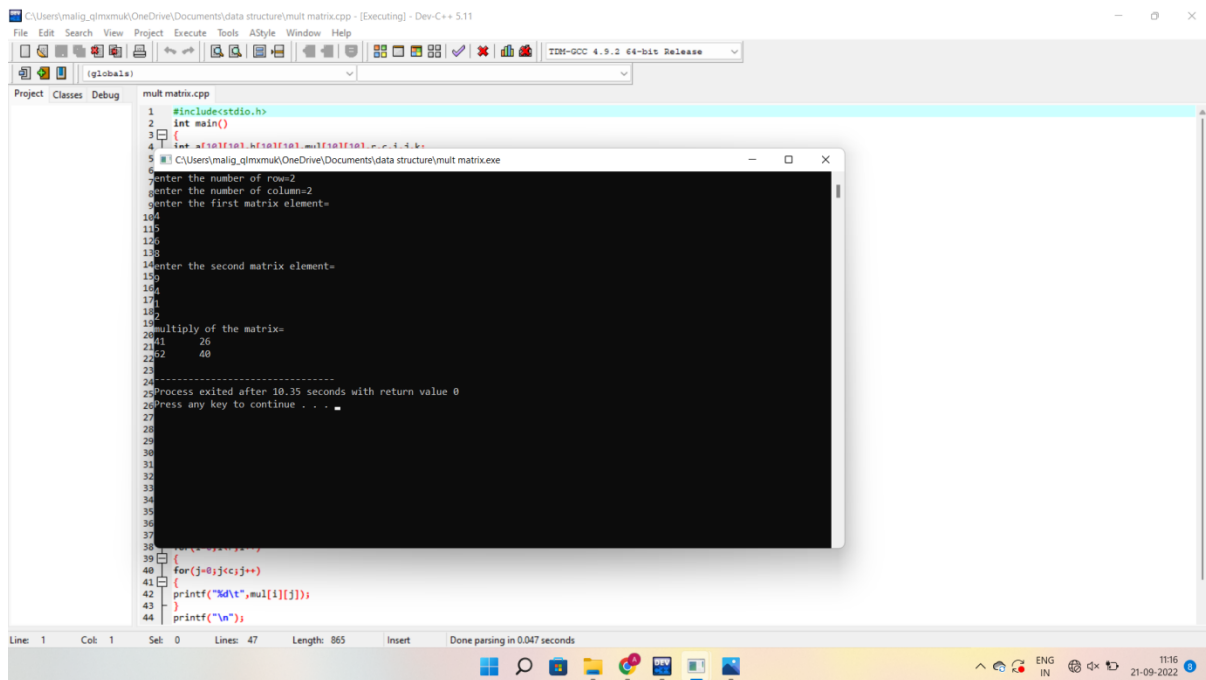


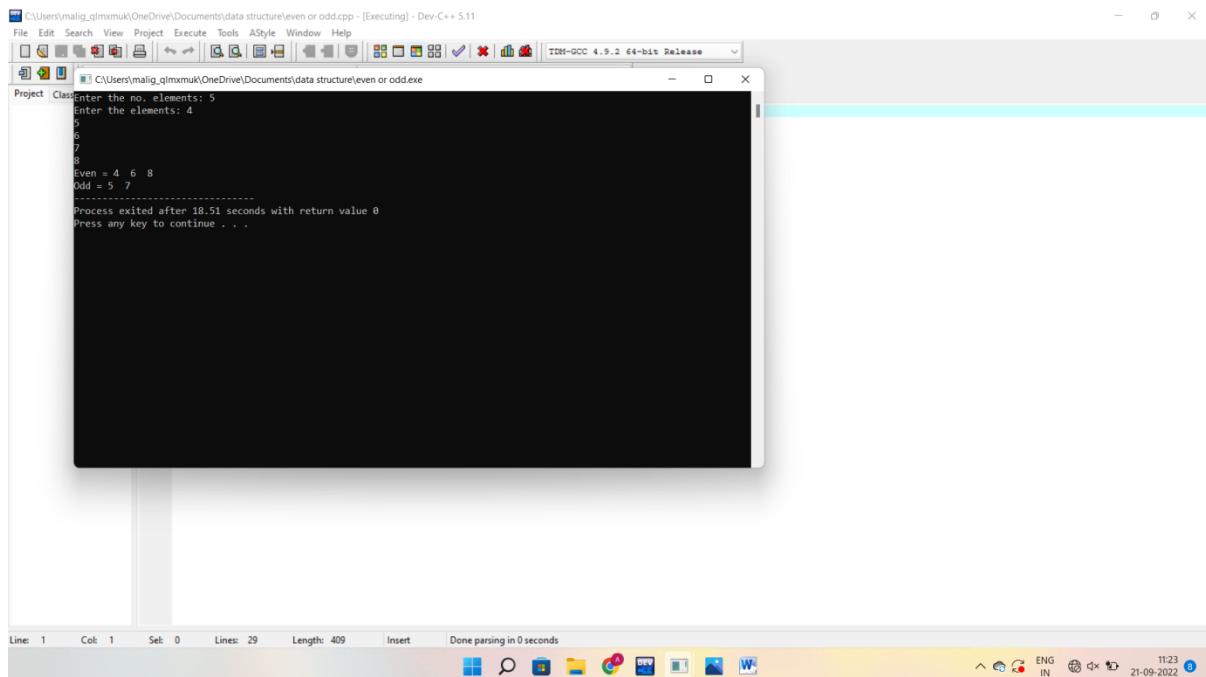
Multiplication of matrix



```
1 #include<stdio.h>
2 int main()
3 {
4     int r,c;
5     printf("Enter the number of row=2\n");
6     printf("Enter the number of column=2\n");
7     printf("Enter the first matrix element=\n");
8     int a[2][2];
9     for(i=0;i<2;i++)
10     {
11         for(j=0;j<2;j++)
12         {
13             scanf("%d",&a[i][j]);
14         }
15     }
16     printf("Enter the second matrix element=\n");
17     int b[2][2];
18     for(i=0;i<2;i++)
19     {
20         for(j=0;j<2;j++)
21         {
22             scanf("%d",&b[i][j]);
23         }
24     }
25     printf("multiply of the matrix=\n");
26     int mul[2][2];
27     for(i=0;i<2;i++)
28     {
29         for(j=0;j<2;j++)
30         {
31             mul[i][j]=0;
32             for(k=0;k<2;k++)
33             {
34                 mul[i][j]+=a[i][k]*b[k][j];
35             }
36         }
37     }
38     for(i=0;i<2;i++)
39     {
40         for(j=0;j<2;j++)
41         {
42             printf("%d\t",mul[i][j]);
43         }
44         printf("\n");
45     }
```

Process exited after 10.35 seconds with return value 0
Press any key to continue . . .

