



National University
of computer and emerging sciences

DS LAB 3 ACTIVITY

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TASK – 01(a):

Task 3.cpp	Task 5.cpp	Task 4.cpp	Task 1(a).cpp	Task 1(b).cpp	Task 2(a).cpp	Task 2(b).cpp
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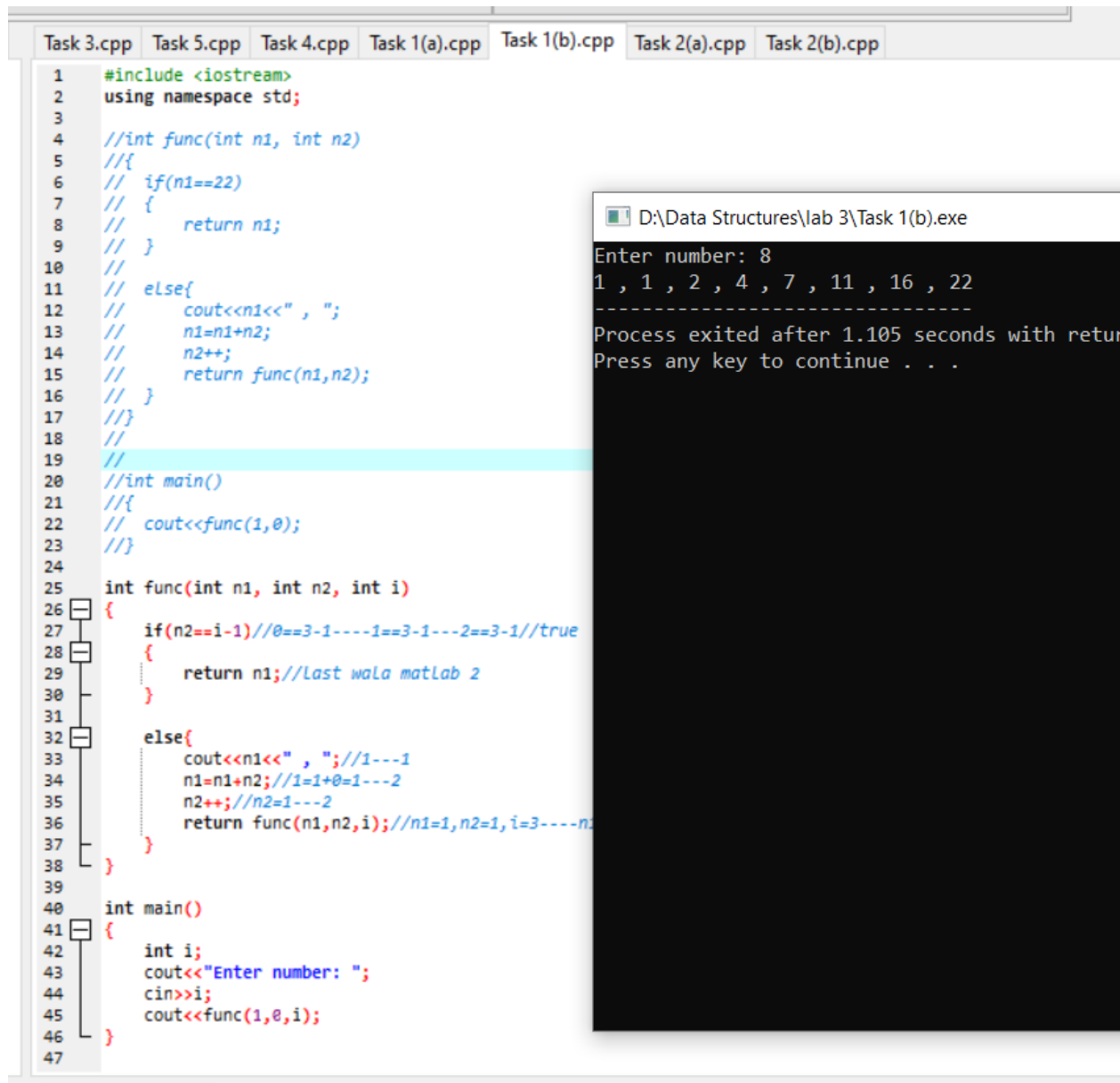
```
1  #include <iostream>
2  using namespace std;
3
4  //int func(int n1, int n2)
5  //{
6  //  if(n1==22)
7  //  {
8  //      return n1;
9  //  }
10 //
11 //  else{
12 //      cout<<n1<<" , ";
13 //      n1=n1+n2;
14 //      n2++;
15 //      return func(n1,n2);
16 //  }
17 //}
18 //
19 //
20 //int main()
21 //{
22 //  cout<<func(1,0);
23 //}
24
25 int func(int n1, int n2, int i)
26 {
27     if(n2==i-1)//0==3-1---1==3-1---2==3-1//true
28     {
29         return n1;//Last wala matlab 2
30     }
31
32     else{
33         cout<<n1<<" , ";//1---1
34         n1=n1+n2;//1+0=1---2
35         n2++;//n2=1---2
36         return func(n1,n2,i);//n1=1,n2=1,i=3---n1=2,n2=2,i=3
37     }
38 }
39
40 int main()
41 {
42     int i;
43     cout<<"Enter number: ";
44     cin>>i;
45     cout<<func(1,0,i);
46 }
47
```

