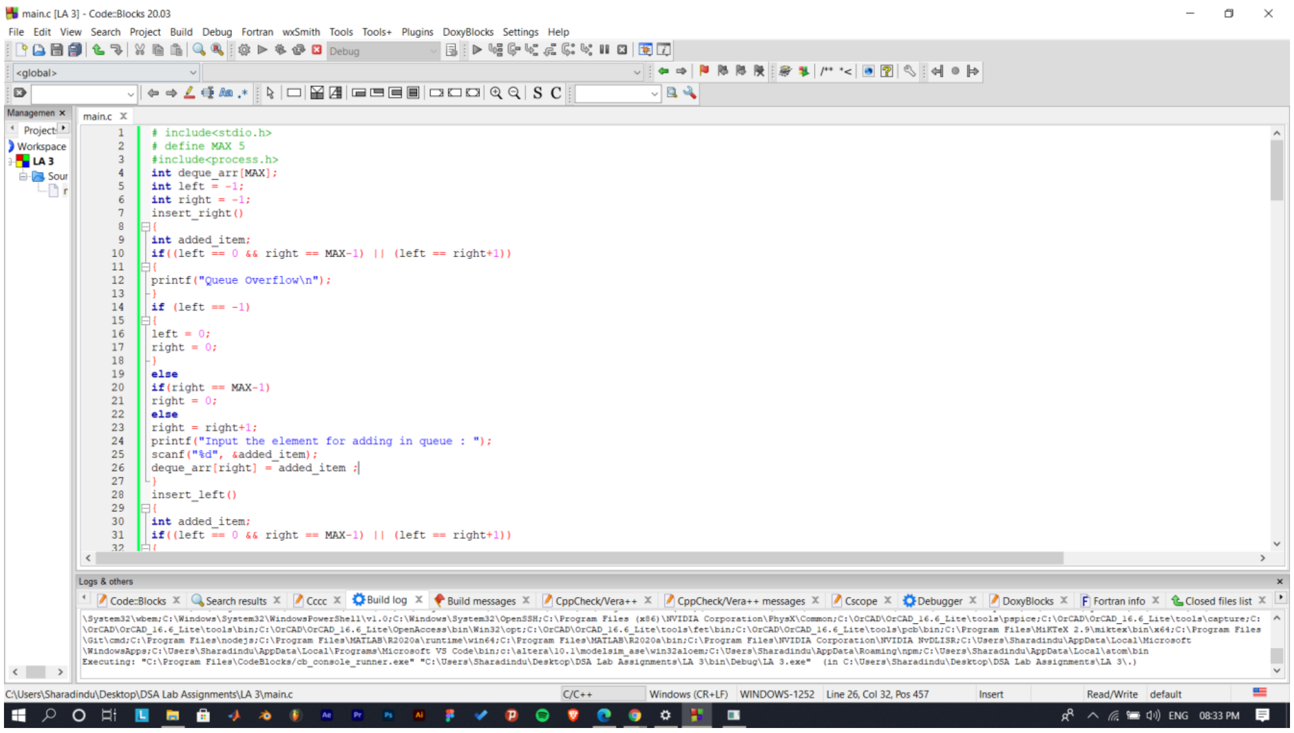
```
# include<stdio.h>
# define MAX 5
#include<process.h>
int deque_arr[MAX];
int left = -1;
int right = -1;
insert_right()
{
int added_item;
if((left == 0 && right == MAX-1) || (left == right+1))
{
printf("Queue Overflow\n");
}
if (left == -1)
{
left = 0;
right = 0;
}
else
if(right == MAX-1)
right = 0;
else
right = right+1;
printf("Input the element for adding in queue : ");
scanf("%d", &added_item);
deque_arr[right] = added_item ;
}
insert_left()
{
int added_item;
if((left == 0 && right == MAX-1) || (left == right+1))
{
printf("Queue Overflow \n");
}
if (left == -1)
{
left = 0;
right = 0;
}
else
if(left== 0)
left=MAX-1;
else
left=left-1;
printf("Input the element for adding in queue : ");
scanf("%d", &added_item);
deque_arr[left] = added_item ;
```

```
}
delete_left()
{
if (left == -1)
{
printf("Queue Underflow\n");
}
printf("Element deleted from queue is : %d\n",deque_arr[left]);
if(left == right)
{
left = -1;
right=-1;
}
else
if(left == MAX-1)
left = 0;
else
left = left+1;
}
delete_right()
{
if (left == -1)
{
printf("Queue Underflow\n");
}
printf("Element deleted from queue is : %d\n",deque_arr[right]);
if(left == right)
{
left = -1;
right=-1;
}
else
if(right == 0)
right=MAX-1;
else
right=right-1;
}
display_queue()
{
int front_pos = left,rear_pos = right;
if(left == -1)
{
printf("Queue is empty\n");
}
printf("Queue elements :\n");
if( front_pos <= rear_pos )
{
while(front_pos <= rear_pos)
{
printf("%d ",deque_arr[front_pos]);
front_pos++;
}
}
else
{
while(front_pos <= MAX-1)
{
printf("%d ",deque_arr[front_pos]);
front_pos++;
}
front_pos = 0;
while(front_pos <= rear_pos)
{
printf("%d ",deque_arr[front_pos]);
```

```
front_pos++;
}
}
printf("\n");
}
input_que()
{
int choice;
while(1)
{
printf("1.Insert at right\n");
printf("2.Delete from left\n");
printf("3.Delete from right\n");
printf("4.Display\n");
printf("5.Quit\n");
printf("Enter your choice : ");
scanf("%d",&choice);
switch(choice)
{
case 1:
insert_right();
break;
case 2:
delete_left();
break;
case 3:
delete_right();
break;
case 4:
display_queue();
break;
case 5:
exit(0);
default:
printf("Wrong choice\n");
}
}
}
output_que()
{
int choice;
while(1)
{
printf("1.Insert at right\n");
printf("2.Insert at left\n");
printf("3.Delete from left\n");
printf("4.Display\n");
printf("5.Quit\n");
printf("Enter your choice : ");
scanf("%d",&choice);
switch(choice)
{
case 1:
insert_right();
break;
case 2:
insert_left();
break;
case 3:
delete_left();
break;
case 4:
display_queue();
break;
```

