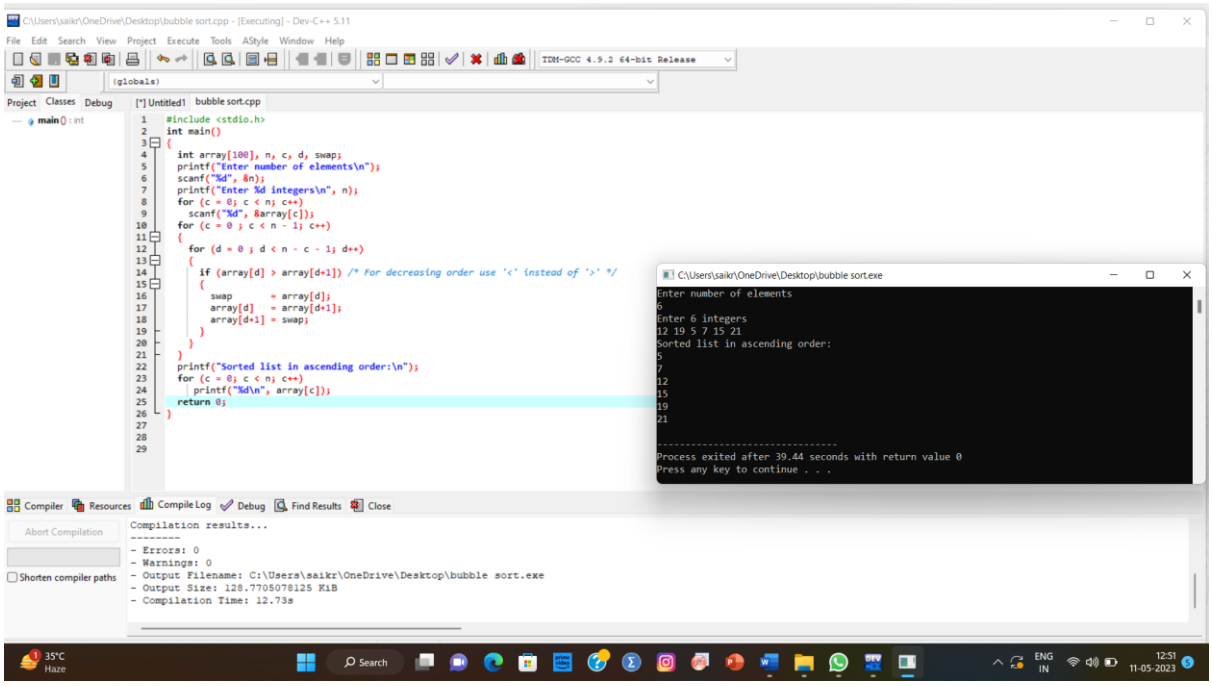
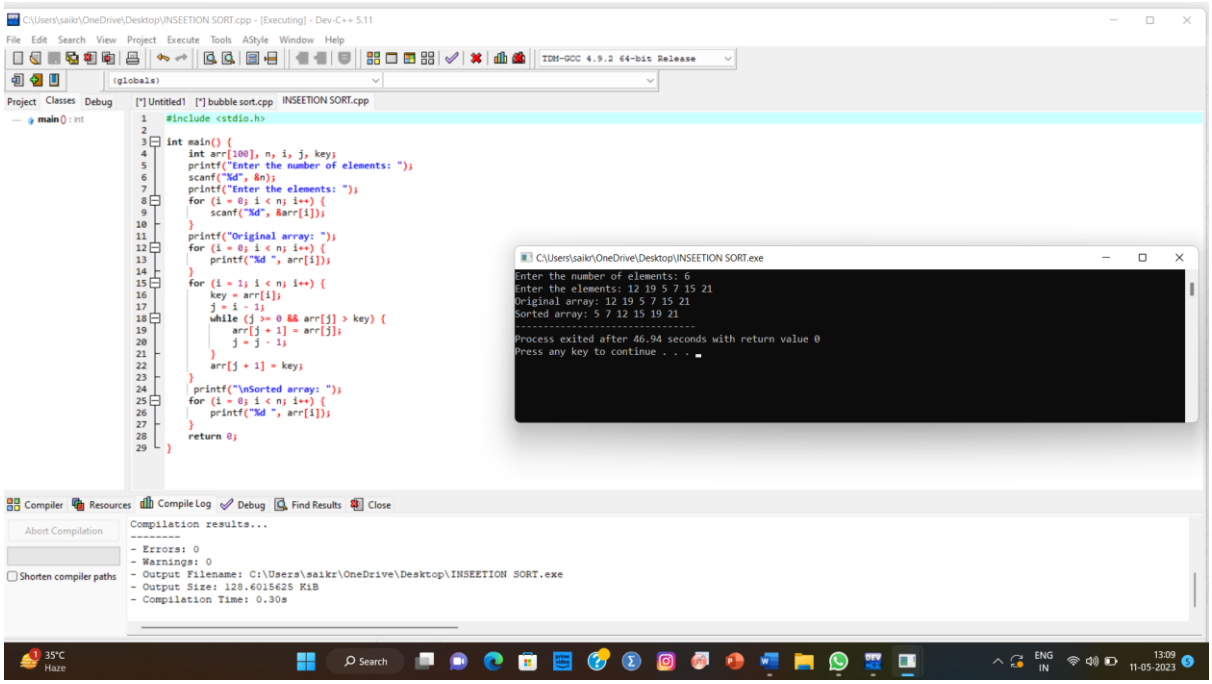
Data Structures Day 3

T. Sai krishna (192211870)

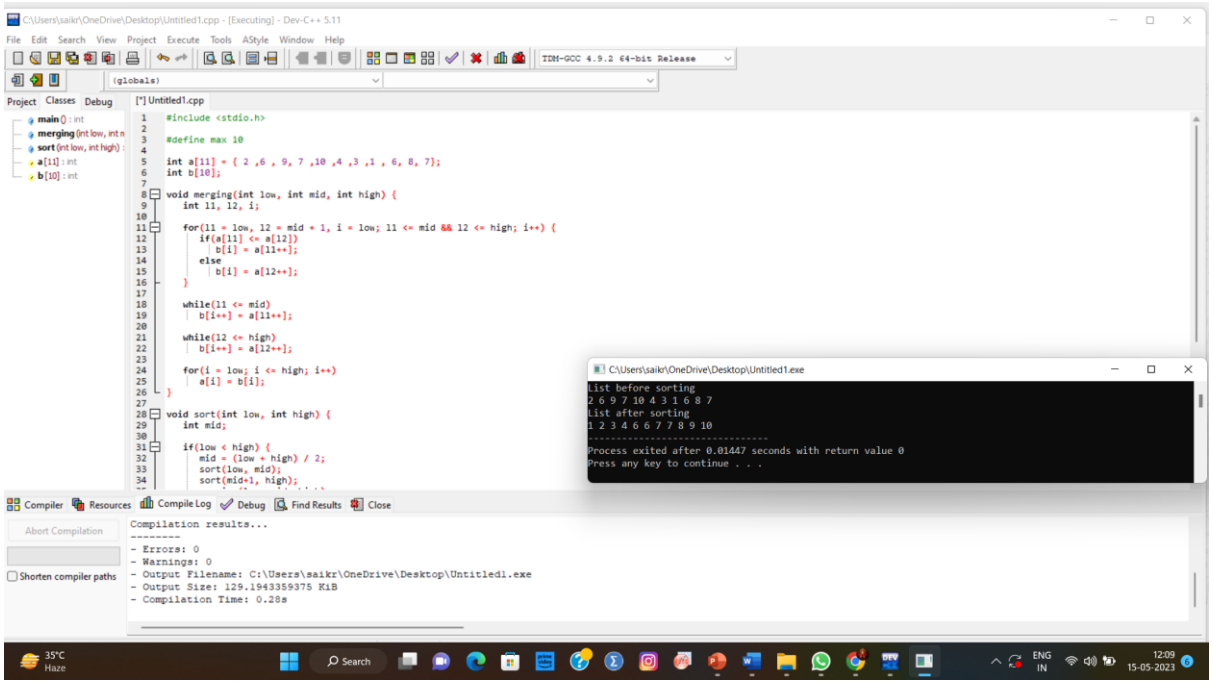
31)Write C programme to implement Bubble sort.

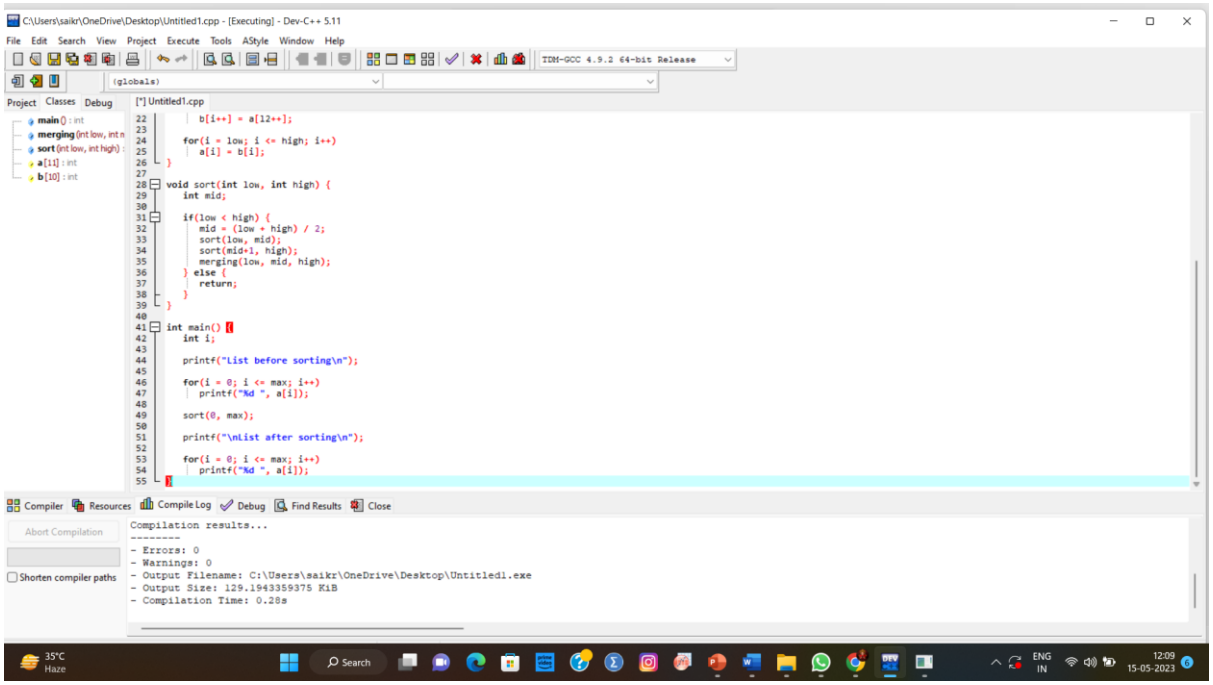


32) Write C programme to implement Insertion sort.