D:\Data Structures\lab 3\Task 1(a).exe

Enter a number: 7
1 , 3 , 6 , 10 , 15 , 21 , 28

Process exited after 3.229 seconds with
Press any key to continue . . .

TASK – 01(b):



The image shows a C++ IDE with a tabbed interface. The active tab is 'Task 1(b).cpp'. The code in the editor is as follows:

```
1  #include <iostream>
2  using namespace std;
3
4  //int func(int n1, int n2)
5  //{
6  //  if(n1==22)
7  //  {
8  //      return n1;
9  //  }
10 //
11 //  else{
12 //      cout<<n1<<" , ";
13 //      n1=n1+n2;
14 //      n2++;
15 //      return func(n1,n2);
16 //  }
17 //}
18 //
19 //
20 //int main()
21 //{
22 //  cout<<func(1,0);
23 //}
24
25 int func(int n1, int n2, int i)
26 {
27     if(n2==i-1)//0==3-1----1==3-1---2==3-1//true
28     {
29         return n1;//Last wala matlab 2
30     }
31
32     else{
33         cout<<n1<<" , ";//1---1
34         n1=n1+n2;//1=1+0=1---2
35         n2++;//n2=1---2
36         return func(n1,n2,i);//n1=1,n2=1,i=3---n2
37     }
38 }
39
40 int main()
41 {
42     int i;
43     cout<<"Enter number: ";
44     cin>>i;
45     cout<<func(1,0,i);
46 }
47
```

The execution output window shows the following text:

```
D:\Data Structures\lab 3\Task 1(b).exe
Enter number: 8
1 , 1 , 2 , 4 , 7 , 11 , 16 , 22
-----
Process exited after 1.105 seconds with return code 0
Press any key to continue . . .
```

TASK - 02(a):