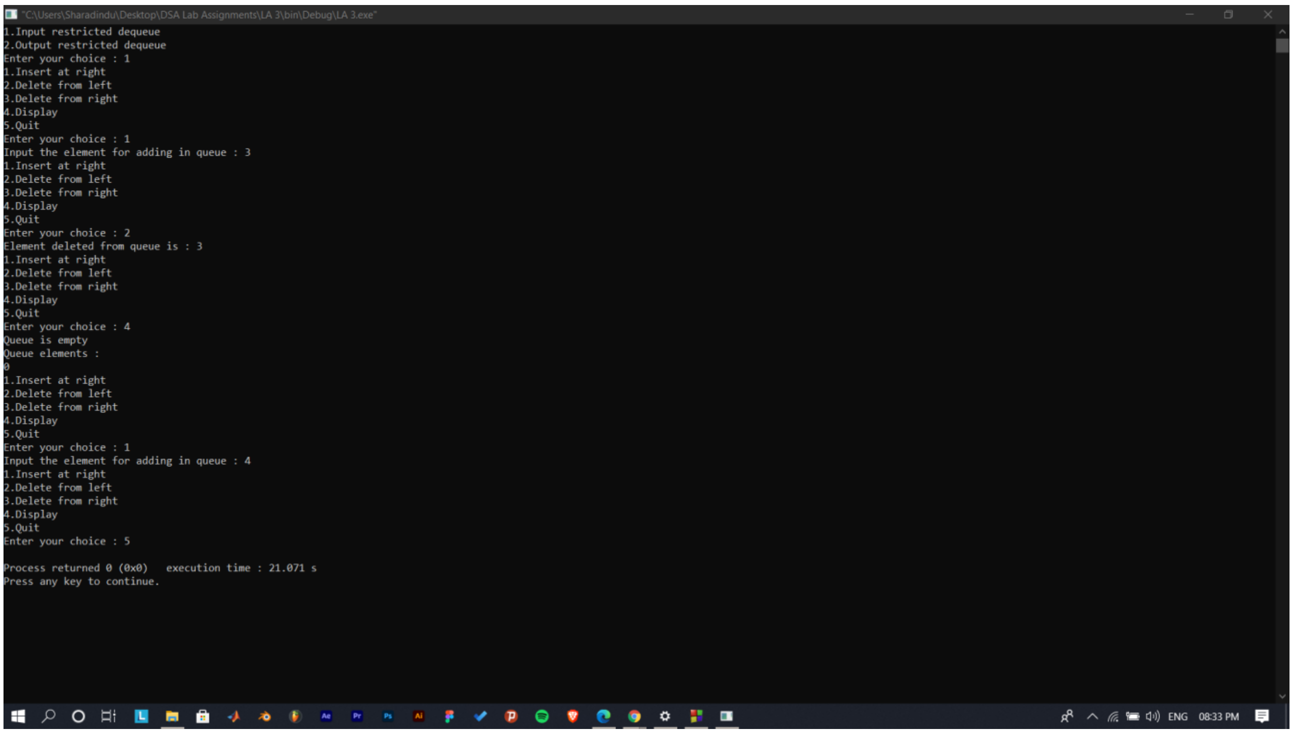
```
case 5:
exit(0);
default:
printf("Wrong choice\n");
}
}
}

void main()
{
int choice;
printf("1.Input restricted dequeue\n");
printf("2.Output restricted dequeue\n");
printf("Enter your choice : ");
scanf("%d",&choice);
switch(choice)
{
case 1 :
input_que();
break;
case 2:
output_que();
break;
default:
printf("Wrong choice\n");
}
}
```

