

Day 1:

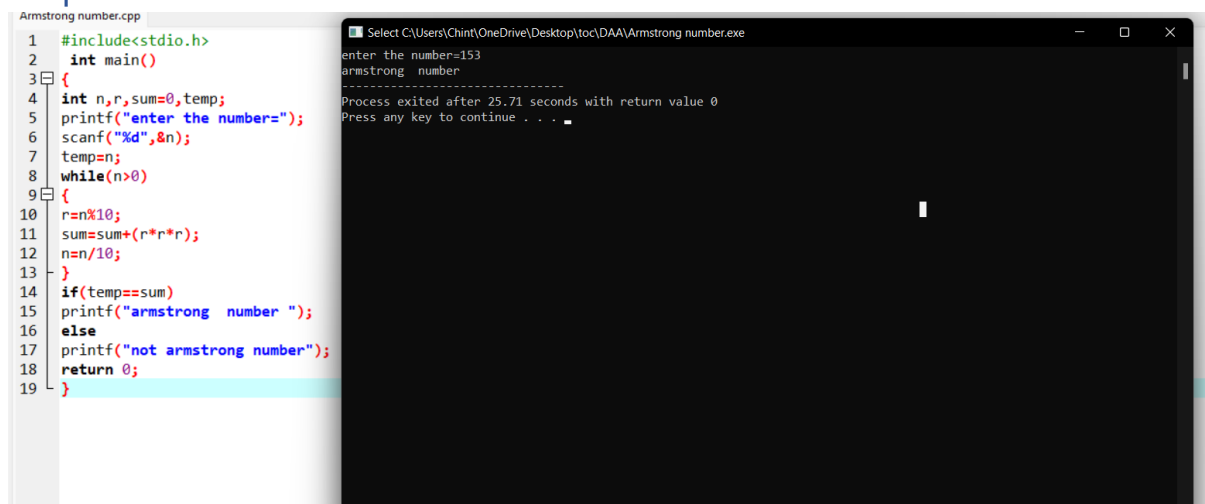
DAA

1.Armstrong number:

Program:

```
1. #include<stdio.h>
2. int main()
3. {
4. int n,r,sum=0,temp;
5. printf("enter the number=");
6. scanf("%d",&n);
7. temp=n;
8. while(n>0)
9. {
10.r=n%10;
11.sum=sum+(r*r*r);
12.n=n/10;
13.}
14.if(temp==sum)
15.printf("armstrong number ");
16.else
17.printf("not armstrong number");
18.return 0;
19.}
```

Output:



The screenshot displays a C++ IDE with two windows. The left window, titled 'Armstrong number.cpp', shows the source code of the program. The right window, titled 'Select C:\Users\Chint\OneDrive\Desktop\toc\DAA\Armstrong number.exe', shows the program's execution. The terminal output shows the prompt 'enter the number=153', followed by 'armstrong number' and a confirmation message: 'Process exited after 25.71 seconds with return value 0. Press any key to continue . . .'. The code in the left window is as follows:

```
1 #include<stdio.h>
2 int main()
3 {
4 int n,r,sum=0,temp;
5 printf("enter the number=");
6 scanf("%d",&n);
7 temp=n;
8 while(n>0)
9 {
10 r=n%10;
11 sum=sum+(r*r*r);
12 n=n/10;
13 }
14 if(temp==sum)
15 printf("armstrong number ");
16 else
17 printf("not armstrong number");
18 return 0;
19 }
```

2.Time complexity:

i)

program:

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

```
void function(int min);
```

```
int main()
```

```
{
```

```
int n;
```

```
scanf("%d",&n);
```

```
function(n);
```

```
return 0;
```

```
}
```

```
void function(int n)
```

```
{
```

```
int count=0;
```

```
int i=1,s=1;
```

```
count++;
```

```
count++;
```

```
while(s<=n)
```

```
{
```

```
count++;
```

```
i++;
```

```
count++;
```

```
s+=i;
```

```
count++;
```