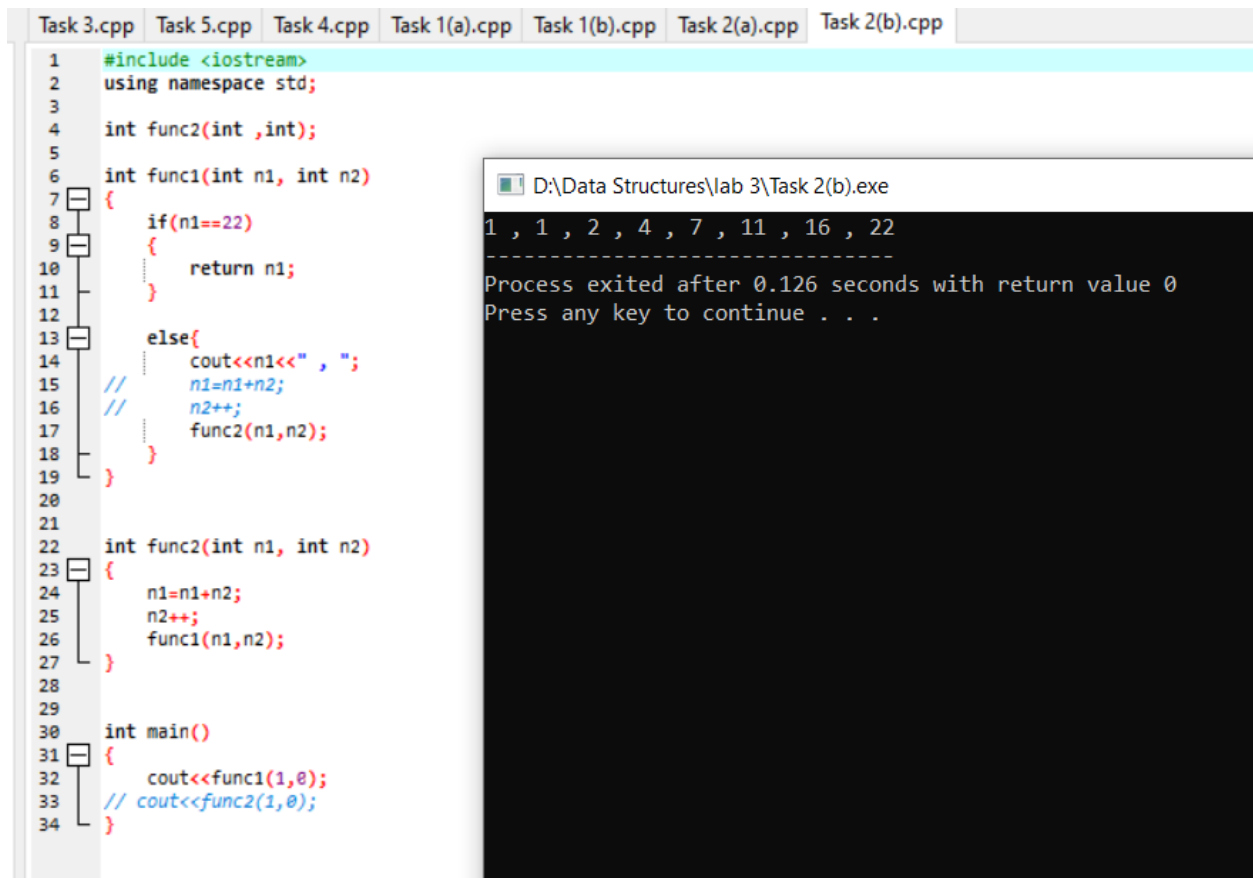
```
Task 3.cpp Task 5.cpp Task 4.cpp Task 1(a).cpp Task 1(b).cpp Task 2(a).cpp Task 2(b).cpp
1  #include<iostream>
2  using namespace std;
3
4  int func1(int,int,int);
5  int func2(int,int,int);
6
7  int func1(int a,int n,int i)
8  {
9      if(i==n)
10     {
11         return a; //ye a last value print kar raha kyun k i==n hogaya or line 16 main pehle hi a ko assign
12     }
13
14     else
15     {
16         cout<<a<<" , ";
17         i++;
18         a=a+i;
19         // func2(a , n , i);
20     }
21 }
22
23
24 int func2(int a,int n,int i)
25 {
26     a=a+i;
27     func1(a , n , i);
28 }
29
30
31 int main()
32 {
33     int x,i=1;
34     cout<<"Enter a number: ";
35     cin>>x;
36     cout<<func1(1,x,i);
37 }
38
39
40
41
42
43 //include<iostream>
44 //using namespace std;
45 //
```

D:\Data Structures\lab 3\Task 2(a).exe

Enter a number: 7
1 , 3 , 6 , 10 , 15 , 21 , 28

Process exited after 1.896 seconds with return value 0
Press any key to continue . . .

TASK – 02(b):



The image shows a C++ IDE with a code editor on the left and a console window on the right. The code editor displays a C++ program with line numbers 1 to 34. The console window shows the output of the program, which is a sequence of numbers: 1, 1, 2, 4, 7, 11, 16, 22. Below the numbers, it says "Process exited after 0.126 seconds with return value 0" and "Press any key to continue . . .".

```
1  #include <iostream>
2  using namespace std;
3
4  int func2(int ,int);
5
6  int func1(int n1, int n2)
7  {
8      if(n1==22)
9      {
10         return n1;
11     }
12
13     else{
14         cout<<n1<<" , ";
15         // n1=n1+n2;
16         // n2++;
17         func2(n1,n2);
18     }
19 }
20
21
22 int func2(int n1, int n2)
23 {
24     n1=n1+n2;
25     n2++;
26     func1(n1,n2);
27 }
28
29
30 int main()
31 {
32     cout<<func1(1,0);
33     // cout<<func2(1,0);
34 }
```