Screenshot of Code & Output:


main.c [LA 3] - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
main.c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++ CppCheck/Vera++ messages Cscope Debugger DoxyBlocks Fortran info Closed files list
C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c
C/C++ Windows (CR+LF) WINDOWS-1252 Line 26, Col 32, Pos 457 Insert Read/Write default
ENG 08:33 PM

```
# include<stdio.h>
# define MAX 5
#include<process.h>
int deque_arr[MAX];
int left = -1;
int right = -1;
insert_right()
{
int added_item;
if((left == 0 && right == MAX-1) || (left == right+1))
{
printf("Queue Overflow\n");
}
if (left == -1)
{
left = 0;
right = 0;
}
else
if(right == MAX-1)
right = 0;
else
right = right+1;
printf("Input the element for adding in queue : ");
scanf("%d", &added_item);
deque_arr[right] = added_item ;
}
insert_left()
{
int added_item;
if((left == 0 && right == MAX-1) || (left == right+1))
{
```

```
\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite\tools\capture;C:
\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex\bin\x64;C:\Program Files
\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu\AppData\Local\Microsoft
\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\.)
```



```
"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"
1.Input restricted dequeue
2.Output restricted dequeue
Enter your choice : 1
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your choice : 1
Input the element for adding in queue : 3
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your choice : 2
Element deleted from queue is : 3
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your choice : 4
Queue is empty
Queue elements :
0
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your choice : 1
Input the element for adding in queue : 4
1.Insert at right
2.Delete from left
3.Delete from right
4.Display
5.Quit
Enter your choice : 5

Process returned 0 (0x0)   execution time : 21.071 s
Press any key to continue.
```

Question 5

Problem:

Write a menu driven program to perform the following operations on a singly linked list:

a. Insert
b. Delete
c. Display
d. Exit

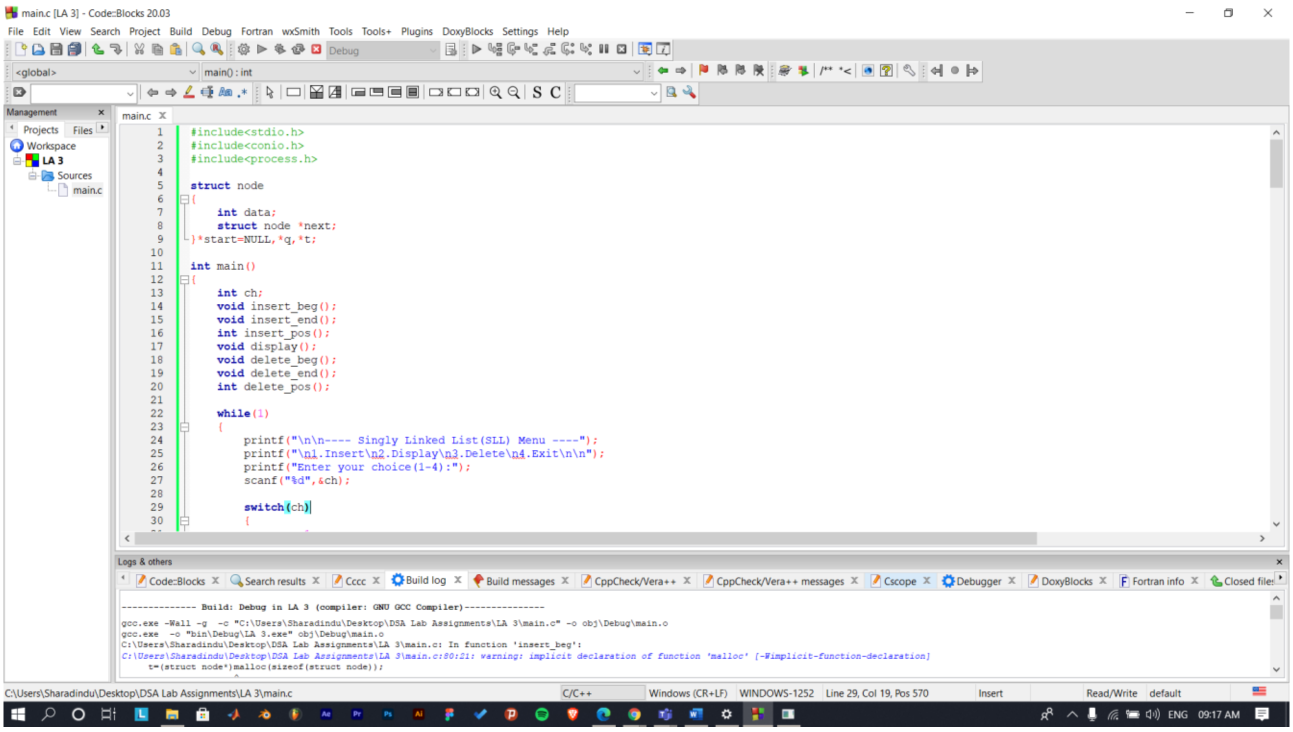
Code & Input:

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

struct node
{
    int data;
    struct node *next;
}*start=NULL,*q,*t;

int main()
{
    int ch;
    void insert_beg();
    void insert_end();
    int insert_pos();
    void display();
    void delete_beg();
    void delete_end();
    int delete_pos();

    while(1)
    {
        printf("\n\n---- Singly Linked List(SLL) Menu ----");
        printf("\n1.Insert\n2.Display\n3.Delete\n4.Exit\n\n");
        printf("Enter your choice(1-4):");
        scanf("%d",&ch);

        switch(ch)
        {
            case 1:
                    printf("\n---- Insert Menu ----");
                    printf("\n1.Insert at beginning\n2.Insert at end\n3.Insert at
specified position\n4.Exit");
                    printf("\n\nEnter your choice(1-4):");
                    scanf("%d",&ch);

                    switch(ch)
                    {
                        case 1: insert_beg();
                                break;
                        case 2: insert_end();
                                break;
                        case 3: insert_pos();
```