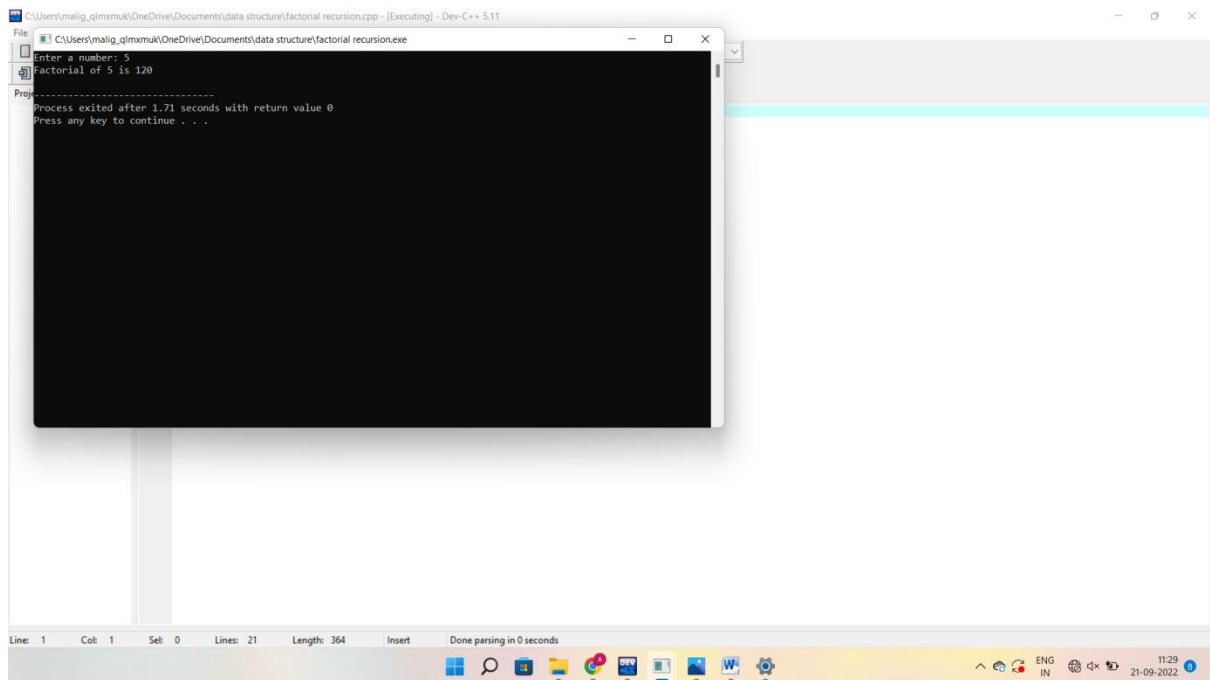
Even or odd



```
1 #include<stdio.h>
2 int main()
3 {
4     int n;
5     printf("Enter the no. elements: 5\n");
6     printf("Enter the elements: 4\n");
7     int a[5];
8     for(i=0;i<5;i++)
9     {
10         scanf("%d",&a[i]);
11     }
12     printf("Even = 4 6 8\n");
13     printf("Odd = 5 7\n");
14     return 0;
15 }
```

Process exited after 10.51 seconds with return value 0
Press any key to continue . . .

Factorial without Recursion

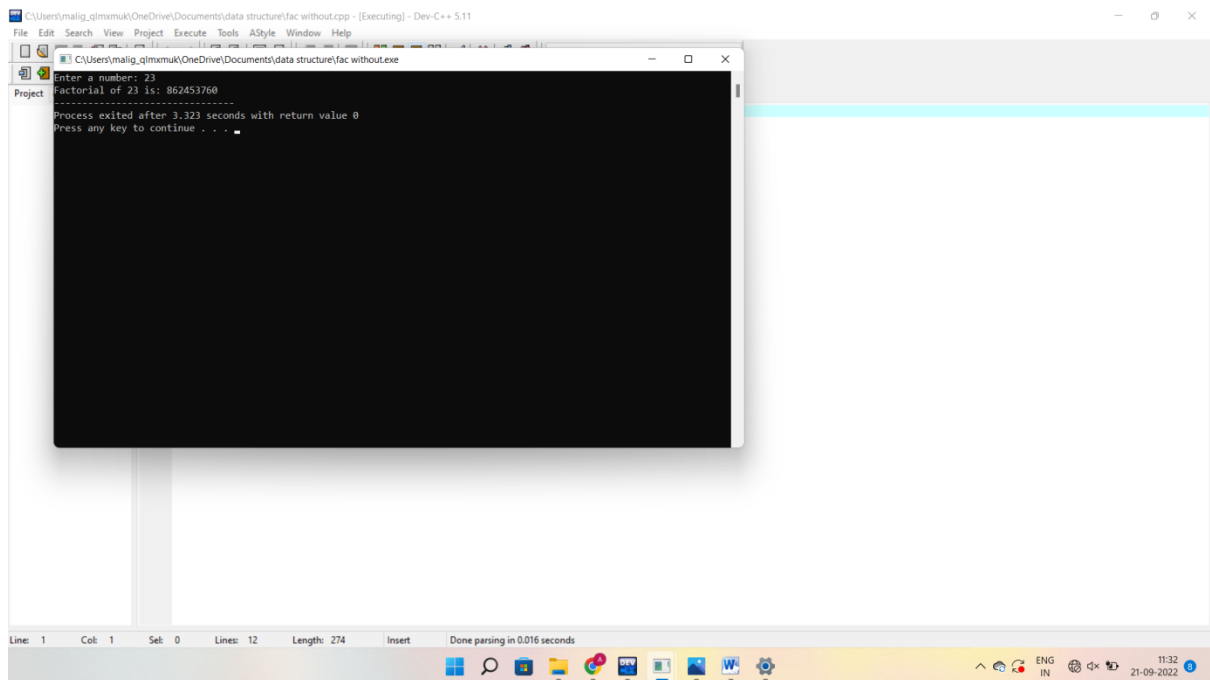


The screenshot shows the Dev-C++ IDE with a project named 'factorial recursion.exe'. The console window displays the following output:

```
Enter a number: 5
factorial of 5 is 120
Process exited after 1.71 seconds with return value 0
Press any key to continue . . .
```

The status bar at the bottom indicates the file is 'factorial recursion.cpp', 21 lines long, and the parsing is complete.