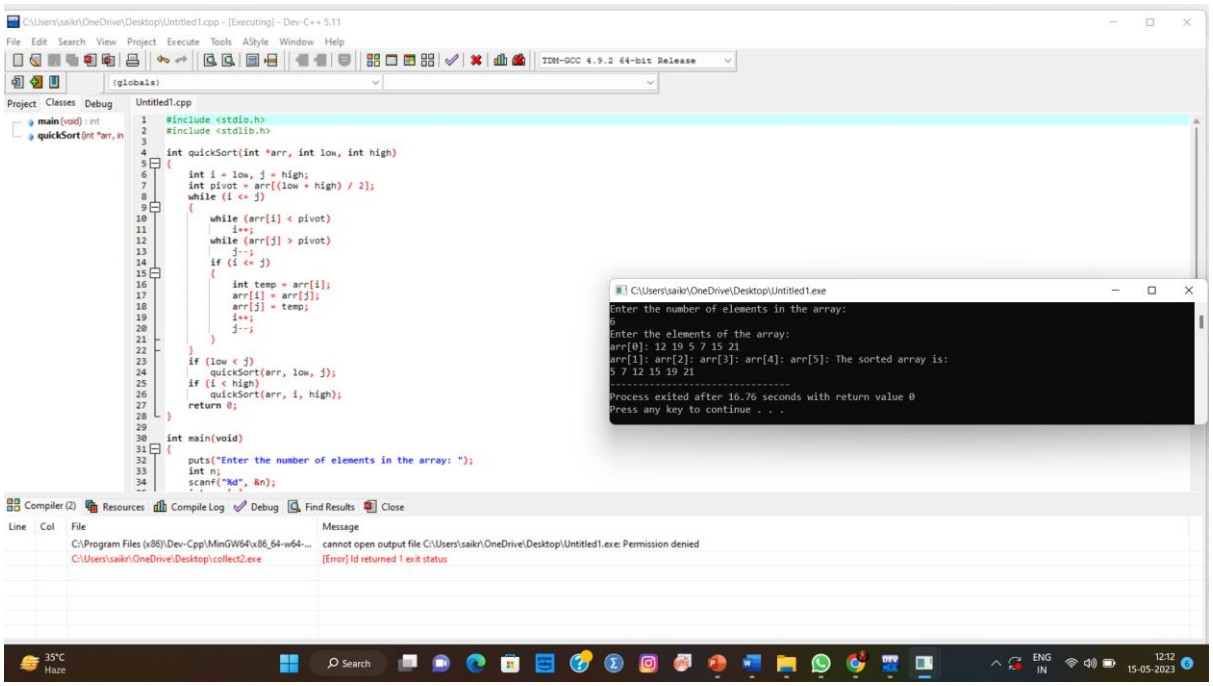


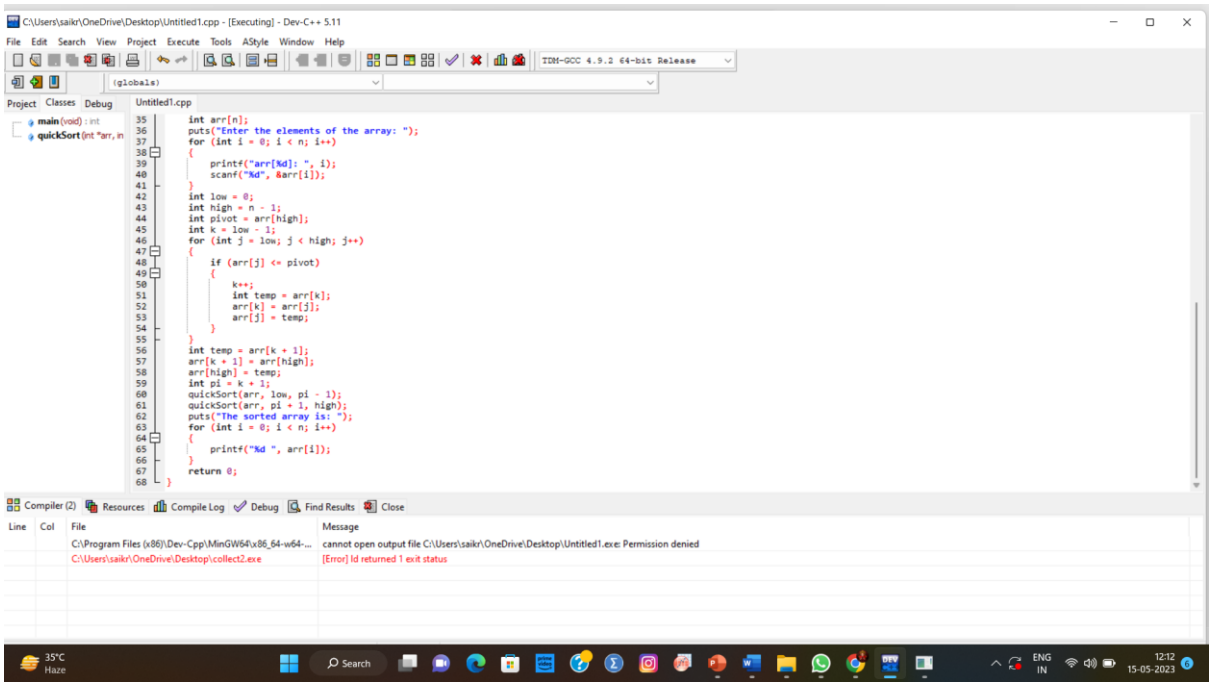
33) Write C programme to implement Merge sort.



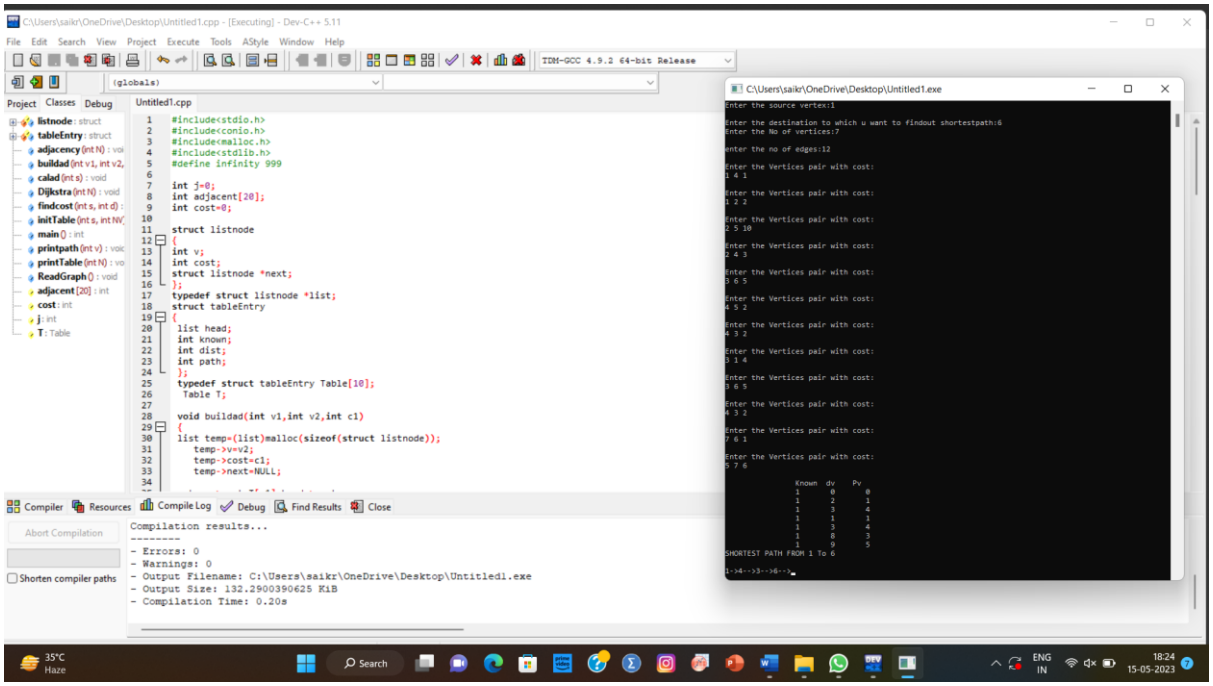


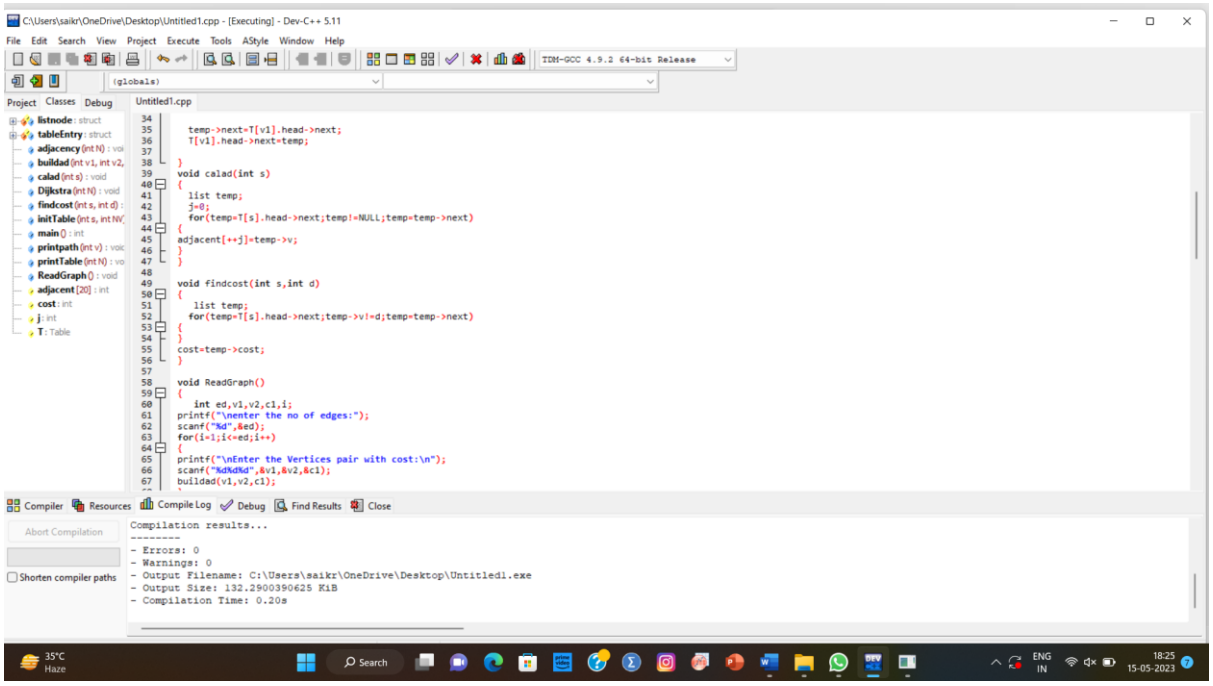
34)Write C programme to implement Quick sort.