```
                            break;
                        case 4: exit(0);
                        default: printf("Wrong Choice!!");
                    }
                    break;

            case 2: display();
                    break;

            case 3: printf("\n---- Delete Menu ----");
                    printf("\n1.Delete     from     beginning\n2.Delete     from
end\n3.Delete from specified position\n4.Exit");
                    printf("\n\nEnter your choice(1-4):");
                    scanf("%d",&ch);

                    switch(ch)
                    {
                        case 1: delete_beg();
                                break;
                        case 2: delete_end();
                                break;
                        case 3: delete_pos();
                                break;
                        case 4: exit(0);
                        default: printf("Wrong Choice!!");
                    }
                    break;
            case 4: exit(0);
                    default: printf("Wrong Choice!!");
        }
    }
    return 0;
}

void insert_beg()
{
    int num;
    t=(struct node*)malloc(sizeof(struct node));
    printf("Enter data:");
    scanf("%d",&num);
    t->data=num;

    if(start==NULL)        //If list is empty
    {
        t->next=NULL;
        start=t;
    }
    else
    {
        t->next=start;
        start=t;
    }
}

void insert_end()
{
    int num;
    t=(struct node*)malloc(sizeof(struct node));
    printf("Enter data:");
    scanf("%d",&num);
    t->data=num;
    t->next=NULL;

    if(start==NULL)        //If list is empty
    {
        start=t;
    }
    else
    {
        q=start;
        while(q->next!=NULL)
        q=q->next;
        q->next=t;
    }
}

int insert_pos()
{
    int pos,i,num;
    if(start==NULL)
    {
        printf("List is empty!!");
        return 0;
    }

    t=(struct node*)malloc(sizeof(struct node));
    printf("Enter data:");
    scanf("%d",&num);
    printf("Enter position to insert:");
    scanf("%d",&pos);
    t->data=num;

    q=start;
    for(i=1;i<pos-1;i++)
    {
        if(q->next==NULL)
        {
            printf("There are less elements!!");
            return 0;
        }

        q=q->next;
    }

    t->next=q->next;
    q->next=t;
    return 0;
}

void display()
{
    if(start==NULL)
    {
        printf("List is empty!!");
    }
    else
    {
        q=start;
        printf("The linked list is:\n");
        while(q!=NULL)
        {
            printf("%d->",q->data);
            q=q->next;
        }
    }
}

void delete_beg()
```

```c
{
    if(start==NULL)
    {
        printf("The list is empty!!");
    }
    else
    {
        q=start;
        start=start->next;
        printf("Deleted element is %d",q->data);
        free(q);
    }
}

void delete_end()
{
    if(start==NULL)
    {
        printf("The list is empty!!");
    }
    else
    {
        q=start;
        while(q->next->next!=NULL)
        q=q->next;

        t=q->next;
        q->next=NULL;
        printf("Deleted element is %d",t->data);
        free(t);
    }
}

int delete_pos()
{
    int pos,i;

    if(start==NULL)
    {
        printf("List is empty!!");
        return 0;
    }

    printf("Enter position to delete:");
    scanf("%d",&pos);

    q=start;
    for(i=1;i<pos-1;i++)
    {
        if(q->next==NULL)
        {
            printf("There are less elements!!");
            return 0;
        }
        q=q->next;
    }

    t=q->next;
    q->next=t->next;
    printf("Deleted element is %d",t->data);
    free(t);

    return 0;
}
```

Screenshot of Code & Output:

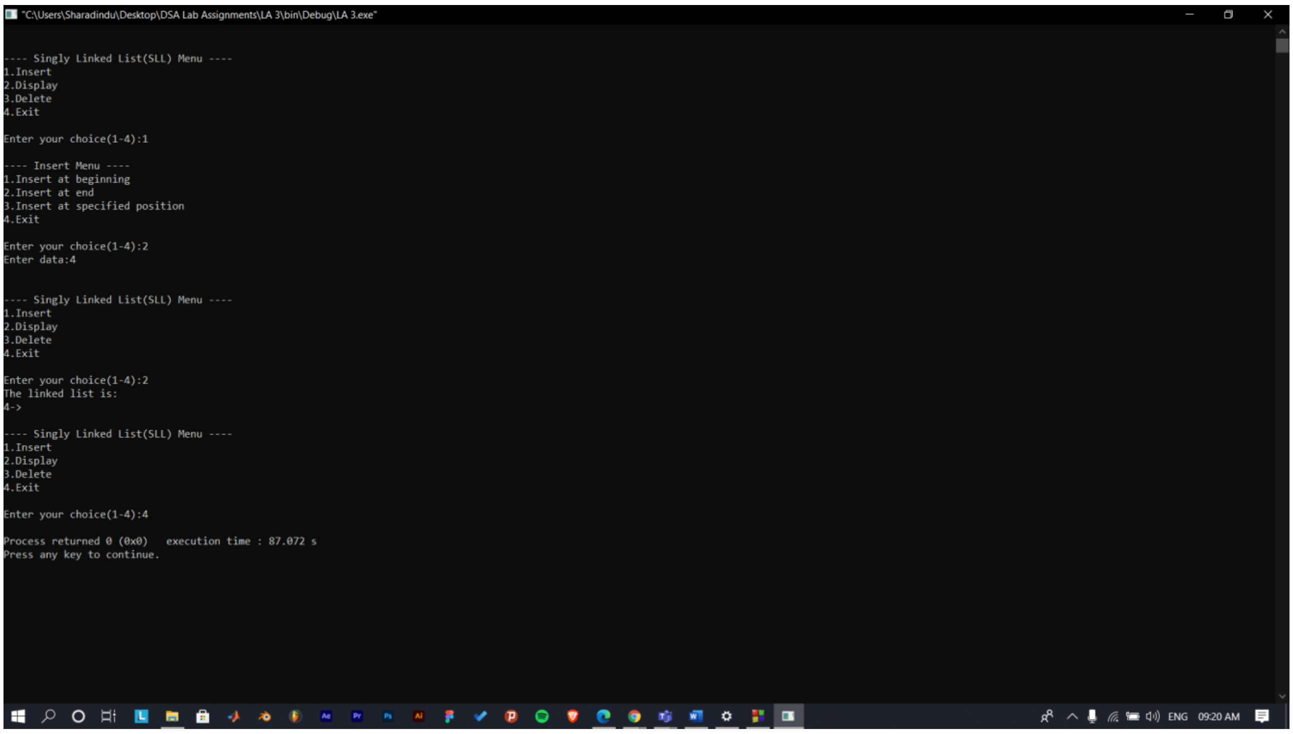


main.c [LA 3] - Code::Blocks 20.03