Factorial Recursion

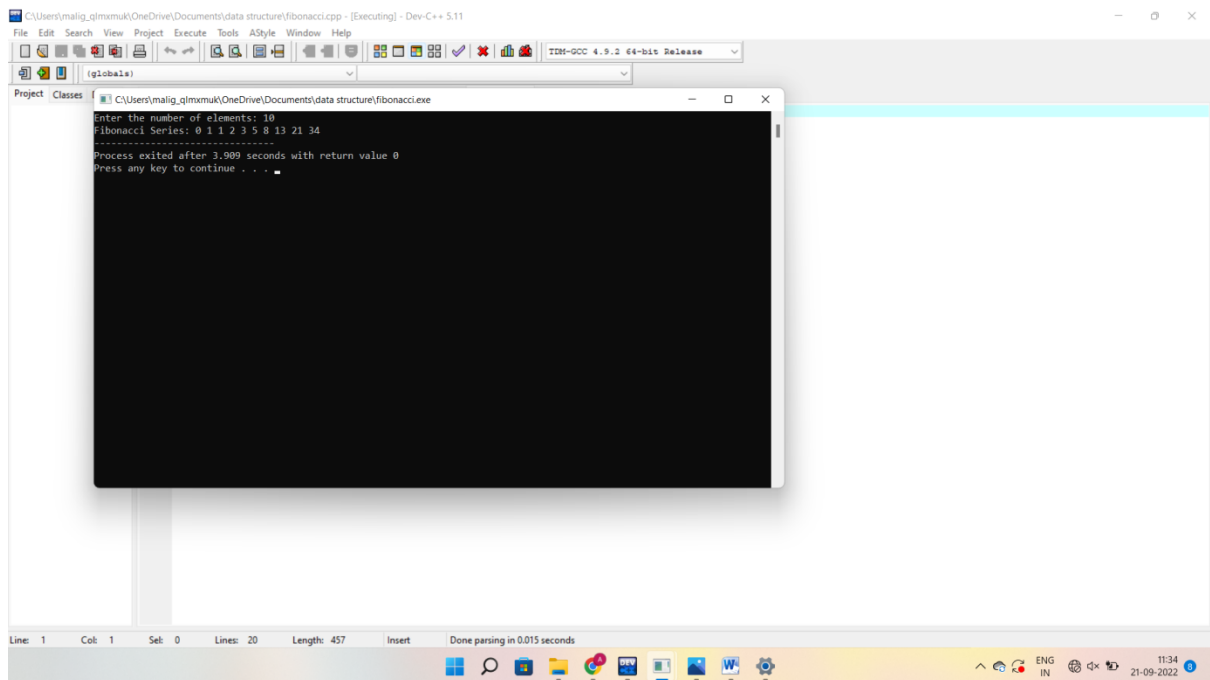


The screenshot shows the Dev-C++ IDE with a project named 'fac without.cpp'. The console window displays the following output:

```
Enter a number: 23
Factorial of 23 is: 862453760
Process exited after 3.323 seconds with return value 0
Press any key to continue . . .
```

The status bar at the bottom indicates the file is 'fac without.cpp', 12 lines long, and the parsing is complete.

Fibonacci recursion

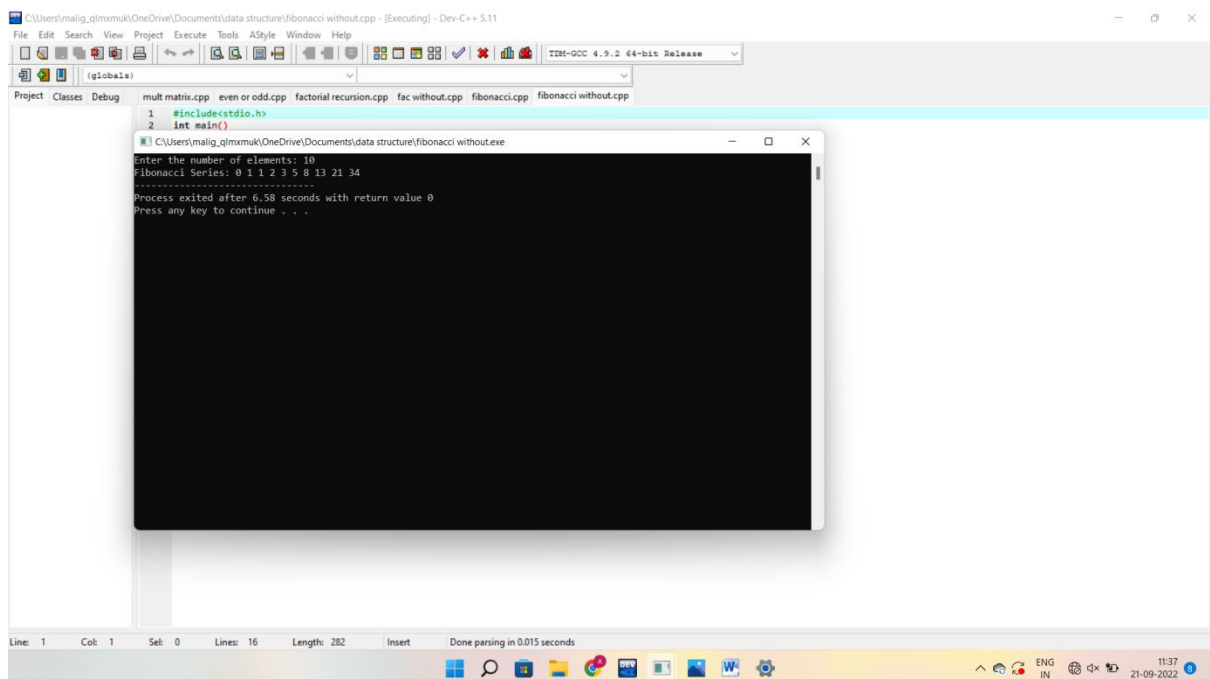


The screenshot shows the Dev-C++ IDE with a project named 'fibonacci.exe'. The console window displays the following output:

```
Enter the number of elements: 10
Fibonacci Series: 0 1 1 2 3 5 8 13 21 34
.....
Process exited after 3.909 seconds with return value 0
Press any key to continue . . .
```

The IDE interface includes a menu bar (File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help), a toolbar, and a status bar at the bottom showing 'Line: 1 Col: 1 Sel: 0 Lines: 20 Length: 457 Insert Done parsing in 0.015 seconds'.

Fibonacci without recursion



The screenshot shows the Dev-C++ IDE with a project named 'fibonacci without.exe'. The console window displays the following output:

```
Enter the number of elements: 10
Fibonacci Series: 0 1 1 2 3 5 8 13 21 34
.....
Process exited after 6.58 seconds with return value 0
Press any key to continue . . .
```

The IDE interface includes a menu bar (File, Edit, Search, View, Project, Execute, Tools, AStyle, Window, Help), a toolbar, and a status bar at the bottom showing 'Line: 1 Col: 1 Sel: 0 Lines: 16 Length: 282 Insert Done parsing in 0.015 seconds'.

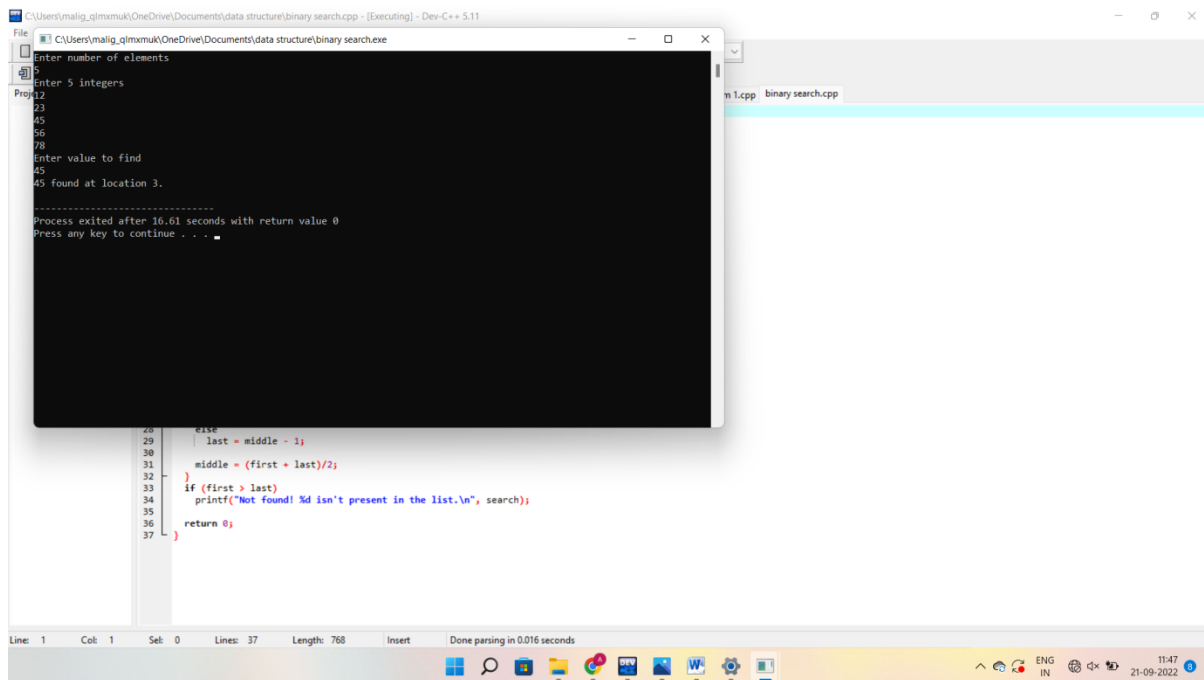
Array

```
C:\Users\malig_qlmxmuk\OneDrive\Documents\data structure\array.exe
Program to Insert and Delete an Element in an Array using switch case
1. Inserting an Element in an Array
2. Deleting an Element in an Array
Select your choice : 1
Enter the size of an array
5
Enter 5 array elements
12
14
23
22
45
List before Insertion: 12 14 23 22 45
Enter an element to Insert
56
Enter a position to insert an element 56
4
List after Insertion: 12 14 23 56 22 45
-----
Process exited after 53.86 seconds with return value 0
Press any key to continue . . .
```