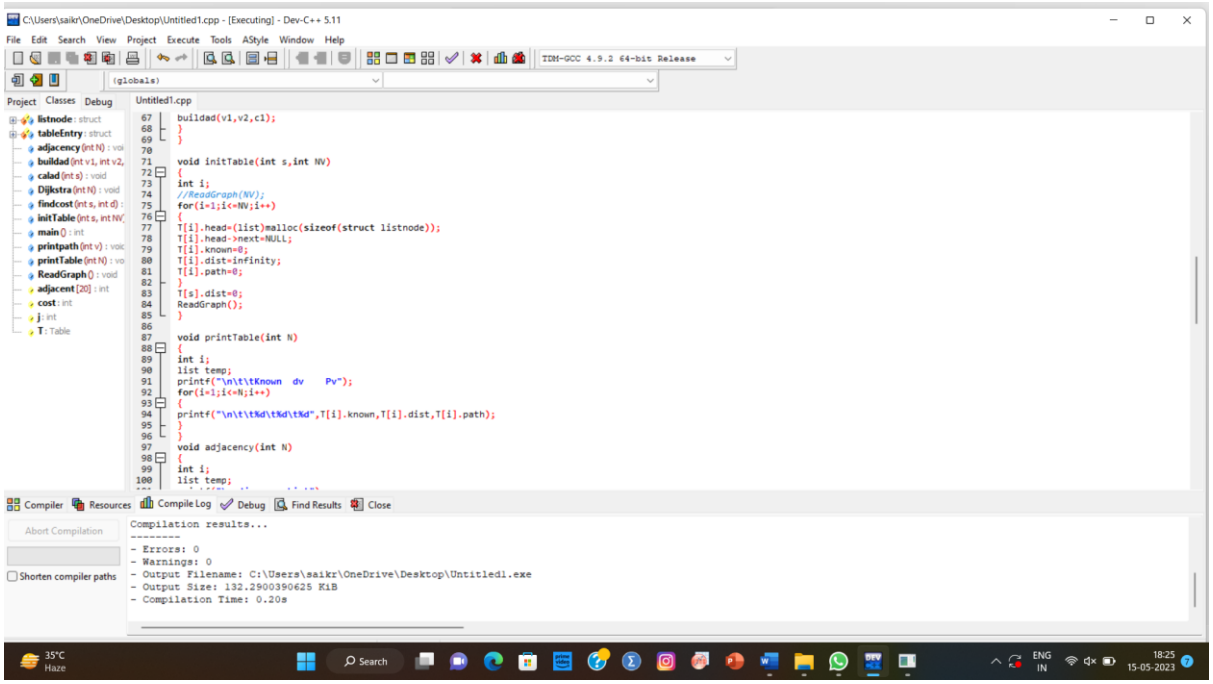




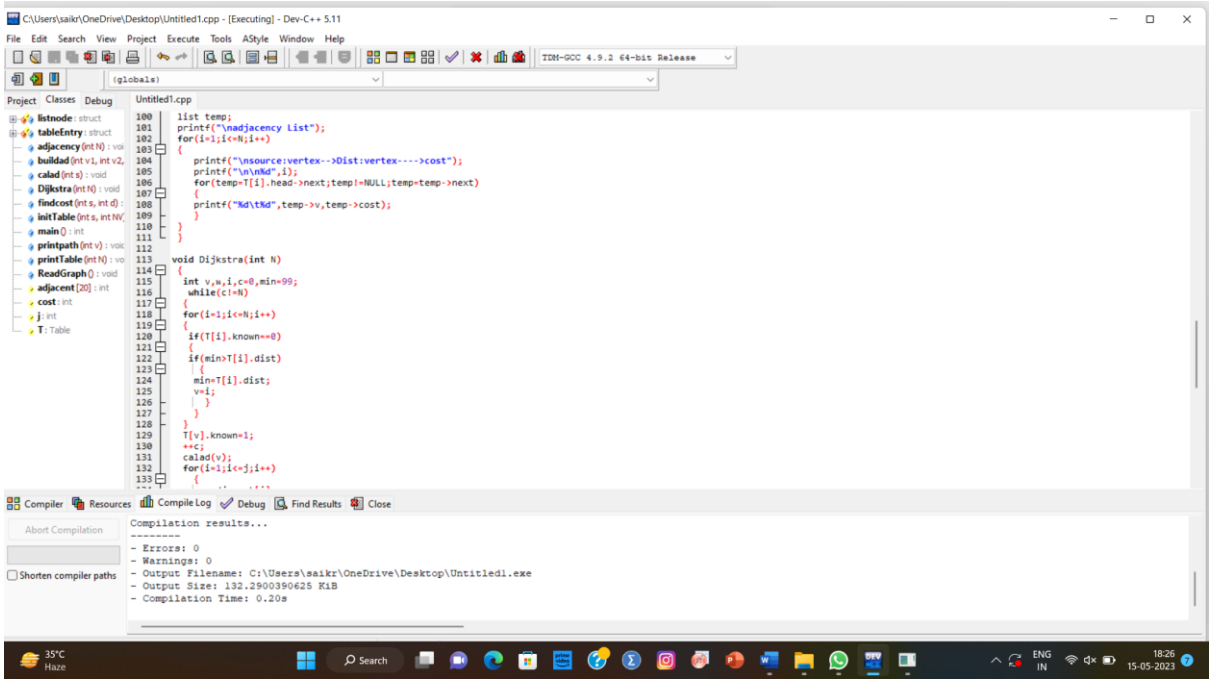
35) Write C programme to implement DIJKSTRA.



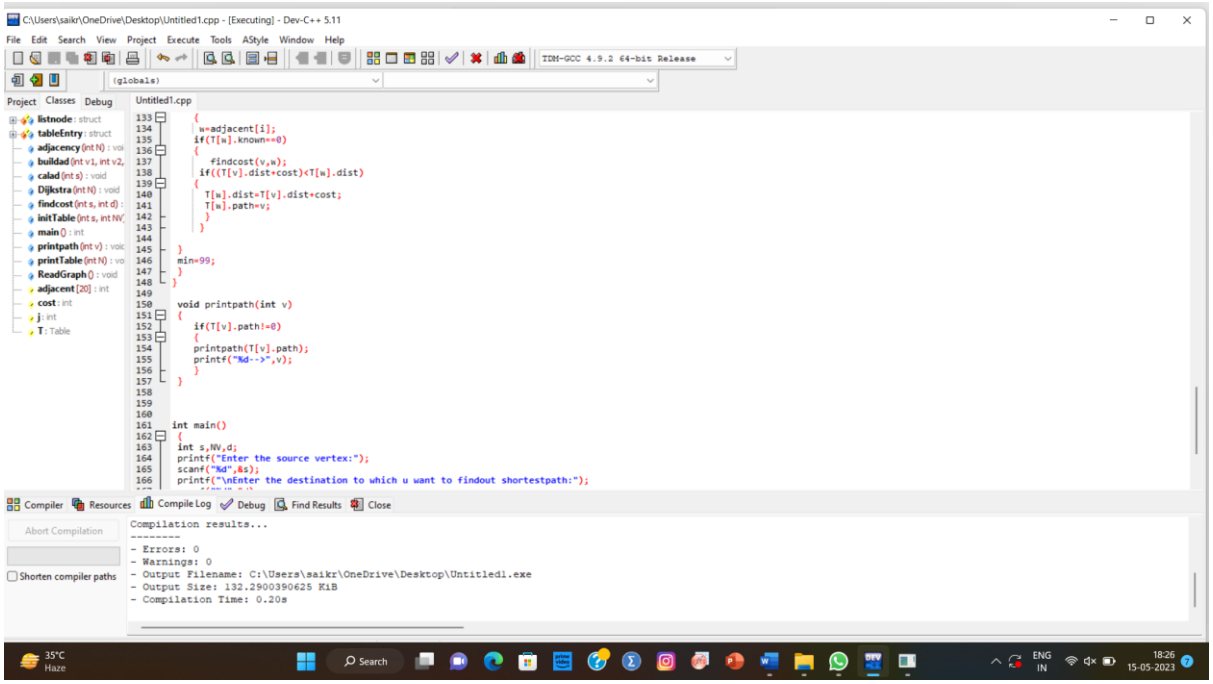



C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
listnode : struct
tableEntry : struct
adjacency (int N) : voi
buildad (int v1, int v2,
calad (int s) : void
Dijkstra (int N) : void
findcost (int s, int d) :
initTable (int s, int NV
main () : int
printpath (int v) : voic
printTable (int N) : vo
ReadGraph () : void
adjacent [20] : int
cost : int
j : int
T : Table
67 buildad(v1,v2,c1);
68 }
69 }
70
71 void initTable(int s,int NV)
72 {
73 int i;
74 //ReadGraph(NV);
75 for(i=1;i<=NV;i++)
76 {
77 T[i].head=(list)malloc(sizeof(struct listnode));
78 T[i].head->next=NULL;
79 T[i].known=0;
80 T[i].dist=infinity;
81 T[i].path=0;
82 }
83 T[s].dist=0;
84 ReadGraph();
85 }
86
87 void printTable(int N)
88 {
89 int i;
90 list temp;
91 printf("\n\t\tKnown dv Pv");
92 for(i=1;i<=N;i++)
93 {
94 printf("\n\t\t%d\t%d\t%d",T[i].known,T[i].dist,T[i].path);
95 }
96 }
97 void adjacency(int N)
98 {
99 int i;
100 list temp;
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