```c
#include<stdio.h>
#include<conio.h>
#include<process.h>

struct node
{
    int data;
    struct node *next;
}*start=NULL,*q,*t;

int main()
{
    int ch;
    void insert_beg();
    void insert_end();
    int insert_pos();
    void display();
    void delete_beg();
    void delete_end();
    int delete_pos();

    while(1)
    {
        printf("\n\n---- Singly Linked List(SLL) Menu ----");
        printf("\n1.Insert\n2.Display\n3.Delete\n4.Exit\n\n");
        printf("Enter your choice(1-4):");
        scanf("%d",&ch);

        switch(ch)
        {
```

```
-------------- Build: Debug in LA 3 (compiler: GNU GCC Compiler)---------------
gcc.exe -Wall -g  -c "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c" -o obj\Debug\main.o
gcc.exe  -o "bin\Debug\LA 3.exe" obj\Debug\main.o
C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c: In function 'insert_beg':
C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c:80:21: warning: implicit declaration of function 'malloc' [-Wimplicit-function-declaration]
     t=(struct node*)malloc(sizeof(struct node));
```

C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\main.c   C/C++   Windows (CR+LF)   WINDOWS-1252   Line 29, Col 19, Pos 570   Insert   Read/Write   default



"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"

```

---- Singly Linked List(SLL) Menu ----
1.Insert
2.Display
3.Delete
4.Exit

Enter your choice(1-4):1

---- Insert Menu ----
1.Insert at beginning
2.Insert at end
3.Insert at specified position
4.Exit

Enter your choice(1-4):2
Enter data:4


---- Singly Linked List(SLL) Menu ----
1.Insert
2.Display
3.Delete
4.Exit

Enter your choice(1-4):2
The linked list is:
4->

---- Singly Linked List(SLL) Menu ----
1.Insert
2.Display
3.Delete
4.Exit

Enter your choice(1-4):4

Process returned 0 (0x0)   execution time : 87.072 s
Press any key to continue.
```

Question 6

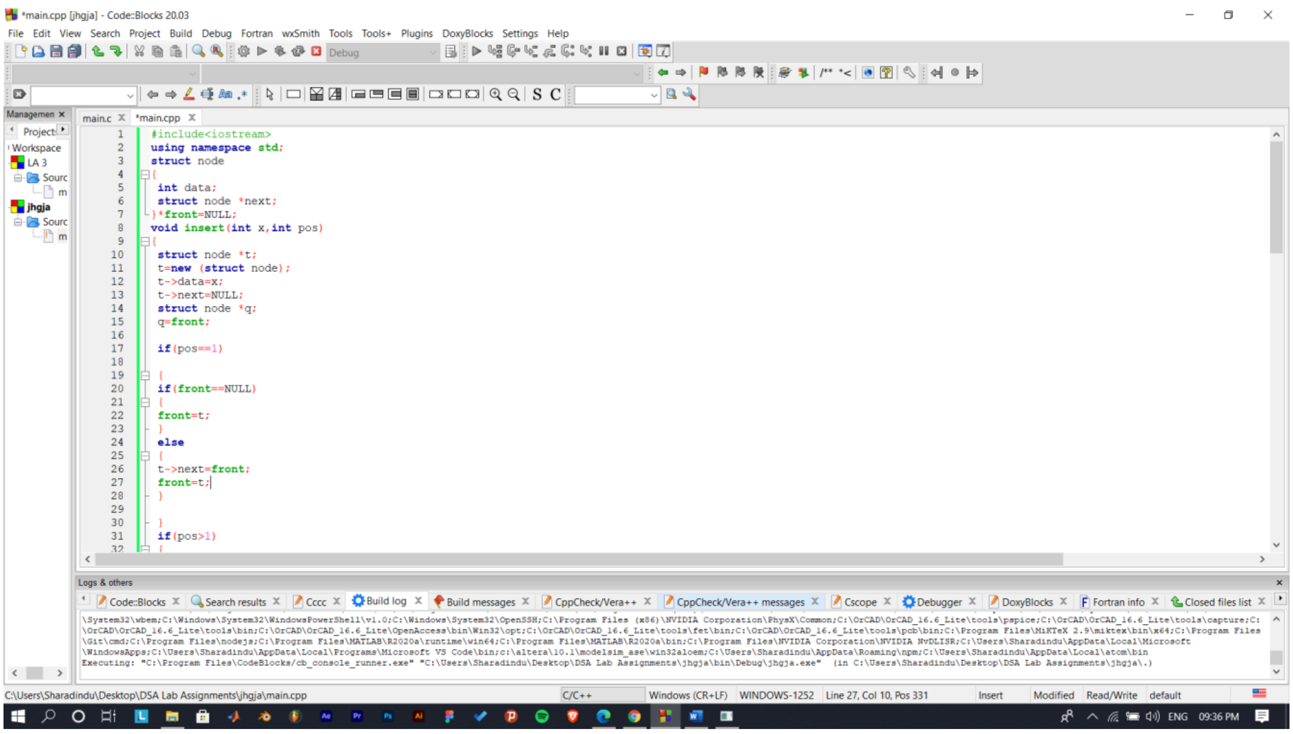
Problem:

WAP to create a sorted one way linked list with *n* nodes. Extend the program to insert a new node at appropriate allocation so that order does not get disturbed.

Code & Input:

```
#include<iostream>
using namespace std;
struct node
{
 int data;
 struct node *next;
}*front=NULL;
void insert(int x,int pos)
{
 struct node *t;
 t=new (struct node);
 t->data=x;
 t->next=NULL;
 struct node *q;
 q=front;

 if(pos==1)

 {
 if(front==NULL)
 {
 front=t;
 }
 else
 {
 t->next=front;
 front=t;
 }

 }
 if(pos>1)
 {
 while(pos-2)
 {
 q=q->next;

 pos--;
 }
t->next=q->next;
 q->next=t;

 }
}
int del(int pos)
{
 struct node *q=NULL,*r;
 int x=-1;
 if(pos<1)
 {
 return x;
 }
 if(pos==1)
 {
 x=front->data;
 front=front->next;
 return x;
 }
 if(pos>1)
 {
 r=front;
 q=NULL;
 while(pos-1)
 {
 q=r;
 r=r->next;
 pos--;
 }
 x=r->data;
 q->next=r->next;

 free(r);
 return x;
 }
}
void display(struct node *p)
{
 struct node *q;
 q=p;
 while(q)
 {
 cout<<q->data<<endl;
 q=q->next;
}
}
int ex()
{
 exit(0);
}
int main()
{
 char ch='y';
 int no,pos;

 while(ch=='y')
 {

 cout<<"enter the element and position where u want to insert it"<<endl;
 cin>>no;
 cin>>pos;
 insert(no,pos);
 cout<<"the list is"<<endl;
 display(front);
 cout<<"do u want to continue press y if yes"<<endl;
 cin>>ch;

 }


}
```

Screenshot of Code & Output:

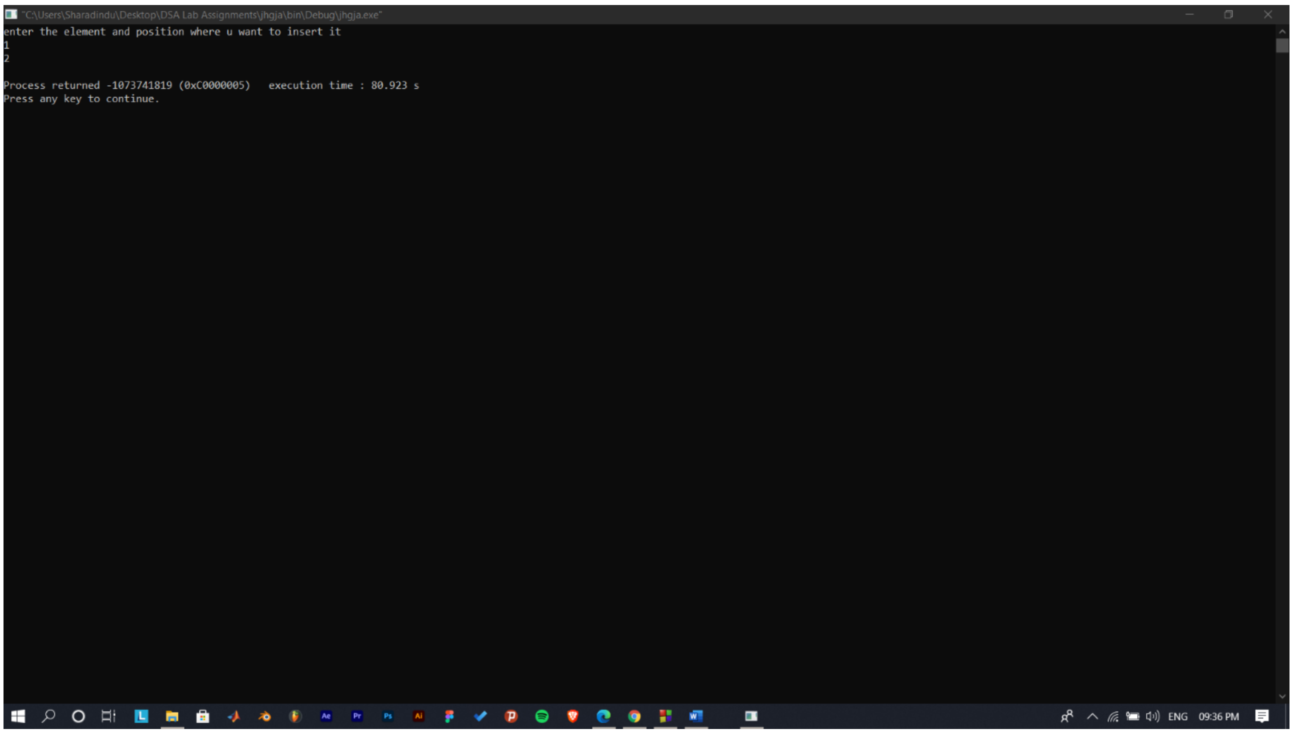


*main.cpp [jhgja] - Code::Blocks 20.03