Linear search

```
C:\Users\malig_qlmxmuk\OneDrive\Documents\data structure\linear num 1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
Project Classes Debug mult matrix.cpp even or odd.cpp factorial recursion.cpp fac without.cpp fibonacci.cpp fibonacci without.cpp array.cpp linear num 1.cpp
1 #include <stdio.h>
2 int main()
Enter number of elements in array
5
Enter 5 integer(s)
12
23
45
56
78
Enter a number to search
56
56 is present at location 4.
-----
Process exited after 10.20 seconds with return value 0
Press any key to continue . . .
```

Binary search



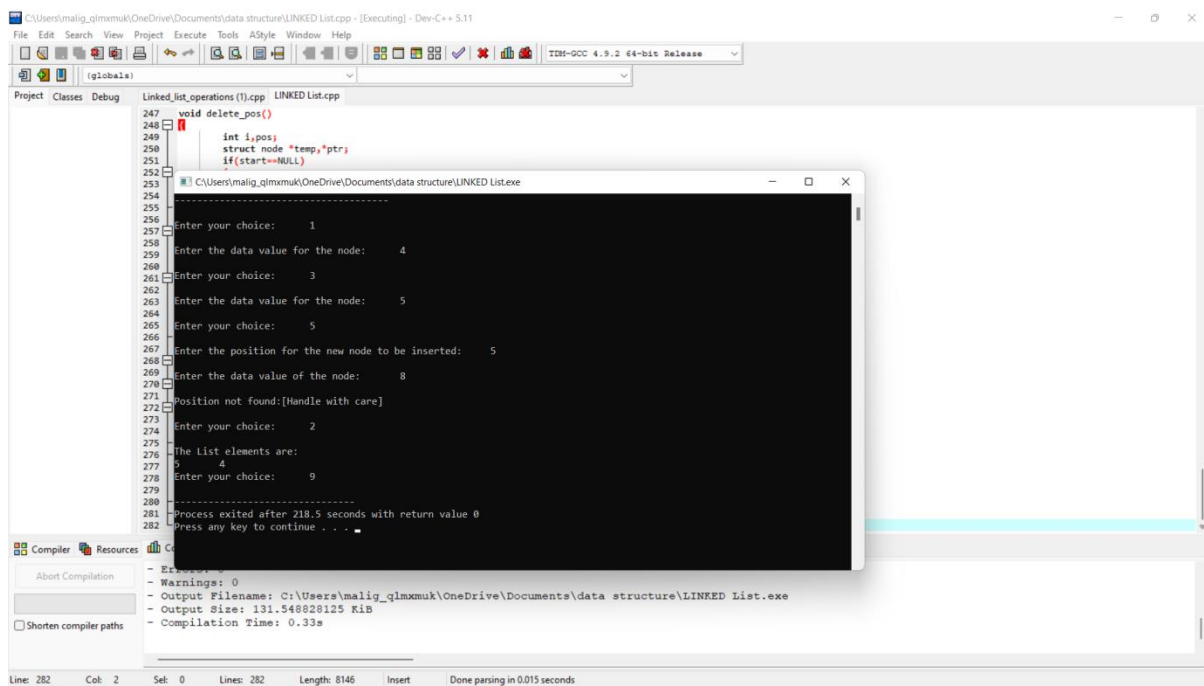
```
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\malig_qlmmuk\OneDrive\Documents\data structure\binary search.cpp - [Executing] - Dev-C++ 5.11
n1.cpp binary search.cpp
Enter number of elements
Enter 5 integers
23
45
56
78
90
Enter value to find
45
45 found at location 3.
-----
Process exited after 16.61 seconds with return value 0
Press any key to continue . . .
```

```
28 else
29     last = middle - 1;
30
31     middle = (first + last)/2;
32 }
33 if (first > last)
34     printf("Not found! %d isn't present in the list.\n", search);
35
36     return 0;
37 }
```

Line: 1 Col: 1 Sel: 0 Lines: 37 Length: 768 Insert Done parsing in 0.016 seconds

11:47 21-09-2022

Linked list



```
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\malig_qlmmuk\OneDrive\Documents\data structure\LINKED List.cpp - [Executing] - Dev-C++ 5.11
LINKED List.cpp
Project Classes Debug
247 void delete_pos()
248 {
249     int i, pos;
250     struct node *temp, *ptr;
251     if (start == NULL)
252         return;
253
254     Enter your choice: 1
255     Enter the data value for the node: 4
256     Enter your choice: 3
257     Enter the data value for the node: 5
258     Enter your choice: 5
259     Enter the position for the new node to be inserted: 5
260     Enter the data value of the node: 8
261     Position not found:[Handle with care]
262     Enter your choice: 2
263     The List elements are:
264     4
265     Enter your choice: 9
266     -----
267     Process exited after 218.5 seconds with return value 0
268     Press any key to continue . . .
```

```
247 void delete_pos()
248 {
249     int i, pos;
250     struct node *temp, *ptr;
251     if (start == NULL)
252         return;
253
254     Enter your choice: 1
255     Enter the data value for the node: 4
256     Enter your choice: 3
257     Enter the data value for the node: 5
258     Enter your choice: 5
259     Enter the position for the new node to be inserted: 5
260     Enter the data value of the node: 8
261     Position not found:[Handle with care]
262     Enter your choice: 2
263     The List elements are:
264     4
265     Enter your choice: 9
266     -----
267     Process exited after 218.5 seconds with return value 0
268     Press any key to continue . . .
```

Compiler Resources

Abort Compilation

Shorten compiler paths

Line: 282 Col: 2 Sel: 0 Lines: 282 Length: 8146 Insert Done parsing in 0.015 seconds

Stack operations

```
STACK OPERATIONS USING ARRAY
-----
1. PUSH
2. POP
3. DISPLAY
4. EXIT
Enter the Choice:1
Enter a value to be pushed:5
Enter the Choice:1
Enter a value to be pushed:6
Enter the Choice:1
Enter a value to be pushed:78
Enter the Choice:3
The elements in STACK
78
6
5
Press Next Choice
Enter the Choice:4
EXIT POINT
-----
Process exited after 52.88 seconds with return value 0
Press any key to continue . . .
```