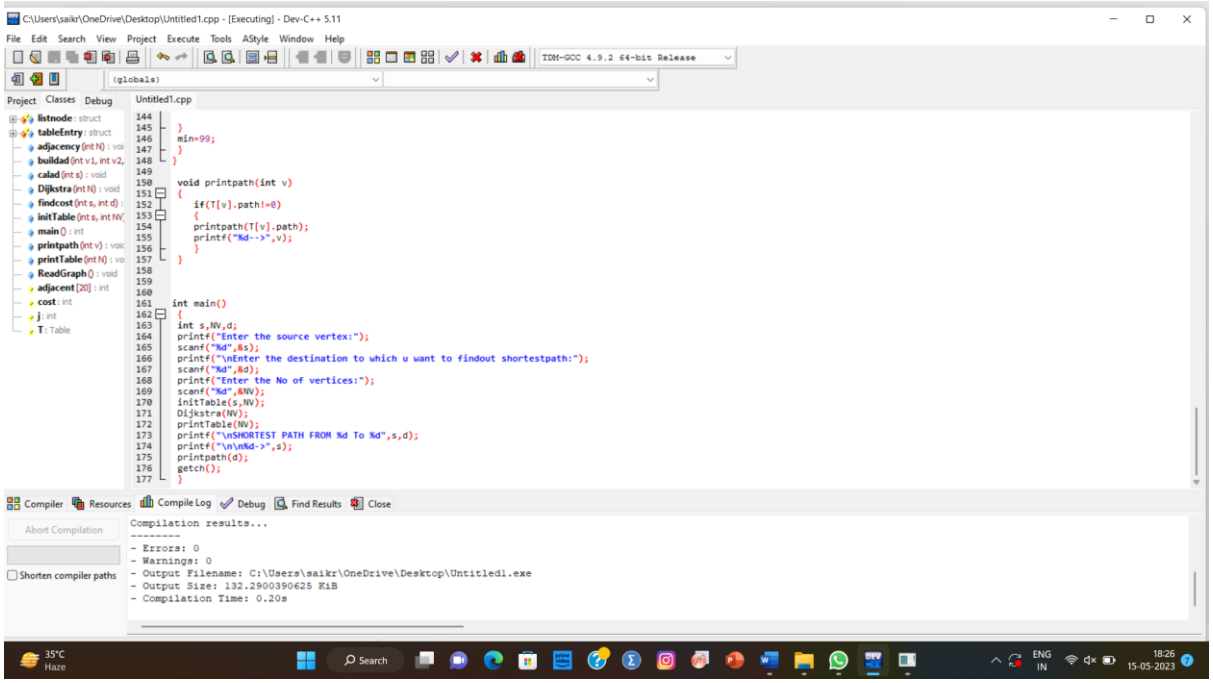
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 132.2900390625 KiB
- Compilation Time: 0.20s
35°C Haze
Search
ENG IN
18:25 15-05-2023


C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
100 list temp;
101 printf("\nadjacency List");
102 for(i=1;i<=N;i++)
103 {
104 printf("\nsource:vertex-->Dist:vertex---->cost");
105 printf("\n\n%d",i);
106 for(temp=T[i].head->next;temp!=NULL;temp=temp->next)
107 {
108 printf("%d\t%d",temp->v,temp->cost);
109 }
110 }
111 }
112
113 void Dijkstra(int N)
114 {
115 int v,w,i,c=0,min=99;
116 while(c!=N)
117 {
118 for(i=1;i<=N;i++)
119 {
120 if(T[i].known==0)
121 {
122 if(min>T[i].dist)
123 {
124 min=T[i].dist;
125 v=i;
126 }
127 }
128 }
129 T[v].known=1;
130 ++c;
131 calad(v);
132 for(i=1;i<=j;i++)
133 {
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 132.2900390625 KiB
- Compilation Time: 0.20s
35°C Haze
Search
ENG IN
18:26 15-05-2023

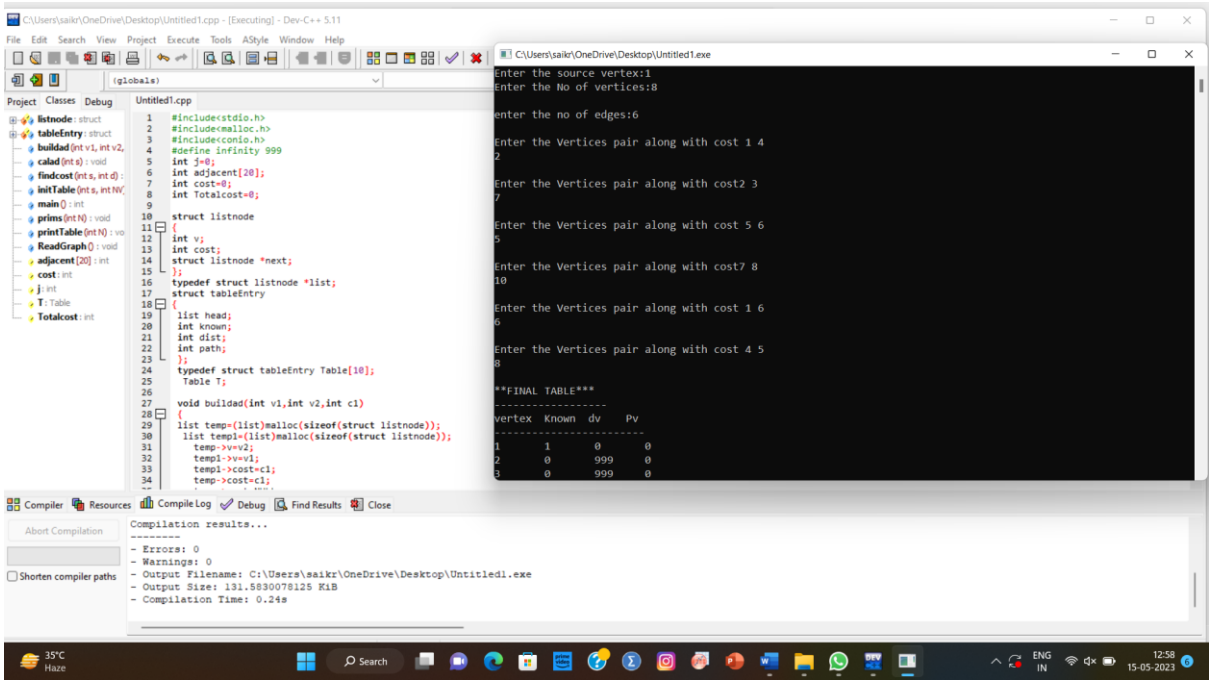

C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
listnode : struct
tableEntry : struct
adjacency (int N) : voi
buildad (int v1, int v2,
calad (int s) : void
Dijkstra (int N) : void
findcost (int s, int d) :
initTable (int s, int NV
main () : int
printpath (int v) : voic
printTable (int N) : vo
ReadGraph () : void
adjacent [20] : int
cost : int
j : int
T : Table
w=adjacent[i];
if(T[w].known==0)
{
findcost(v,w);
if((T[v].dist+cost)<T[w].dist)
{
T[w].dist=T[v].dist+cost;
T[w].path=v;
}
}
}
min=99;
}
}
void printpath(int v)
{
if(T[v].path!=0)
{
printpath(T[v].path);
printf("%d-->",v);
}
}
int main()
{
int s,NV,d;
printf("Enter the source vertex:");
scanf("%d",&s);
printf("\nEnter the destination to which u want to findout shortestpath:");
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

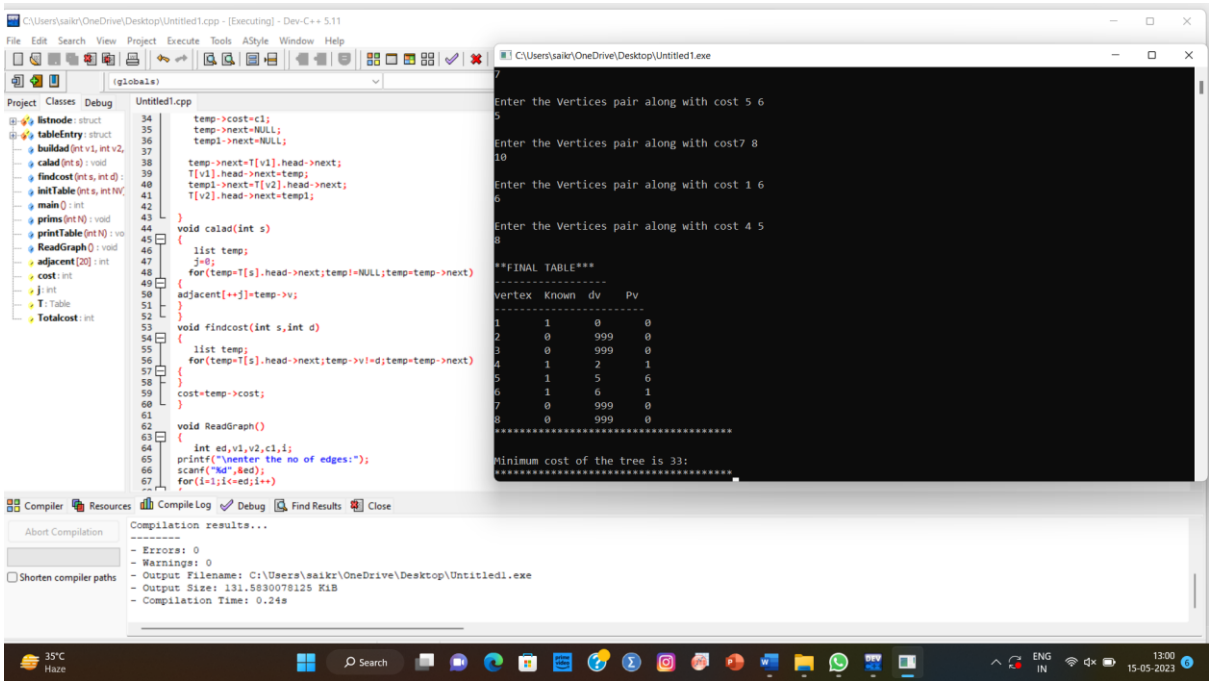
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 132.2900390625 KiB
- Compilation Time: 0.20s
35°C
Haze
Search
ENG
IN
18:26
15-05-2023