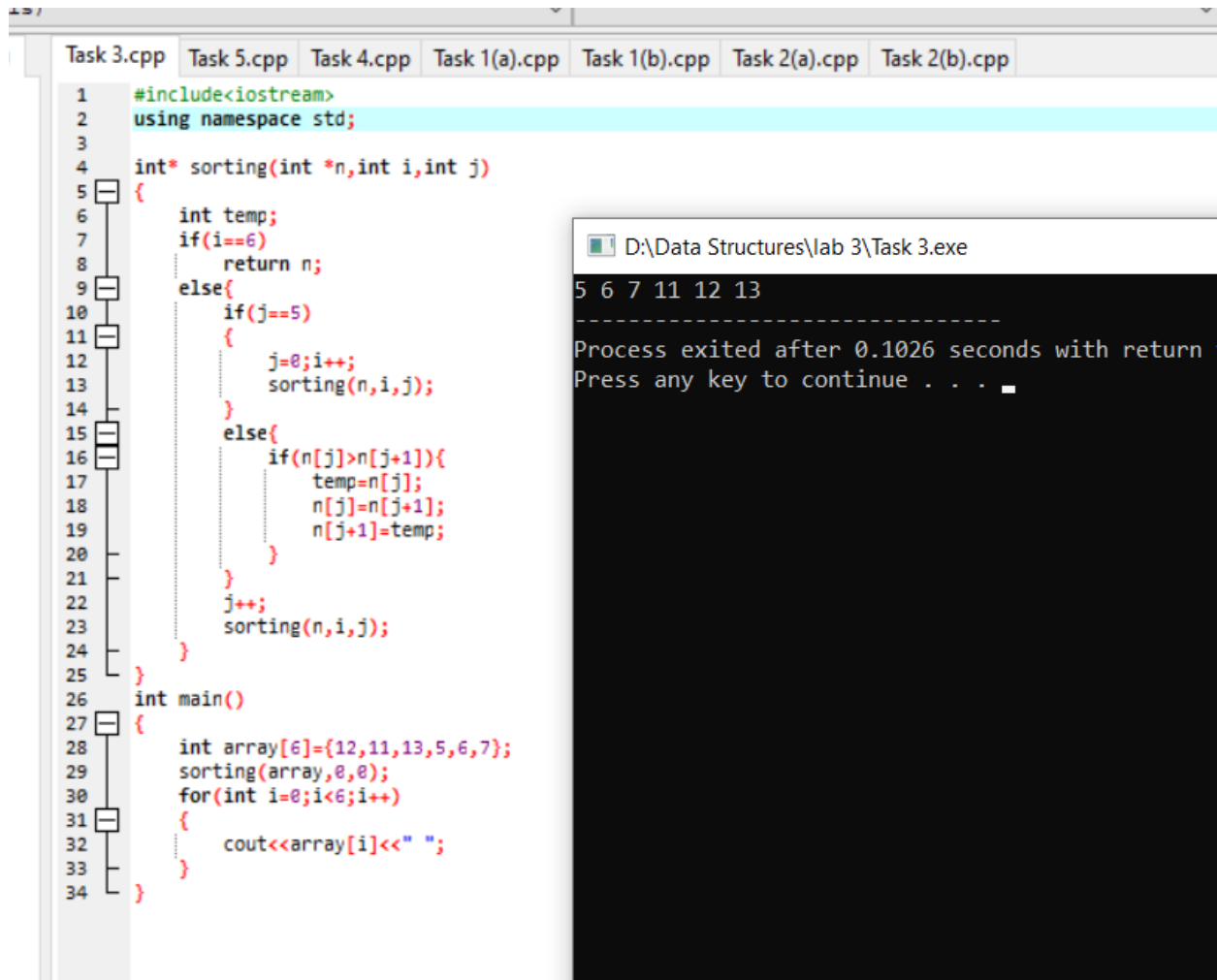
D:\Data Structures\lab 3\Task 2(b).exe

1 , 1 , 2 , 4 , 7 , 11 , 16 , 22

Process exited after 0.126 seconds with return value 0

Press any key to continue . . .