```cpp
#include<iostream>
using namespace std;
struct node
{
 int data;
 struct node *next;
}*front=NULL;
void insert(int x,int pos)
{
 struct node *t;
 t=new (struct node);
 t->data=x;
 t->next=NULL;
 struct node *q;
 q=front;

 if(pos==1)

  {
 if(front==NULL)
 {
 front=t;
 }
 else
 {
 t->next=front;
 front=t;
 }

 }
 if(pos>1)
 {
```

```
\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite\tools\capture;C:
\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex\bin\x64;C:\Program Files
\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu\AppData\Local\Microsoft
\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\bin\Debug\jhgja.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\.)
```

C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\main.cpp | C/C++ | Windows (CR+LF) | WINDOWS-1252 | Line 27, Col 10, Pos 331 | Insert | Modified | Read/Write | default



"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\jhgja\bin\Debug\jhgja.exe"

```
enter the element and position where u want to insert it
1
2

Process returned -1073741819 (0xC0000005)   execution time : 80.923 s
Press any key to continue.
```

Question 7

Problem:

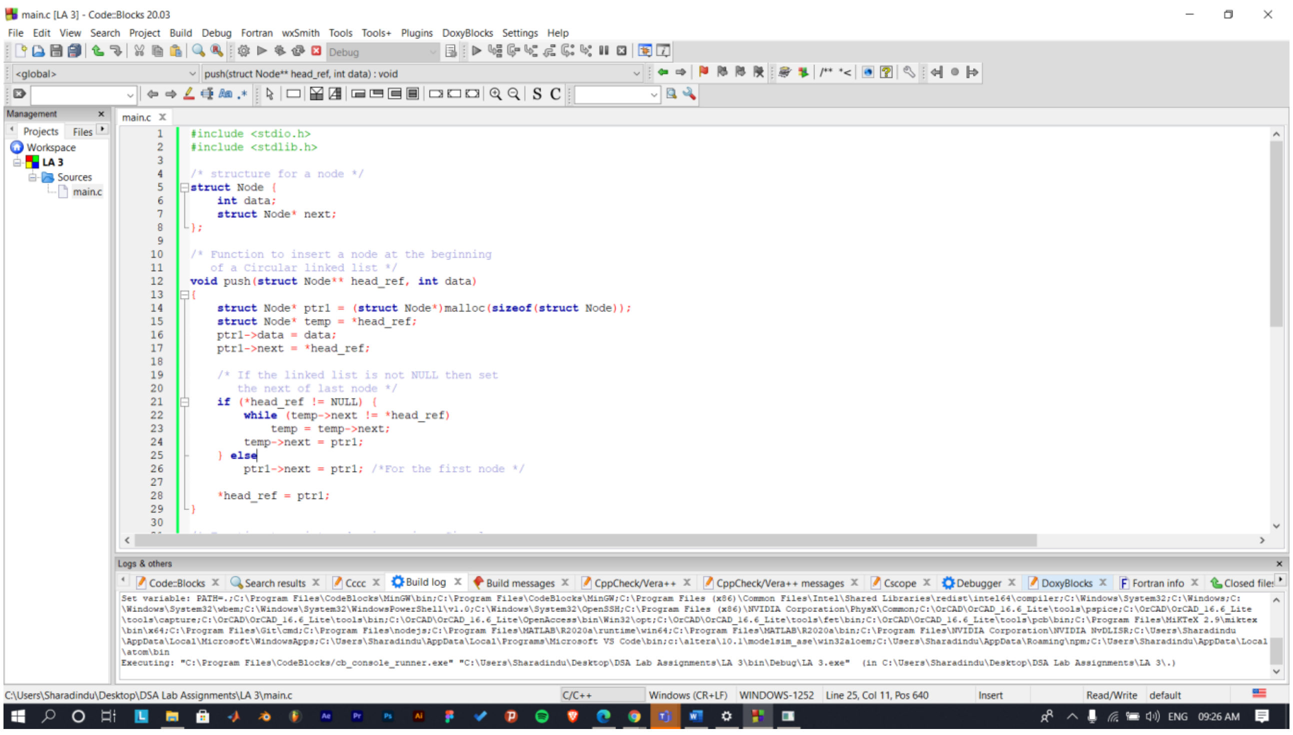
WAP to create a circular list and then count the number of nodes into it.

Code & Input:

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

/* structure for a node */
struct Node {
    int data;
    struct Node* next;
};

/* Function to insert a node at the beginning
   of a Circular linked list */
void push(struct Node** head_ref, int data)
{
    struct Node* ptr1 = (struct Node*)malloc(sizeof(struct Node));
    struct Node* temp = *head_ref;
    ptr1->data = data;
    ptr1->next = *head_ref;

    /* If the linked list is not NULL then set
       the next of last node */
    if (*head_ref != NULL) {
        while (temp->next != *head_ref)
            temp = temp->next;
        temp->next = ptr1;
    } else
        ptr1->next = ptr1; /*For the first node */

    *head_ref = ptr1;
}

/* Function to print nodes in a given Circular
   linked list */
int countNodes(struct Node* head)
{
    struct Node* temp = head;
    int result = 0;
    if (head != NULL) {
        do {
            temp = temp->next;
            result++;
        } while (temp != head);
    }

    return result;
}

/* Driver program to test above functions */
int main()
{
    /* Initialize lists as empty */
    struct Node* head = NULL;
```