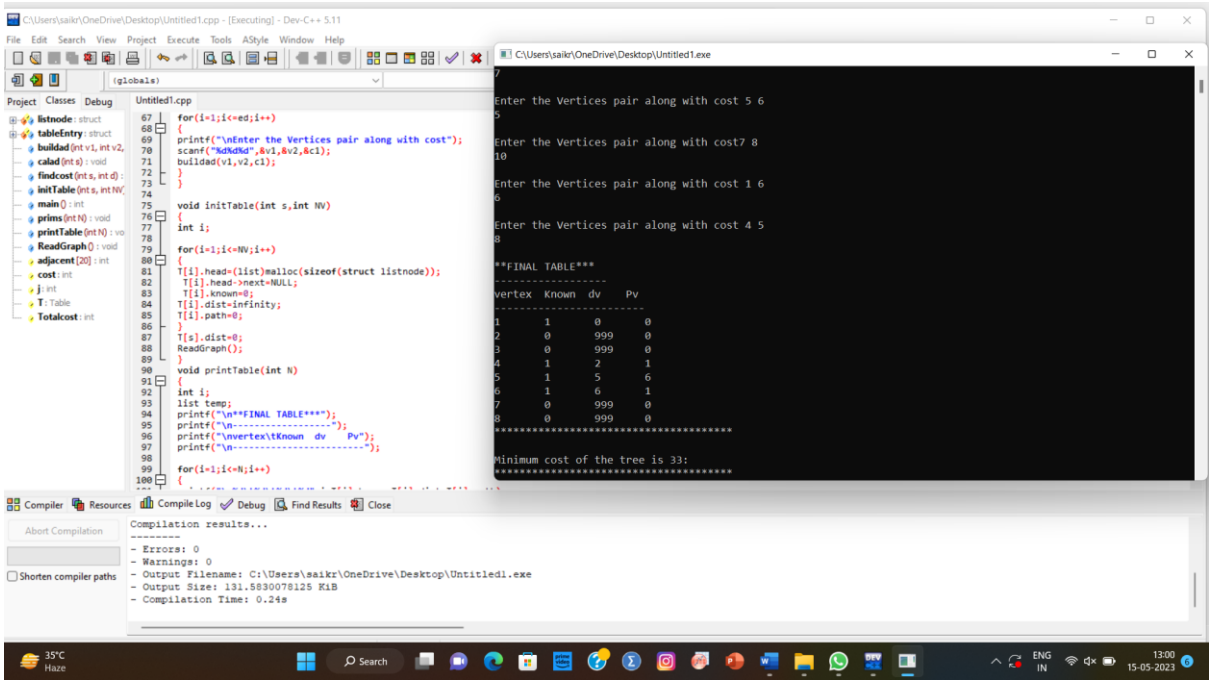

C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
listnode : struct
tableEntry : struct
adjacency (int N) : voi
buildad (int v1, int v2,
calad (int s) : void
Dijkstra (int N) : void
findcost (int s, int d) :
initTable (int s, int NV
main () : int
printpath (int v) : voic
printTable (int N) : vo
ReadGraph () : void
adjacent [20] : int
cost : int
j : int
T : Table
}
min=99;
}
}
void printpath(int v)
{
if(T[v].path!=0)
{
printpath(T[v].path);
printf("%d-->",v);
}
}
int main()
{
int s,NV,d;
printf("Enter the source vertex:");
scanf("%d",&s);
printf("\nEnter the destination to which u want to findout shortestpath:");
scanf("%d",&d);
printf("Enter the No of vertices:");
scanf("%d",&NV);
initTable(s,NV);
Dijkstra(NV);
printTable(NV);
printf("\nSHORTEST PATH FROM %d To %d",s,d);
printf("\n\n%d->",s);
printpath(d);
getch();
}
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

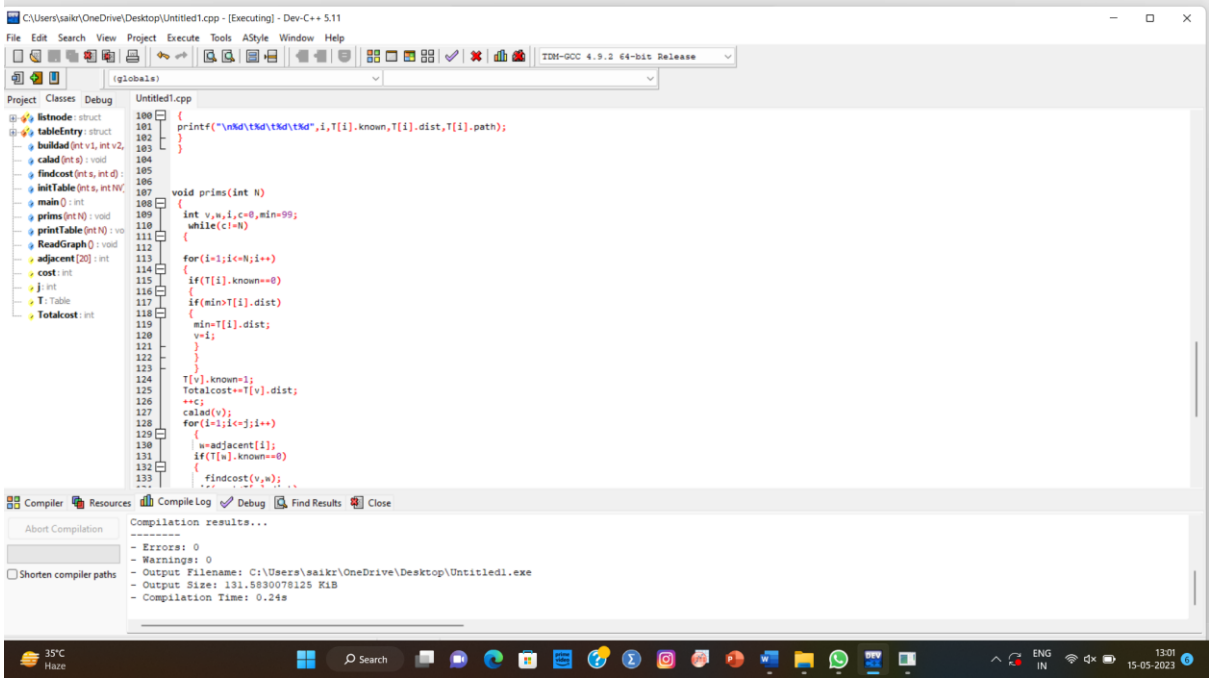
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 132.2900390625 KiB
- Compilation Time: 0.20s
35°C
Haze
Search
ENG
IN
18:26
15-05-2023

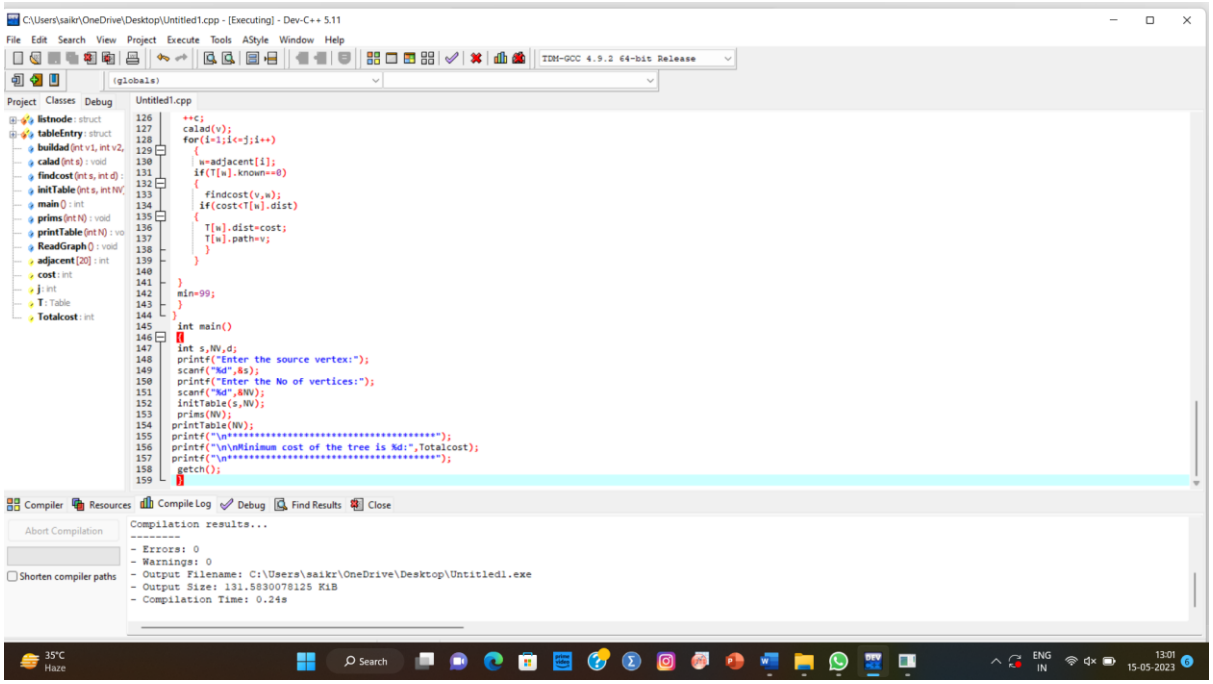
36) Write C programme to implement PRIMS