Compiler Resources Compile Log Debug Find Results Close

Abort Compilation

Shorten compiler paths

Errors: 0
Warnings: 0
Output Filename: C:\Users\malig_glmxmuk\Downloads\Stack.exe
Output Size: 129.9404296875 KiB
Compilation Time: 0.33s

Line: 48 Col: 14 Sel: 0 Lines: 91 Length: 1787 Insert Done parsing in 0.016 seconds

Stack applications

```
22.DFS.cpp 23.Dijkstra's Algorithm.cpp fac without.cpp 12.stack_applic_infix_to_postfix.cpp
C:\Users\malig_glmxmuk\Downloads\12stack_applic_infix_to_postfix.exe
ASSUMPTION: The infix expression contains single letter variables and single digit constants only.
Enter Infix expression : ad*fh+(df-km)
Postfix Expression: adfh*dfkm+
-----
Process exited after 70.11 seconds with return value 0
Press any key to continue . . .
```

Compiler Resources Compile Log Debug Find Results Close

Abort Compilation

Shorten compiler paths

Errors: 0
Warnings: 0
Output Filename: C:\Users\malig_glmxmuk\Downloads\12.stack_applic_infix_to_postfix.exe
Output Size: 131.3271484375 KiB
Compilation Time: 0.22s

Line: 1 Col: 1 Sel: 0 Lines: 165 Length: 2504 Insert Done parsing in 0.015 seconds

Queue

```
C:\Users\malig_glmxmuk\Downloads\queue.exe
Queue using Array
Enter the size of Queue:5

1.Insertion
2.Deletion
3.Display
4.Exit
Enter the Choice:1

Enter no 1:2

Enter the Choice:1

Enter no 2:5

Enter the Choice:1

Enter no 3:6

Enter the Choice:1

Enter no 4:8

Enter the Choice:2

Deleted Element is 2
Enter the Choice:3

Queue Elements are:
5
6
8

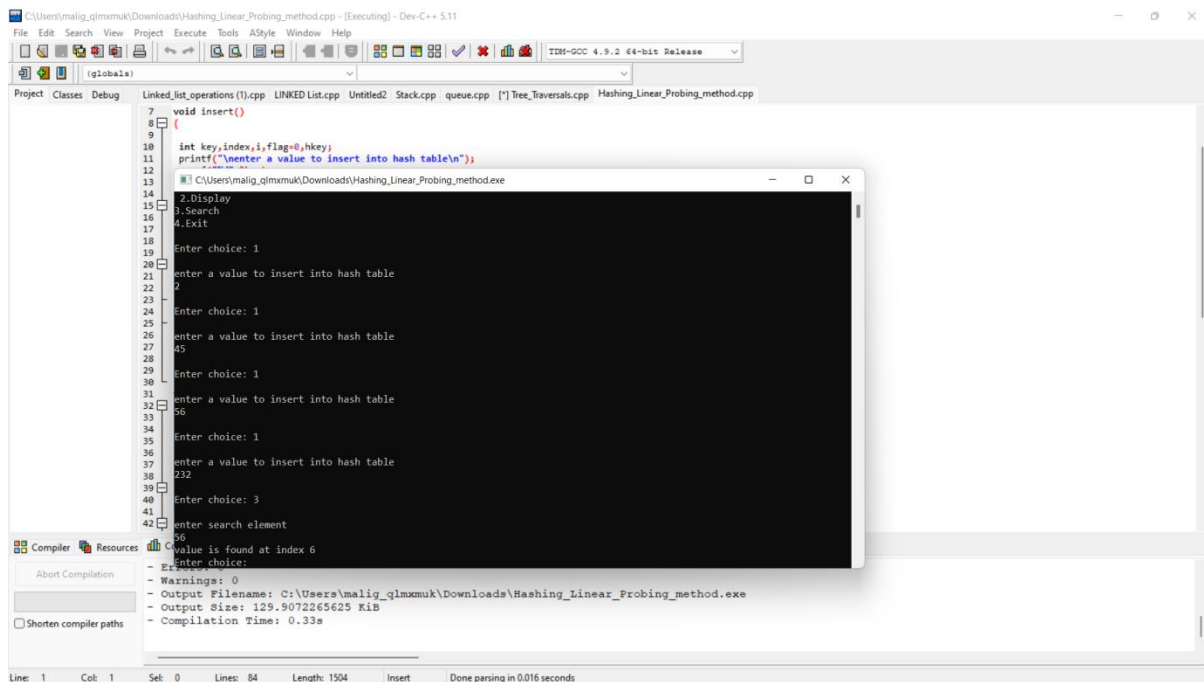
Enter the Choice:
```

Tree transversal

```
C:\Users\malig_glmxmuk\Downloads\Tree_Traversals.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
[Icons] (globals)
Project Classes Debug Linked_list_operations (1).cpp LINKED List.cpp Untitled2 Stack.cpp queue.cpp [*] Tree_Traversals.cpp
111 | for (i = 0; i < n; i++)
112 | {
C:\Users\malig_glmxmuk\Downloads\Tree_Traversals.exe
Enter no. of elements: 5
Enter the elements: 4
5
6
7
8
Visiting elements: 4 5 6 7 8 [ x ] Element not found (31).
Visiting elements: 4 5 6 7 8 [ x ] Element not found (15).
Preorder traversal: 4 5 6 7 8
Inorder traversal: 4 5 6 7 8
Post order traversal: 8 7 6 5 4
-----
Process exited after 8.914 seconds with return value 0
Press any key to continue . . .

Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\malig_glmxmuk\Downloads\Tree_Traversals.exe
- Output Size: 131.0068359375 KiB
- Compilation Time: 0.33s
Line: 109 Col: 2 Set: 0 Lines: 148 Length: 3108 Insert Done parsing in 0.015 seconds
```