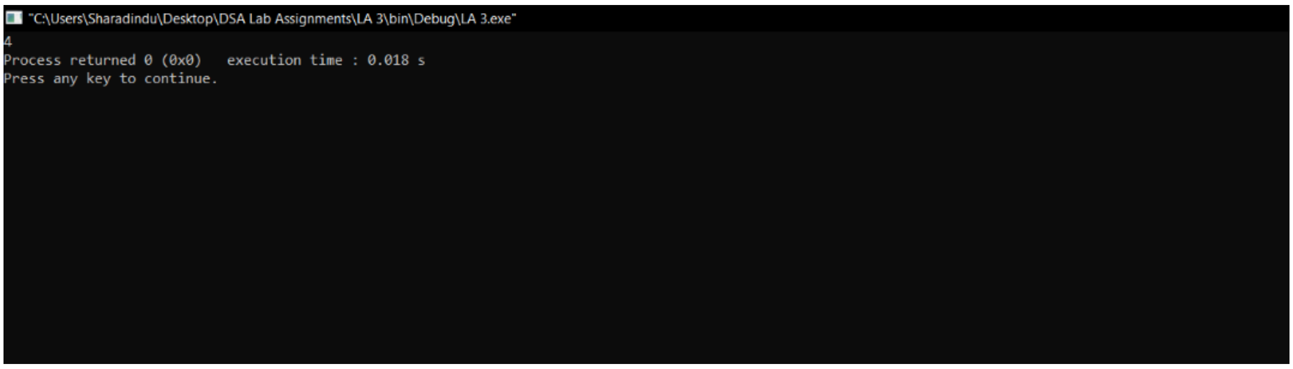
```c
    push(&head, 12);
    push(&head, 56);
    push(&head, 2);
    push(&head, 11);

    printf("%d", countNodes(head));

    return 0;
}
```

Screenshot of Code & Output:



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

/* structure for a node */
struct Node {
    int data;
    struct Node* next;
};

/* Function to insert a node at the beginning
   of a Circular linked list */
void push(struct Node** head_ref, int data)
{
    struct Node* ptr1 = (struct Node*)malloc(sizeof(struct Node));
    struct Node* temp = *head_ref;
    ptr1->data = data;
    ptr1->next = *head_ref;

    /* If the linked list is not NULL then set
       the next of last node */
    if (*head_ref != NULL) {
        while (temp->next != *head_ref)
            temp = temp->next;
        temp->next = ptr1;
    } else
        ptr1->next = ptr1; /*For the first node */

    *head_ref = ptr1;
}
```

```
Set variable: PATH=.;C:\Program Files\CodeBlocks\MinGW\bin;C:\Program Files\CodeBlocks\MinGW;C:\Program Files (x86)\Common Files\Intel\Shared Libraries\redist\intel64\compiler;C:\Windows\System32;C:\Windows;C:
\Windows\System32\wbem;C:\Windows\System32\WindowsPowerShell\v1.0;C:\Windows\System32\OpenSSH;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\OrCAD\OrCAD_16.6_Lite\tools\pspice;C:\OrCAD\OrCAD_16.6_Lite
\tools\capture;C:\OrCAD\OrCAD_16.6_Lite\tools\bin;C:\OrCAD\OrCAD_16.6_Lite\OpenAccess\bin\Win32\opt;C:\OrCAD\OrCAD_16.6_Lite\tools\fet\bin;C:\OrCAD\OrCAD_16.6_Lite\tools\pcb\bin;C:\Program Files\MiKTeX 2.9\miktex
\bin\x64;C:\Program Files\Git\cmd;C:\Program Files\nodejs;C:\Program Files\MATLAB\R2020a\runtime\win64;C:\Program Files\MATLAB\R2020a\bin;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Users\Sharadindu
\AppData\Local\Microsoft\WindowsApps;C:\Users\Sharadindu\AppData\Local\Programs\Microsoft VS Code\bin;c:\altera\10.1\modelsim_ase\win32aloem;C:\Users\Sharadindu\AppData\Roaming\npm;C:\Users\Sharadindu\AppData\Local
\atom\bin
Executing: "C:\Program Files\CodeBlocks/cb_console_runner.exe" "C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"  (in C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\.)
```



```
"C:\Users\Sharadindu\Desktop\DSA Lab Assignments\LA 3\bin\Debug\LA 3.exe"
4
Process returned 0 (0x0)   execution time : 0.018 s
Press any key to continue.
```