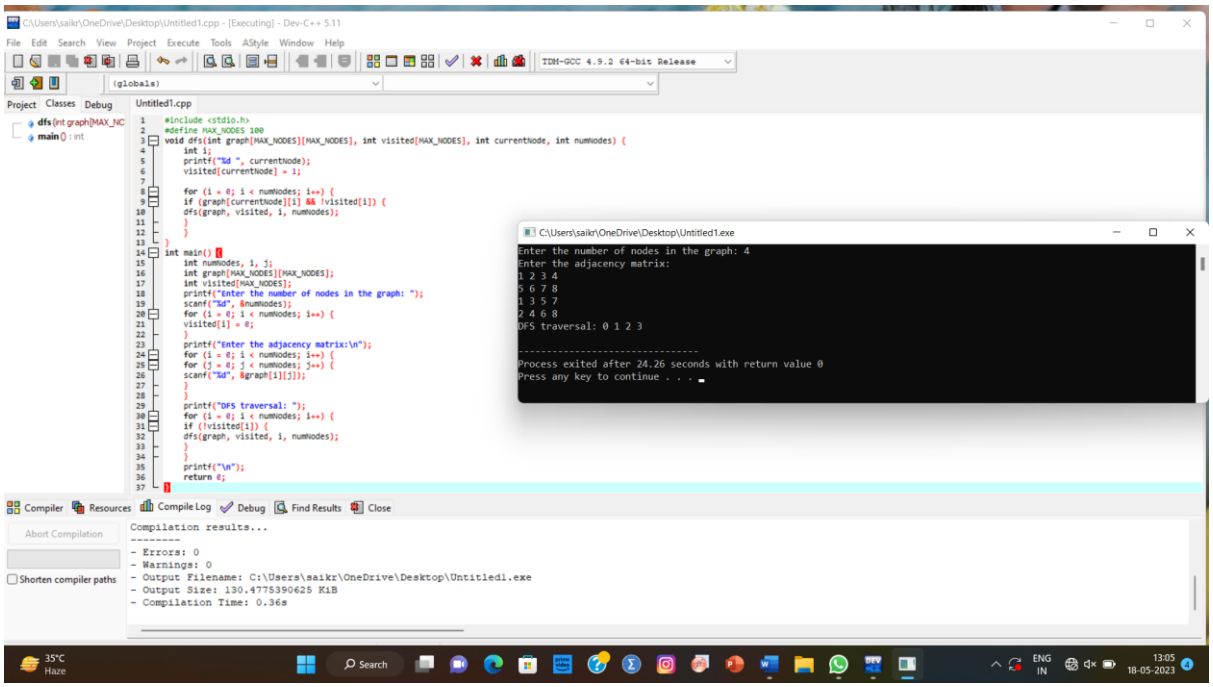



C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
Project Classes Debug
Untitled1.cpp
C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
7
Enter the Vertices pair along with cost 5 6
5
Enter the Vertices pair along with cost7 8
10
Enter the Vertices pair along with cost 1 6
6
Enter the Vertices pair along with cost 4 5
8
FINAL TABLE*
vertex Known dv Pv
1 1 0 0
2 0 999 0
3 0 999 0
4 1 2 1
5 1 5 6
6 1 6 1
7 0 999 0
8 0 999 0
Minimum cost of the tree is 33:
Compiler Resources Compile Log Debug Find Results Close
Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 131.5830078125 KiB
- Compilation Time: 0.24s
35°C Haze
Search
ENG IN
13:00 15-05-2023

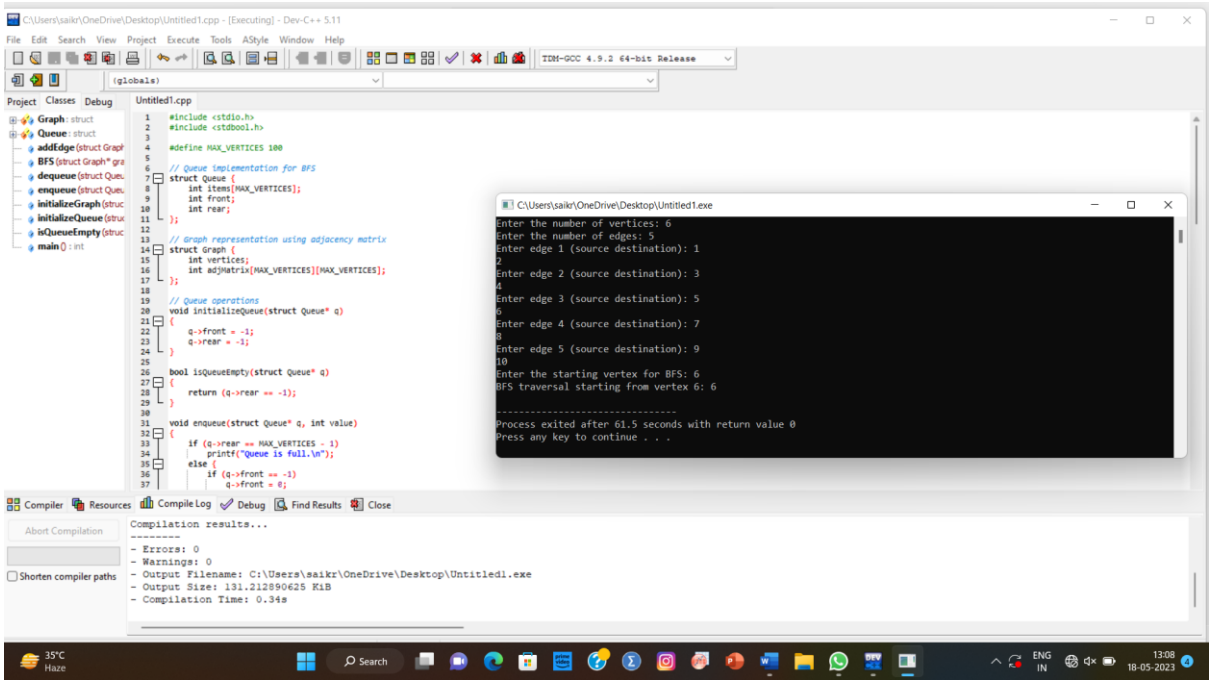

C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
Project Classes Debug
Untitled1.cpp
Compiler Resources Compile Log Debug Find Results Close
Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 131.5830078125 KiB
- Compilation Time: 0.24s
35°C Haze
Search
ENG IN
13:01 15-05-2023

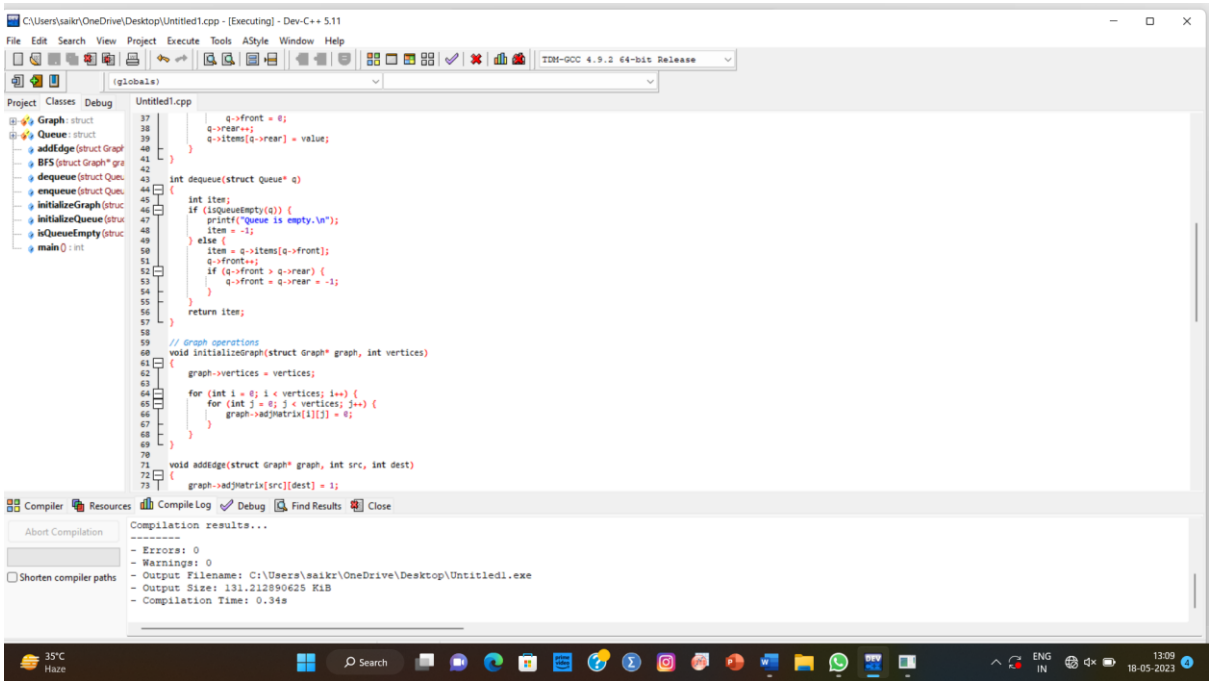


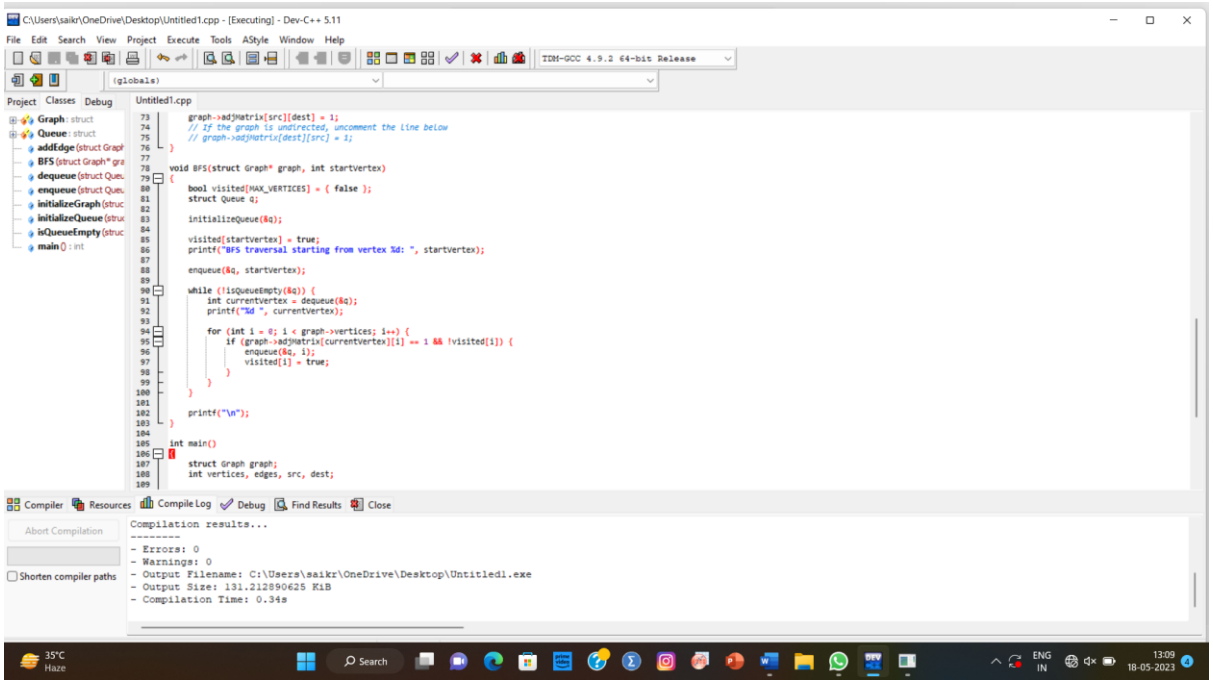
37) Write C programme to implement DFS.