TASK - 03:



The image shows a C++ IDE with a file explorer at the top displaying several task files: Task 3.cpp, Task 5.cpp, Task 4.cpp, Task 1(a).cpp, Task 1(b).cpp, Task 2(a).cpp, and Task 2(b).cpp. The main editor window displays the code for Task 3.cpp, which includes a recursive sorting function and a main function. The code is as follows:

```
1  #include<iostream>
2  using namespace std;
3
4  int* sorting(int *n,int i,int j)
5  {
6      int temp;
7      if(i==6)
8          return n;
9      else{
10         if(j==5)
11         {
12             j=0;i++;
13             sorting(n,i,j);
14         }
15         else{
16             if(n[j]>n[j+1]){
17                 temp=n[j];
18                 n[j]=n[j+1];
19                 n[j+1]=temp;
20             }
21             j++;
22             sorting(n,i,j);
23         }
24     }
25 }
26 int main()
27 {
28     int array[6]={12,11,13,5,6,7};
29     sorting(array,0,0);
30     for(int i=0;i<6;i++)
31     {
32         cout<<array[i]<<" ";
33     }
34 }
```

To the right of the code editor, a terminal window titled "D:\Data Structures\lab 3\Task 3.exe" shows the program's output. It displays the numbers 5 6 7 11 12 13, followed by a separator line, and then a message indicating the process exited after 0.1026 seconds with a return value of 0. The prompt "Press any key to continue . . ." is visible at the bottom of the terminal output.

TASK - 04:

Task 3.cpp	Task 5.cpp	Task 4.cpp	Task 1(a).cpp	Task 1(b).cpp
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```
1  #include<iostream>
2  using namespace std;
3
4  int fun(int n)
5  {
6      if(n>100)
7          return n-10;
8
9      return fun(fun(n+11));
10
11  // fun(95)
12  //
13  // retrun fun(fun(95+11))
14  //
15  //          106-10=96
16  //
17  //          fun(96)
18  //          fun(fun(96+11))
19  //          fun(97)
20  //          fun(fun(97+11))
21  //          fun(98)
22  //          fun(fun(98+11))
23  //          fun(99)
24  //          fun(fun(99+11))
25  //          fun(100)
26  //          fun(fun(100+11))
27  //          fun(111)
28
29
30  int main()
31  {
32      int r;
33      r=fun(95);
34      cout<<" "<<r;
35
36      return 0;
37  }
```

TASK – 05 (a) & (b):

Task 3.cpp	Task 5.cpp	Task 4.cpp	Task 1(a).cpp	Task 1(b).cpp	Task 2(a).cpp	Ta
------------	------------	------------	---------------	---------------	---------------	----





```
16     return true; }
17
18     return false;
19 }
20 bool mazecal(int maze[n][n], int x, int y, int solmaze[n][m]){
21     if(x == n - 1 && y == m - 1 && maze[x][y] == 1){
22         solmaze[x][y] = 1;
23         return true;
24     }
25     if(safepath(maze, x, y) == true){
26         if (solzaze[x][y] == 1){
27             return false;
28         }
29         solmaze[x][y] = 1;
30
31         if(mazecal(maze, x+1, y, solmaze) == true){
32             return true;
33         }
34         if(mazecal(maze, x, y+1, solmaze) == true){
35             return true;
36         }
37         solmaze[x][y] = 0;
38         return false;
39     }
40     return false;
41 }
42 bool maze1(int maze[n][m]){
43     int solmaze[n][m] = {
44         { 0, 0, 0, 0 },
45         { 0, 0, 0, 0 },
46         { 0, 0, 0, 0 },
47         { 0, 0, 0, 0 }
48     };
49     if(mazecal(maze, 0, 0, solmaze) == false){
50         return false;
51     }
52     print(solzaze);
53     return true;
54 }
55
56 int main(){
57     int maze[n][m] = {
58         { 1, 1, 0, 1 },
59         { 0, 1, 1, 1 },
60         { 0, 1, 1, 0 },
61         { 0, 0, 1, 1 }
62     };
```




```

63     cout<<"Given Maze:\n"<<endl;
64     for(int i=0;i<n;i++){
65         for(int j=0;j<m;j++){
66             cout<<maze[i][j]<<" ";
67         }cout<<endl;
68     }
69     cout<<"\n-----\n";
70     cout<<"\nSolved Maze:\n"<<endl;
71     maze1(maze);
72     return 0;
73 }
74
75

```

ces  Compile Log  Debug  Find Results 

 D:\Data Structures\lab 3\Task 5.exe

Given Maze:

```

1 1 0 1
0 1 1 1
0 1 1 0
0 0 1 1

```

Solved Maze:

```

1 1 0 0
0 1 0 0
0 1 1 0
0 0 1 1

```

Process exited after 0.1014 seconds with return value 0
Press any key to continue . . .