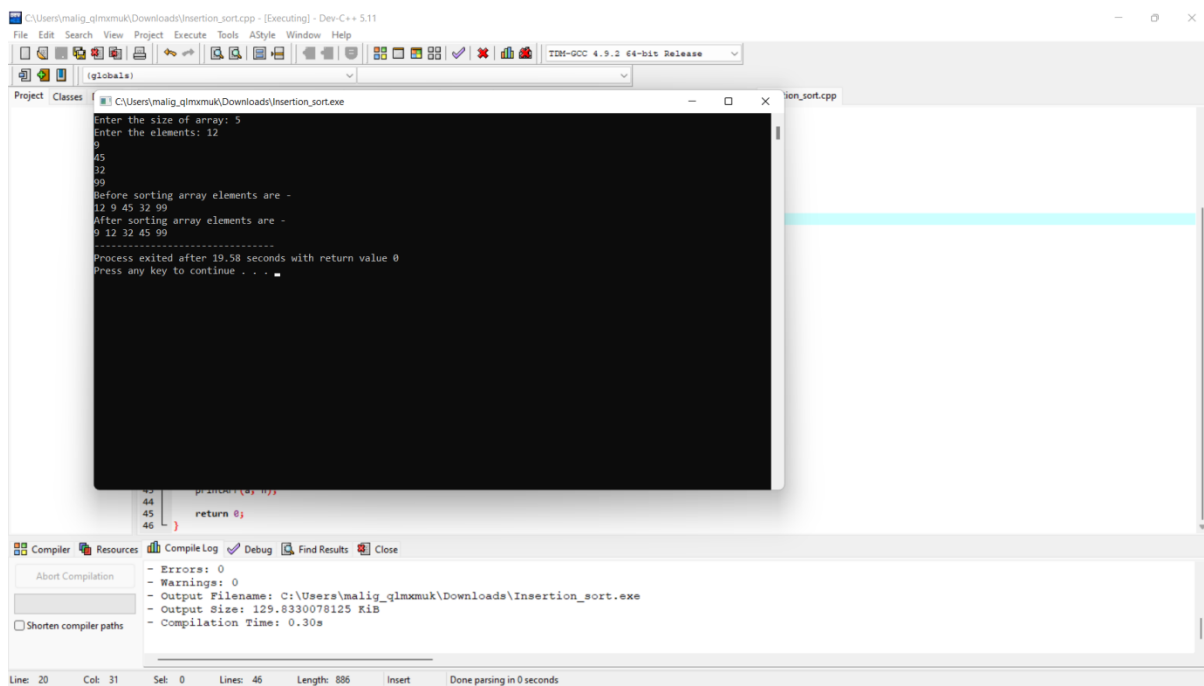
Hashing using linear probing



The screenshot shows the Dev-C++ IDE with the file `Hashing_Linear_Probing_method.cpp` open. The code defines a hash table using linear probing. The `insert()` function takes a key and index, and the `search()` function finds the value in the table. The output window shows the program's execution, including prompts for choices and values, and the final search result.

```
7 void insert()  
8 {  
9     int key, index, i, flag=0, hkey;  
10    printf("\nEnter a value to insert into hash table\n");  
11  
12    while (1)  
13    {  
14        Enter choice: 1  
15        Enter a value to insert into hash table  
16        2  
17        Enter choice: 1  
18        Enter a value to insert into hash table  
19        45  
20        Enter choice: 1  
21        Enter a value to insert into hash table  
22        56  
23        Enter choice: 1  
24        Enter a value to insert into hash table  
25        232  
26        Enter choice: 3  
27        Enter search element  
28        56  
29        Value is found at index 6  
30        Enter choice:  
31        - Errors: 0  
32        - Warnings: 0  
33        - Output Filename: C:\Users\malig_glmxmuk\Downloads\Hashing_Linear_Probing_method.exe  
34        - Output Size: 129.9072265625 KiB  
35        - Compilation Time: 0.33s
```

Insertion sort



The screenshot shows the Dev-C++ IDE with the file `Insertion_sort.cpp` open. The code implements the insertion sort algorithm. The output window shows the program's execution, including prompts for array size and elements, the sorting process, and the final sorted array.

```
43    printf("\nBefore sorting array elements are -\n");  
44    for (i = 0; i < n; i++)  
45        printf("%d ", arr[i]);  
46    printf("\n");  
47    printf("\nAfter sorting array elements are -\n");  
48    for (i = 0; i < n; i++)  
49        printf("%d ", arr[i]);  
50    printf("\n");  
51    printf("Process exited after 19.58 seconds with return value 0\n");  
52    printf("Press any key to continue . . . ");  
53    getch();  
54    return 0;  
55 }
```


Merge sort

```
C:\Users\malig_glmxmuk\Downloads\17.Merge_sort.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes
C:\Users\malig_glmxmuk\Downloads\17.Merge_sort.exe
Enter no. of elements: 5
Enter the elements: 4
5
6
7
1
Given array is
4 5 6 7 1
Sorted array is
1 4 5 6 7
-----
Process exited after 9.867 seconds with return value 0
Press any key to continue . . .

Compiler Resources
Abort Compilation
Shorten compiler paths
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\malig_glmxmuk\Downloads\17.Merge_sort.exe
- Output Size: 131.04296875 KiB
- Compilation Time: 0.19s
Line: 1 Col: 1 Sel: 0 Lines: 87 Length: 1511 Insert Done parsing in 0.015 seconds
```

Quick sort

```
C:\Users\malig_glmxmuk\Downloads\18.Quick_sort.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
(globals)
Project Classes Debug
[""] 22.DFS.cpp 23.Dijkstra's Algorithm.cpp fac without.cpp 12.stack_applic_infix_to_postfix.cpp 17.Merge_sort.cpp 18.Quick_sort.cpp
1 #include <stdio.h>
2 int partition (int a[], int start, int end)
3 {
4     int pivot = a[end];
5     int i = (start - 1);
6
7
8
9 Enter no. of elements: 5
10 Enter the elements: 1
11 8
12 4
13 3
14 7
15
16 Before sorting array elements are -
17 1 8 4 3 7
18 After sorting array elements are -
19 1 3 4 7 8
20 -----
21 Process exited after 9.882 seconds with return value 0
22 Press any key to continue . . .

Compiler Resources
Abort Compilation
Shorten compiler paths
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\malig_glmxmuk\Downloads\18.Quick_sort.exe
- Output Size: 129.8671875 KiB
- Compilation Time: 0.20s
Line: 1 Col: 1 Sel: 0 Lines: 55 Length: 1192 Insert Done parsing in 0.015 seconds
```

Heap sort

```
1 #include <iostream>
2 void main()
3 {
4     Enter the no. elements: 5
5     Enter the elements: 9
6     2
7     5
8 }
9 void sort()
10 {
11     Sorted array is
12     1 2 5 7 9
13     -----
14     Process exited after 16.35 seconds with return value 0
15     Press any key to continue . . .
16
17
18
19
20
21
22
23 void
24 {
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39 }
```

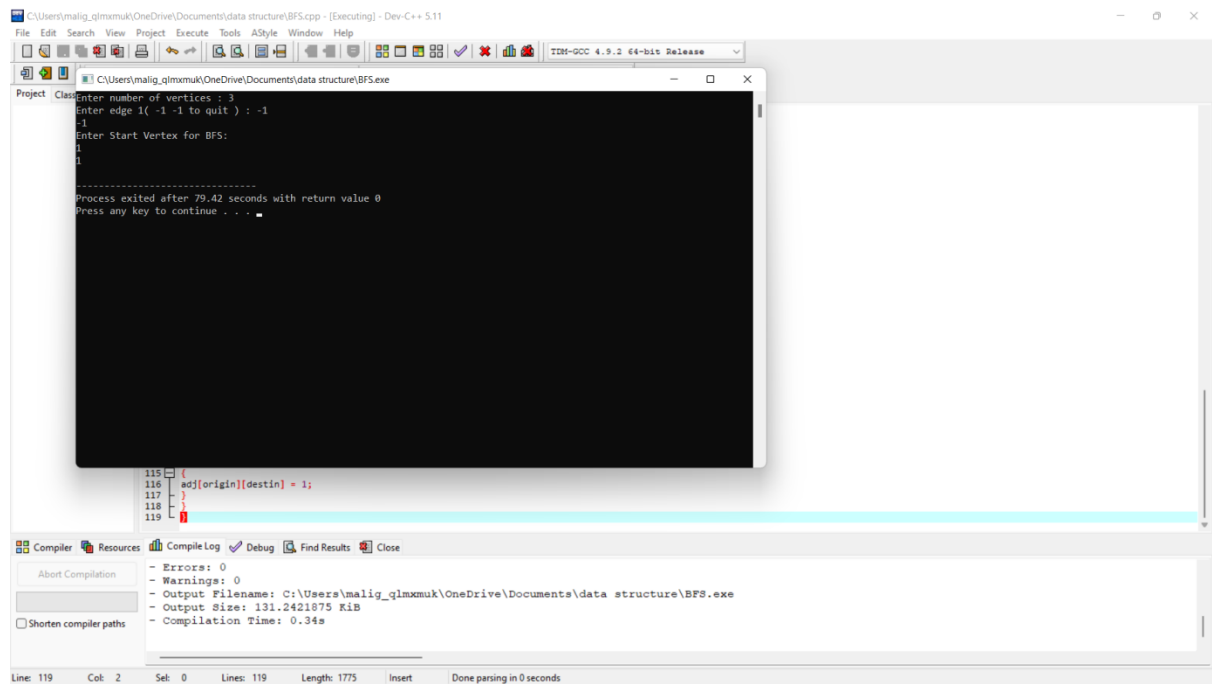
Compiler: 0 Errors, 0 Warnings, 0 Output Filesize: 130.5712890625 KiB, Compilation Time: 0.39s