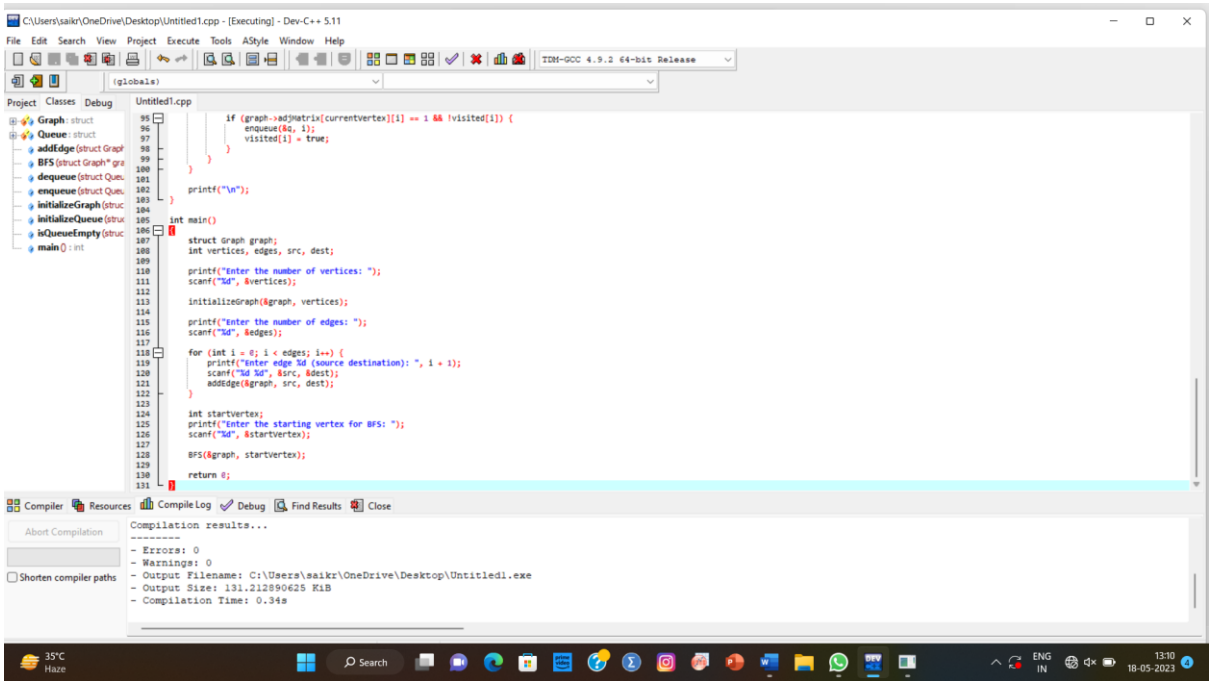
38) Write C programme to implement BFS.





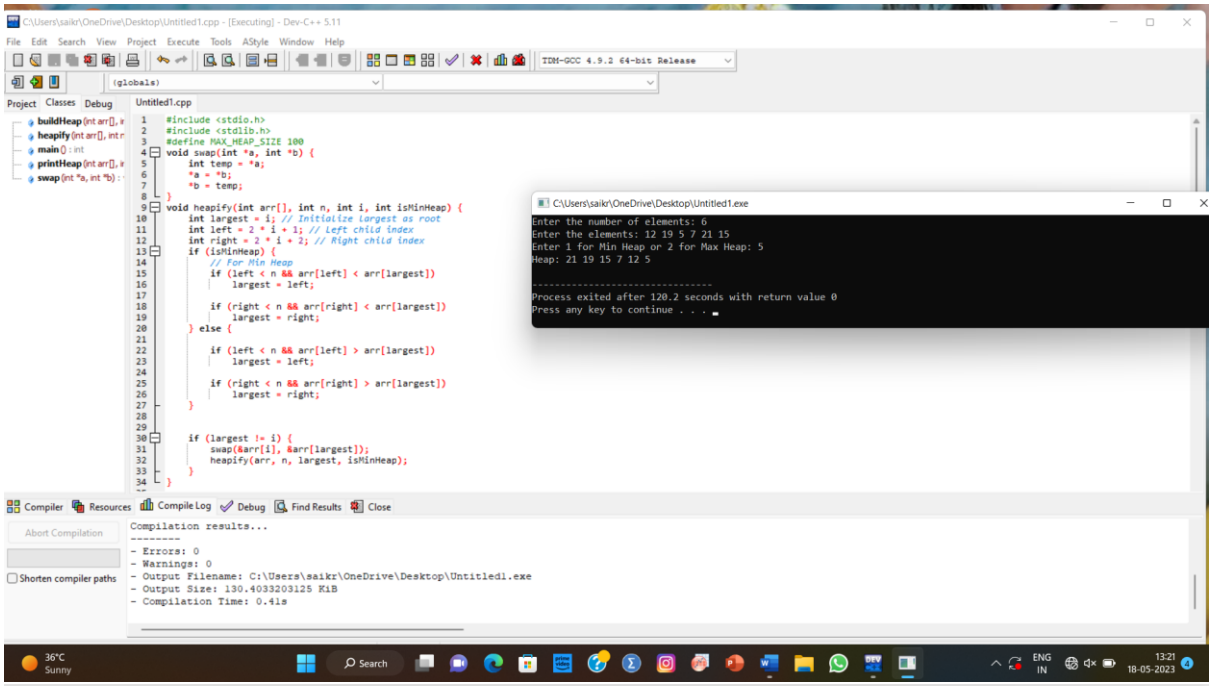

C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
Graph : struct
Queue : struct
addEdge (struct Graph
BFS (struct Graph* gra
dequeue (struct Queu
enqueue (struct Queu
initializeGraph (struc
initializeQueue (struc
isQueueEmpty (struc
main () : int
graph->adjMatrix[src][dest] = 1;
// If the graph is undirected, uncomment the line below
// graph->adjMatrix[dest][src] = 1;
}
void BFS(struct Graph* graph, int startVertex)
{
bool visited[MAX_VERTICES] = { false };
struct Queue q;
initializeQueue(&q);
visited[startVertex] = true;
printf("BFS traversal starting from vertex %d: ", startVertex);
enqueue(&q, startVertex);
while (!isQueueEmpty(&q)) {
int currentVertex = dequeue(&q);
printf("%d ", currentVertex);
for (int i = 0; i < graph->vertices; i++) {
if (graph->adjMatrix[currentVertex][i] == 1 && !visited[i]) {
enqueue(&q, i);
visited[i] = true;
}
}
}
printf("\n");
}
int main()
{
struct Graph graph;
int vertices, edges, src, dest;
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

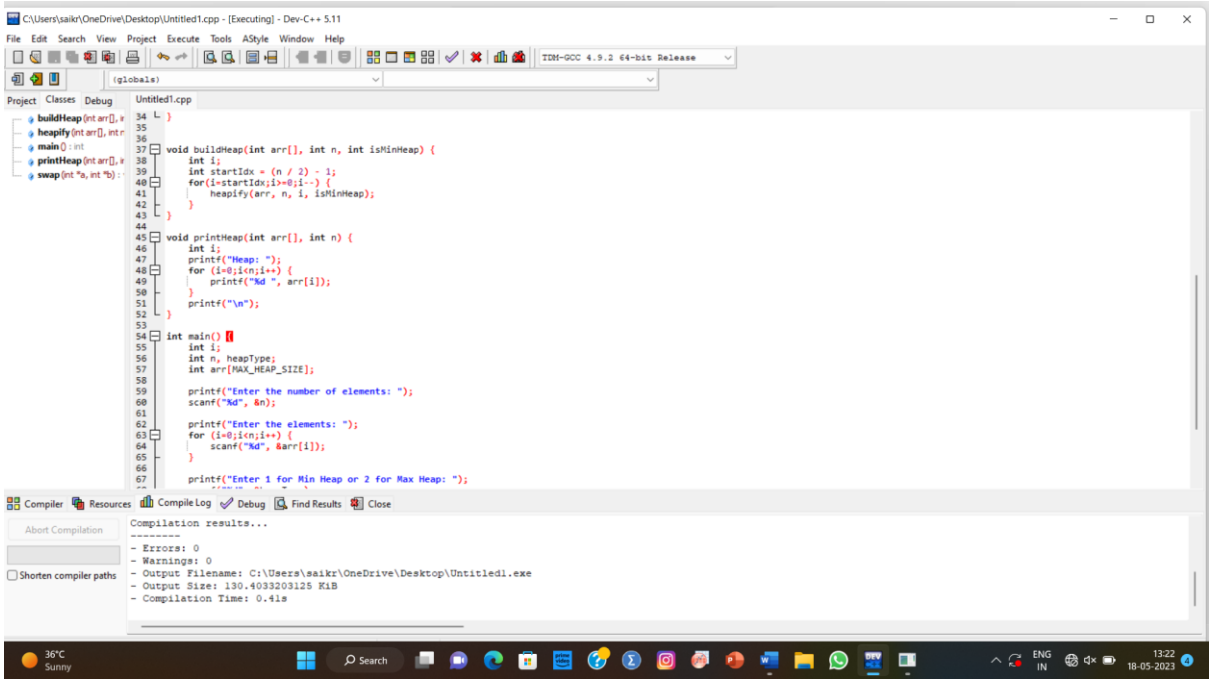
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 131.212890625 KiB
- Compilation Time: 0.34s
35°C
Haze
Search
ENG
IN
13:09
18-05-2023

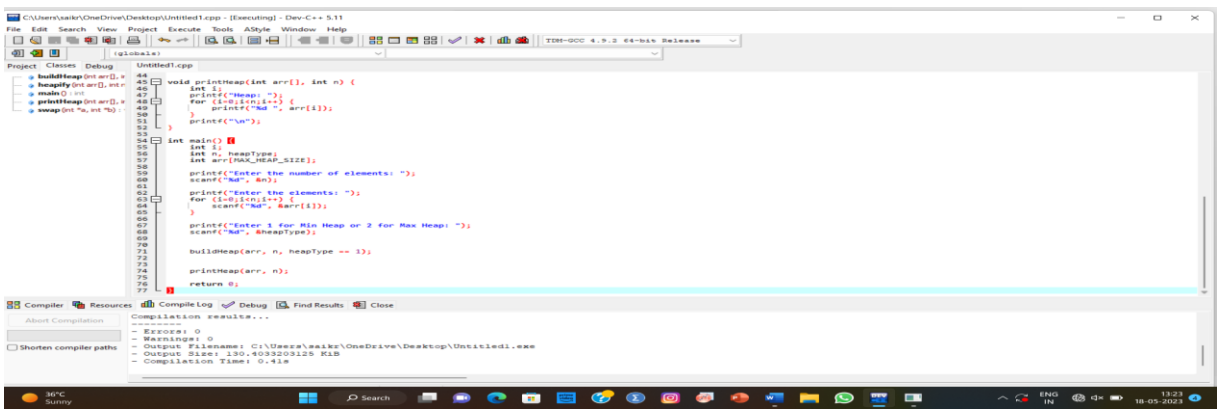

C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
Untitled1.cpp
if (graph->adjMatrix[currentVertex][i] == 1 && !visited[i]) {
enqueue(&q, i);
visited[i] = true;
}
}
}
printf("\n");
}
int main()
{
struct Graph graph;
int vertices, edges, src, dest;
printf("Enter the number of vertices: ");
scanf("%d", &vertices);
initializeGraph(&graph, vertices);
printf("Enter the number of edges: ");
scanf("%d", &edges);
for (int i = 0; i < edges; i++) {
printf("Enter edge %d (source destination): ", i + 1);
scanf("%d %d", &src, &dest);
addEdge(&graph, src, dest);
}
int startVertex;
printf("Enter the starting vertex for BFS: ");
scanf("%d", &startVertex);
BFS(&graph, startVertex);
return 0;
}
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 131.212890625 KiB
- Compilation Time: 0.34s
35°C
Haze
Search
ENG
IN
13:10
18-05-2023

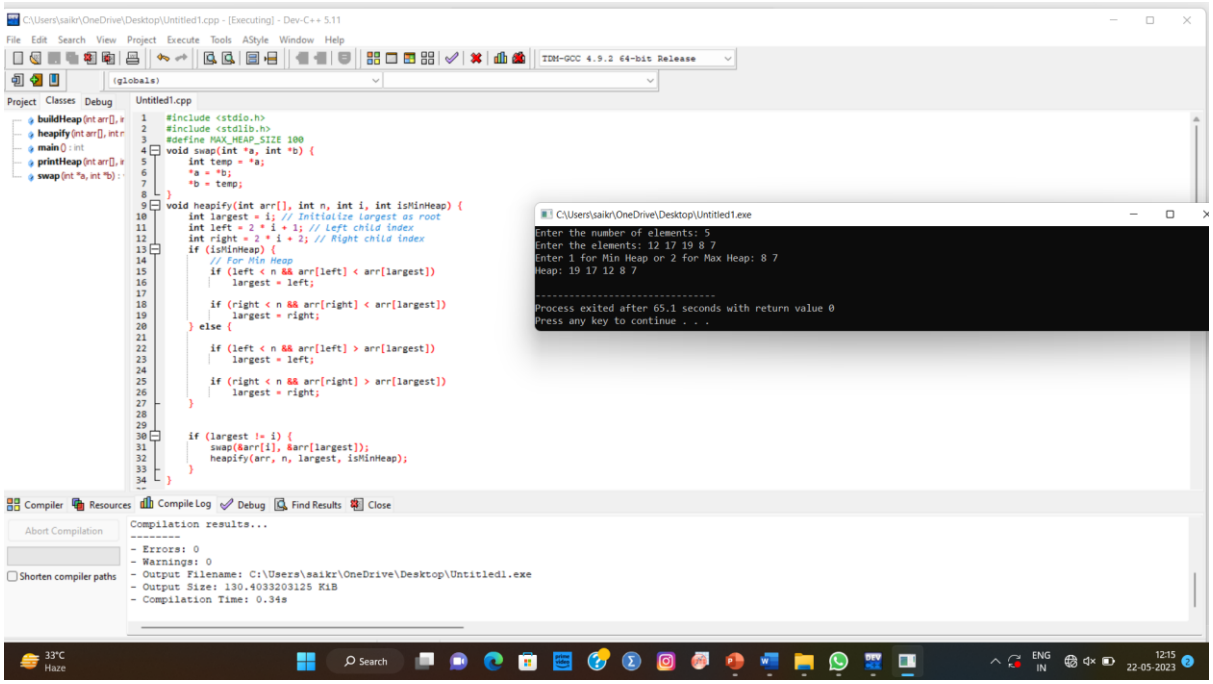
39) Write C programme to implement Min Heap.

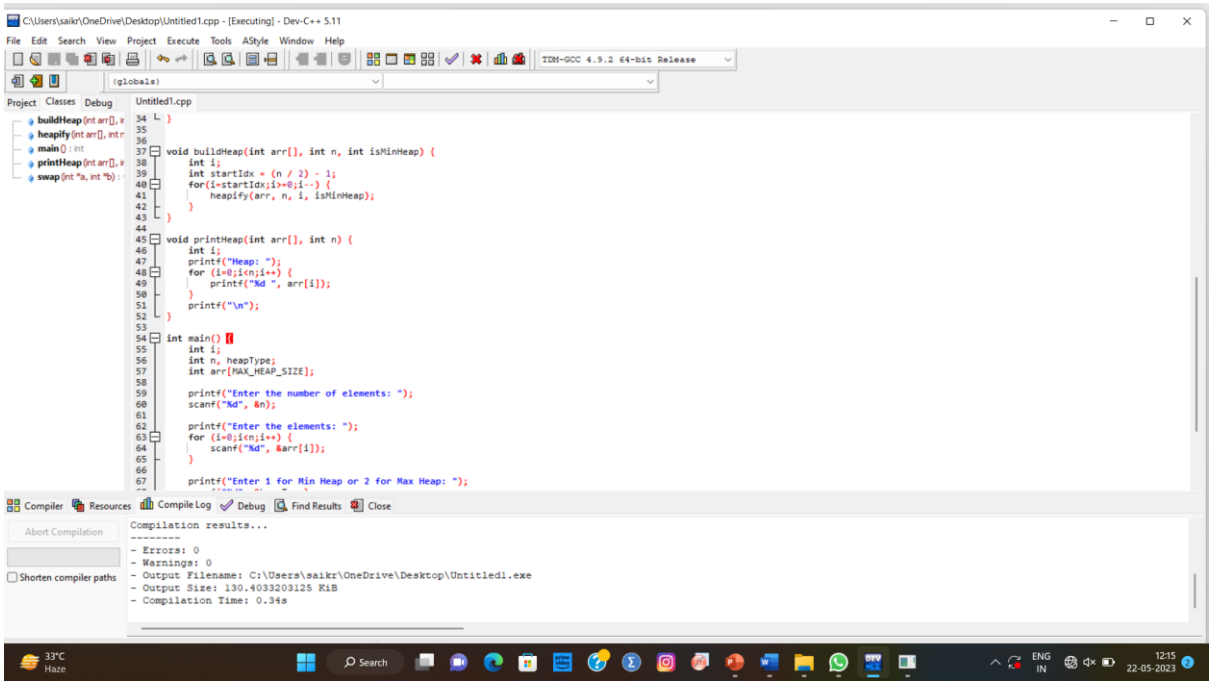


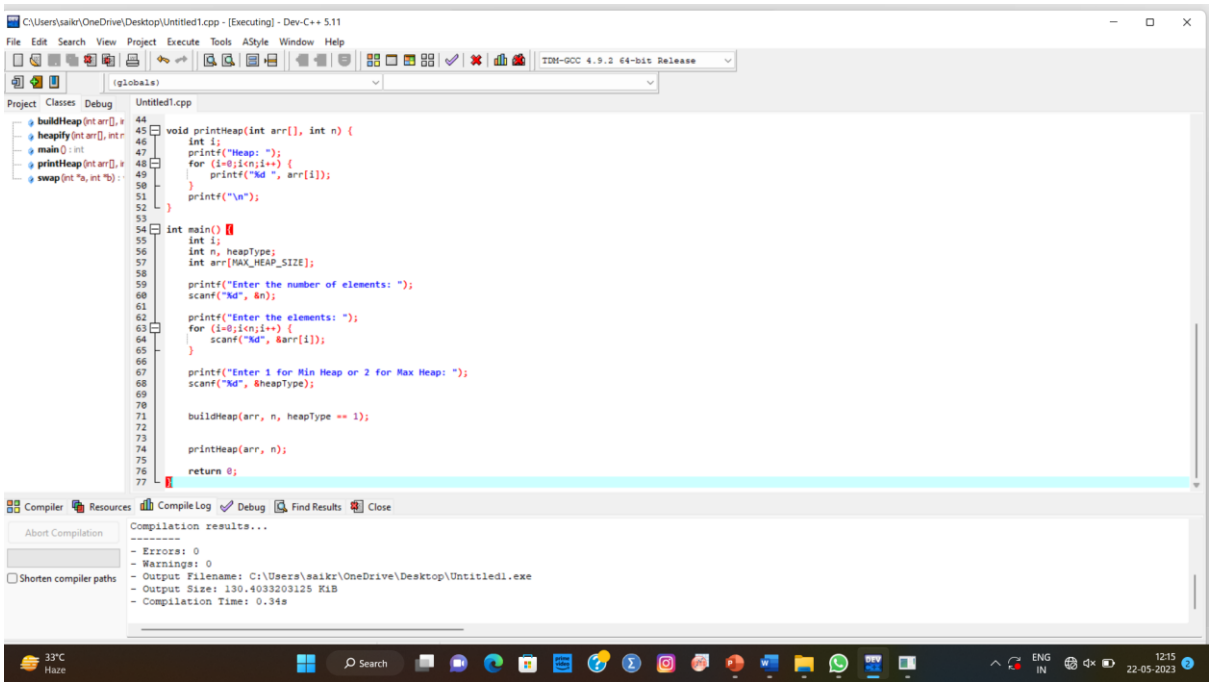




40)Write C programme to implement Max Heap.






C:\Users\saikr\OneDrive\Desktop\Untitled1.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
(globals)
Project Classes Debug
buildHeap(int arr[], i
heapify(int arr[], int n
main() : int
printHeap(int arr[], i
swap(int *a, int *b) :
Untitled1.cpp
44
45 void printHeap(int arr[], int n) {
46 int i;
47 printf("Heap: ");
48 for (i=0;i<n;i++) {
49 printf("%d ", arr[i]);
50 }
51 printf("\n");
52 }
53
54 int main() {
55 int i;
56 int n, heapType;
57 int arr[MAX_HEAP_SIZE];
58
59 printf("Enter the number of elements: ");
60 scanf("%d", &n);
61
62 printf("Enter the elements: ");
63 for (i=0;i<n;i++) {
64 scanf("%d", &arr[i]);
65 }
66
67 printf("Enter 1 for Min Heap or 2 for Max Heap: ");
68 scanf("%d", &heapType);
69
70
71 buildHeap(arr, n, heapType == 1);
72
73
74 printHeap(arr, n);
75
76 return 0;
77 }
Compiler Resources Compile Log Debug Find Results Close
Abort Compilation
Shorten compiler paths
Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\saikr\OneDrive\Desktop\Untitled1.exe
- Output Size: 130.4033203125 KiB
- Compilation Time: 0.34s
33°C
Haze
Search
ENG
IN
12:15
22-05-2023