AVL Tree

```
4 2 1 3 7 5 8
After deletion: 4 2 1 7 5 8
-----
Process exited after 0.02748 seconds with return value 0
Press any key to continue . . .
```

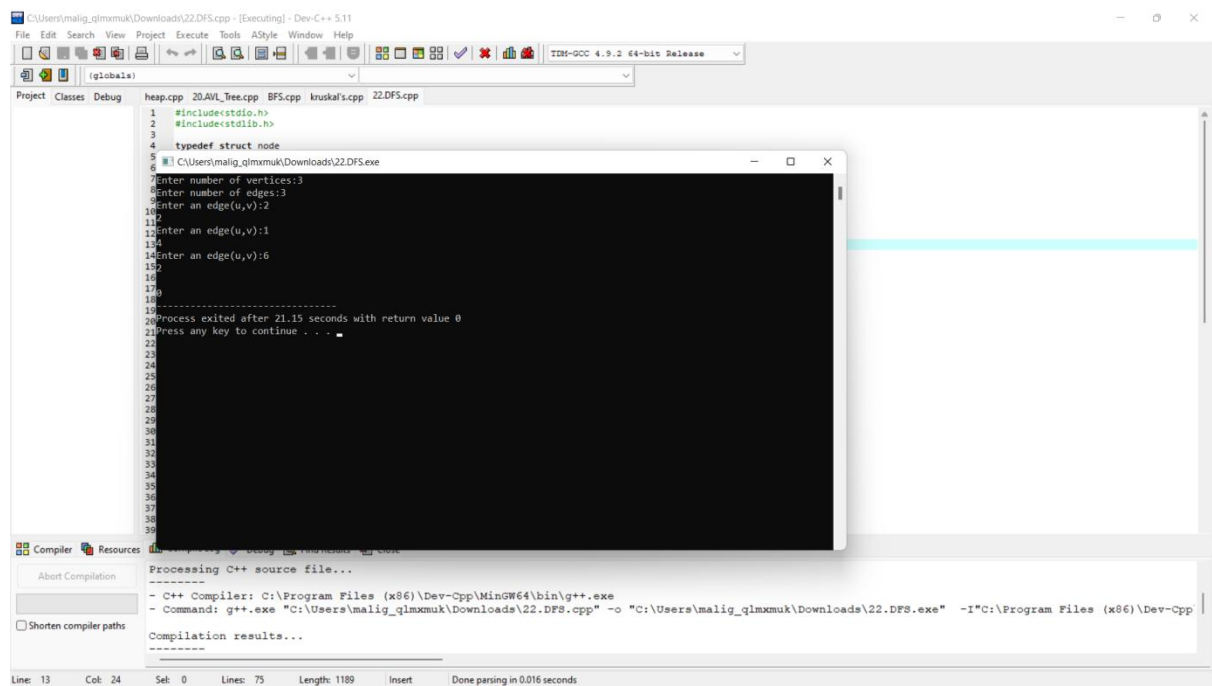
Compiler: 0 Errors, 0 Warnings, 0 Output Filesize: 130.7861328125 KiB, Compilation Time: 0.34s

BFS



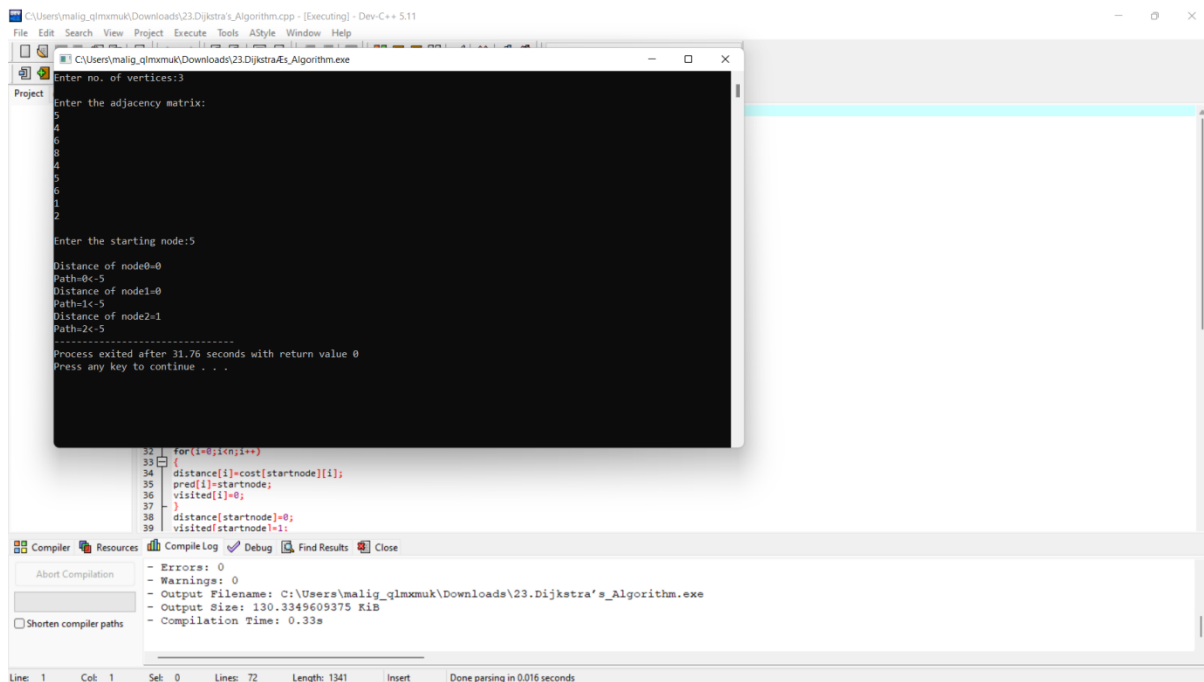
```
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\malig_qlmxmuk\OneDrive\Documents\data structure\BFS.cpp - [Executing] - Dev-C++ 5.11
TDM-GCC 4.9.2 64-bit Release
Project Classes Debug
C:\Users\malig_qlmxmuk\OneDrive\Documents\data structure\BFS.exe
Enter number of vertices : 3
Enter edge 1( -1 -1 to quit ) : -1
-1
Enter Start Vertex for BFS:
1
1
-----
Process exited after 79.42 seconds with return value 0
Press any key to continue . . .
115 [
116 adj[origin][destin] = 1;
117
118
119
Compiler Resources
Abort Compilation
Shorten compiler paths
Compile Log Debug Find Results Close
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\malig_qlmxmuk\OneDrive\Documents\data structure\BFS.exe
- Output Size: 131.2421875 Kib
- Compilation Time: 0.34s
Line: 119 Col: 2 Set: 0 Lines: 119 Length: 1775 Insert Done parsing in 0 seconds
```

DFS



```
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\malig_qlmxmuk\Downloads\22.DFS.cpp - [Executing] - Dev-C++ 5.11
TDM-GCC 4.9.2 64-bit Release
Project Classes Debug
heap.cpp 20.AVL_Tree.cpp BFS.cpp kruskal's.cpp 22.DFS.cpp
1 #include<stdio.h>
2 #include<stdlib.h>
3
4 typedef struct node
5 {
6     C:\Users\malig_qlmxmuk\Downloads\22.DFS.exe
7     Enter number of vertices:3
8     Enter number of edges:3
9     Enter an edge(u,v):2
10
11
12 Enter an edge(u,v):1
13
14 Enter an edge(u,v):6
15
16
17
18
19
20 Process exited after 21.15 seconds with return value 0
21 Press any key to continue . . .
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
Compiler Resources
Abort Compilation
Shorten compiler paths
Processing C++ source file...
-----
C++ Compiler: C:\Program Files (x86)\Dev-Cpp\MinGW64\bin\g++.exe
Command: g++.exe "C:\Users\malig_qlmxmuk\Downloads\22.DFS.cpp" -o "C:\Users\malig_qlmxmuk\Downloads\22.DFS.exe" -I"C:\Program Files (x86)\Dev-Cpp
Compilation results...
-----
Line: 13 Col: 24 Set: 0 Lines: 75 Length: 1189 Insert Done parsing in 0.016 seconds
```

Dijkstra's Algorithm



```
C:\Users\malig_glmxmuk\Downloads\23.Dijkstra's_Algorithm.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\malig_glmxmuk\Downloads\23.Dijkstra's_Algorithm.exe
Enter no. of vertices:3
Enter the adjacency matrix:
5
4
6
8
4
5
6
1
2
Enter the starting node:5
Distance of node0=0
Path=0<5
Distance of node1=0
Path=1<5
Distance of node2=1
Path=2<5
-----
Process exited after 31.76 seconds with return value 0
Press any key to continue . . .
```

Compiler Resources Compile Log Debug Find Results Close

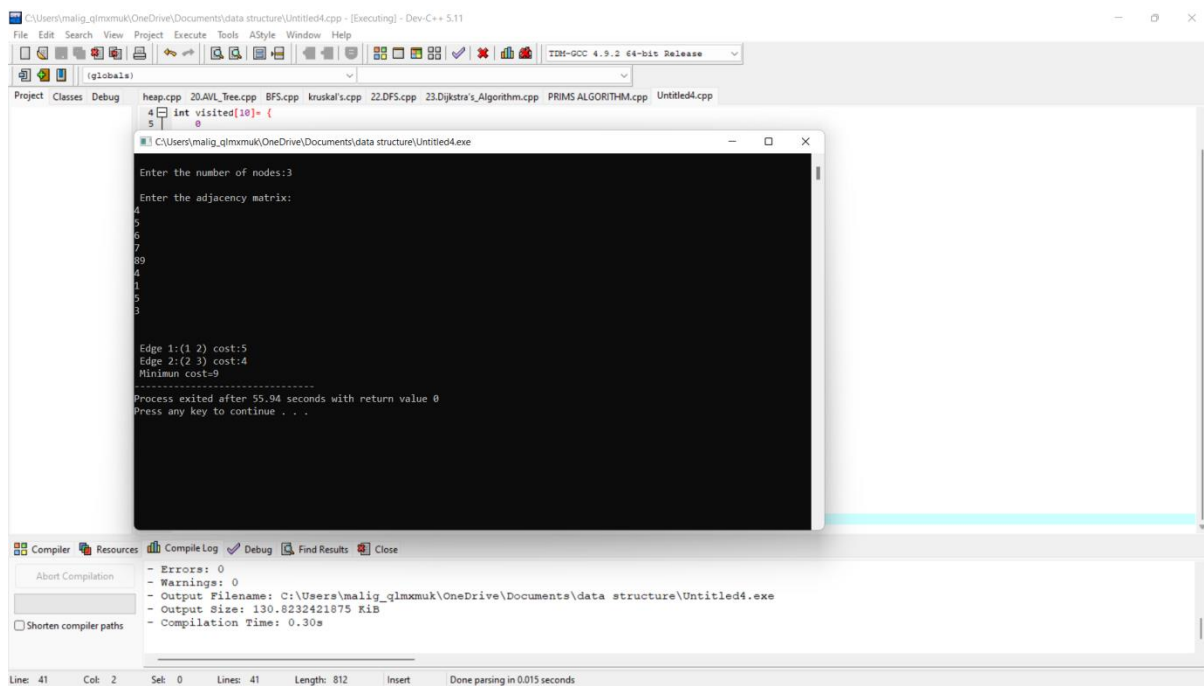
Abort Compilation

Shorten compiler paths

Errors: 0
Warnings: 0
Output Filename: C:\Users\malig_glmxmuk\Downloads\23.Dijkstra's_Algorithm.exe
Output Size: 130.3349609375 KiB
Compilation Time: 0.33s

Line: 1 Col: 1 Sel: 0 Lines: 72 Length: 1341 Insert Done parsing in 0.016 seconds

Prims



```
C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\Untitled4.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
heap.cpp 20.AVL_Tree.cpp BFS.cpp kruskal's.cpp 22.DFS.cpp 23.Dijkstra's_Algorithm.cpp PRIMS ALGORITHM.cpp Untitled4.cpp
C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\Untitled4.exe
Enter the number of nodes:3
Enter the adjacency matrix:
4
5
6
7
8
9
4
1
5
3
Edge 1:(1 2) cost:5
Edge 2:(2 3) cost:4
Minimum cost=9
-----
Process exited after 55.94 seconds with return value 0
Press any key to continue . . .
```

Compiler Resources Compile Log Debug Find Results Close

Abort Compilation

Shorten compiler paths

Errors: 0
Warnings: 0
Output Filename: C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\Untitled4.exe
Output Size: 130.8232421875 KiB
Compilation Time: 0.30s

Line: 41 Col: 2 Sel: 0 Lines: 41 Length: 812 Insert Done parsing in 0.015 seconds

Kruskal Algorithm

The screenshot shows a Dev-C++ IDE with a project named "kruskal.cpp". The code in the editor is as follows:

```
1 #include<stdio.h>
2 #include<stdlib.h>
3 #define VAL 999
4 int i,j,k,u,v,n,ne=1;
5 int min,mincost=0,cost[9][9],parent[9];
6 int #ind int i;
7
8 // C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\kruskal.exe
9 Implementation of Kruskal's algorithm
10 Enter the no. of vertices:3
11 Enter the cost adjacency matrix:
12 2
13 4
14 9
15 4
16 1
17 3
18 5
19 6
20
21 The edges of Minimum Cost Spanning Tree are
22 1 edge (2,3) =1
23 2 edge (3,1) =3
24
25 Minimum cost = 4
26
27 -----
28 Process exited after 22.72 seconds with return value 0
29 Press any key to continue . . .
30
31
32
33
34
35
36
37
38
39
```

The output window shows the following information:

- Compiler: gcc
- Resources: C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\kruskal.exe
- Warnings: 0
- Output Filename: C:\Users\malig_glmxmuk\OneDrive\Documents\data structure\kruskal.exe
- Output Size: 130.5341796875 KiB
- Compilation Time: 0.36s

The status bar at the bottom indicates: Line: 62, Col: 2, Set: 0, Lines: 62, Length: 1345, Insert, Done parsing in 0.031 seconds.