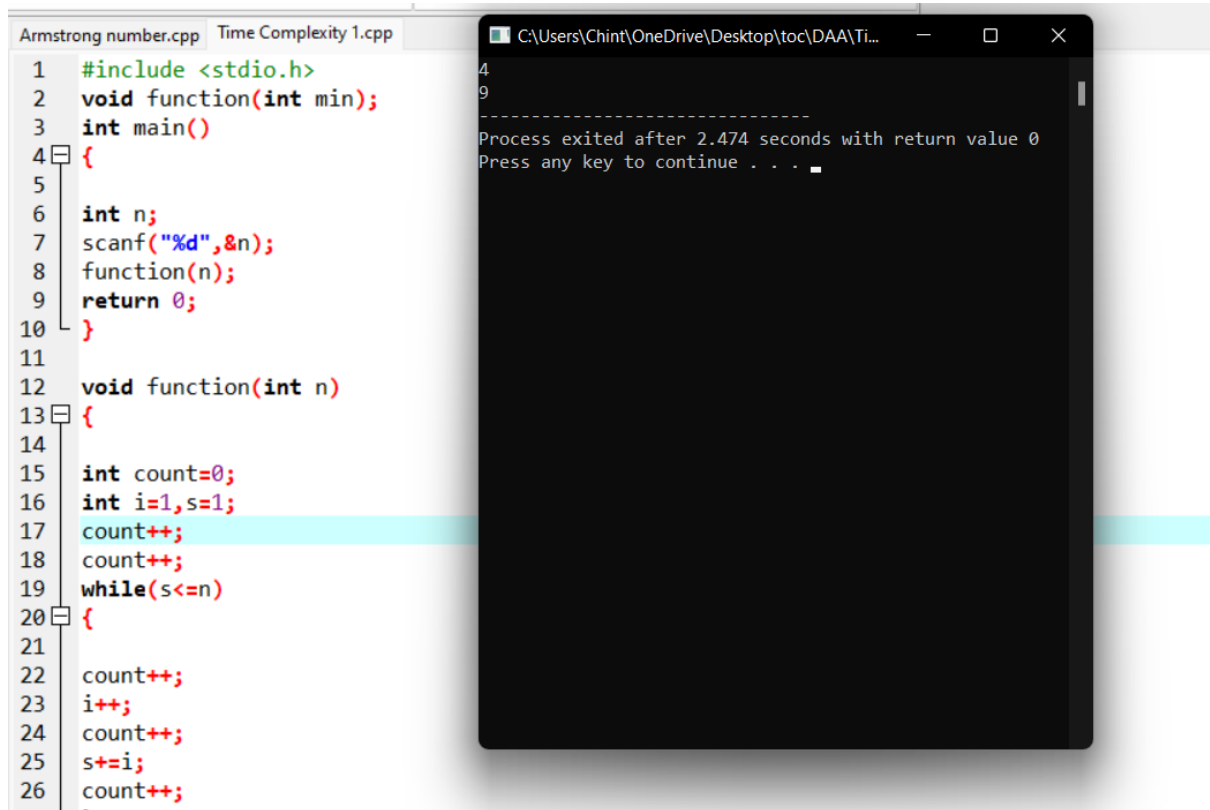
```
}
```

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```
count++;  
printf("%d",count);  
}
```

Output:



The screenshot displays a C++ IDE with two windows. The left window, titled 'Armstrong number.cpp', contains the following code:

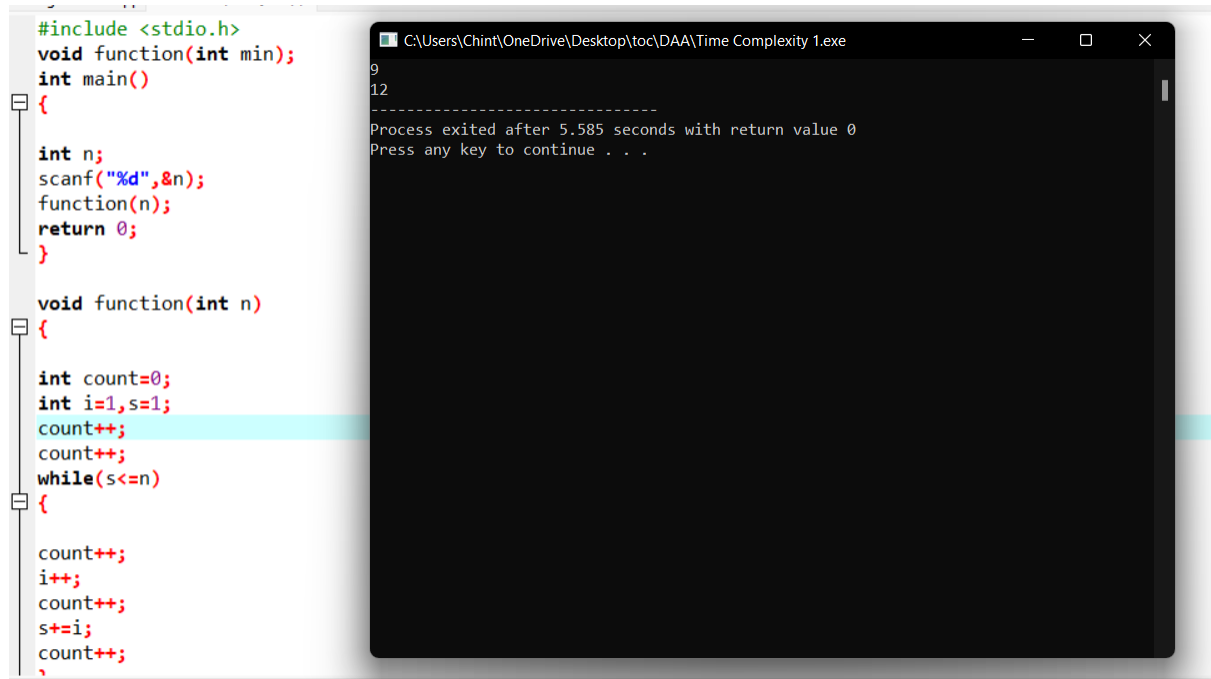
```
1  #include <stdio.h>  
2  void function(int min);  
3  int main()  
4  {  
5  
6      int n;  
7      scanf("%d",&n);  
8      function(n);  
9      return 0;  
10 }  
11  
12 void function(int n)  
13 {  
14  
15     int count=0;  
16     int i=1,s=1;  
17     count++;  
18     count++;  
19     while(s<=n)  
20     {  
21  
22         count++;  
23         i++;  
24         count++;  
25         s+=i;  
26         count++;  
27     }
```

The right window, titled 'C:\Users\Chint\OneDrive\Desktop\toc\DAA\Ti...', shows the program's execution output:

```
4  
9  
-----  
Process exited after 2.474 seconds with return value 0  
Press any key to continue . . .
```

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The image shows a C program in a code editor and its execution output in a terminal window. The code defines a function and a main function. The main function takes an integer 'n' as input and calls the defined function. The defined function calculates the sum of integers from 1 to 'n' using a while loop and prints the result. The terminal output shows the input '12', the calculated sum '66', and the execution time '5.585 seconds'.

```
#include <stdio.h>
void function(int min);
int main()
{
    int n;
    scanf("%d",&n);
    function(n);
    return 0;
}

void function(int n)
{
    int count=0;
    int i=1,s=1;
    count++;
    count++;
    while(s<=n)
    {
        count++;
        i++;
        count++;
        s+=i;
        count++;
    }
}
```

```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\Time Complexity 1.exe
9
12
-----
Process exited after 5.585 seconds with return value 0
Press any key to continue . . .
```

ii)

program:

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

```
void function(int n);
```

```
int main()
```

```
{
```

```
int n; scanf("%d",&n);
```

```
function(n);
```

```
return 0;
```

```
}
```

```
void function(int n)
```

```
{
```

```
int count=0;
```

```
if(n==1)
```

```
{
```

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```
count++; count++;
```

```
}
```

```
else
```

```
{
```

```
count++;
```

```
for(int i=1;i<=n;i++)
```

```
{
```

```
count++;
```

```
for(int j=1;j<=n;j++)
```

```
{
```

```
count++;
```

```
count++;
```

```
count++;
```

```
count++;
```

```
break;
```

```
}
```

```
}
```

```
count++;
```

```
}
```

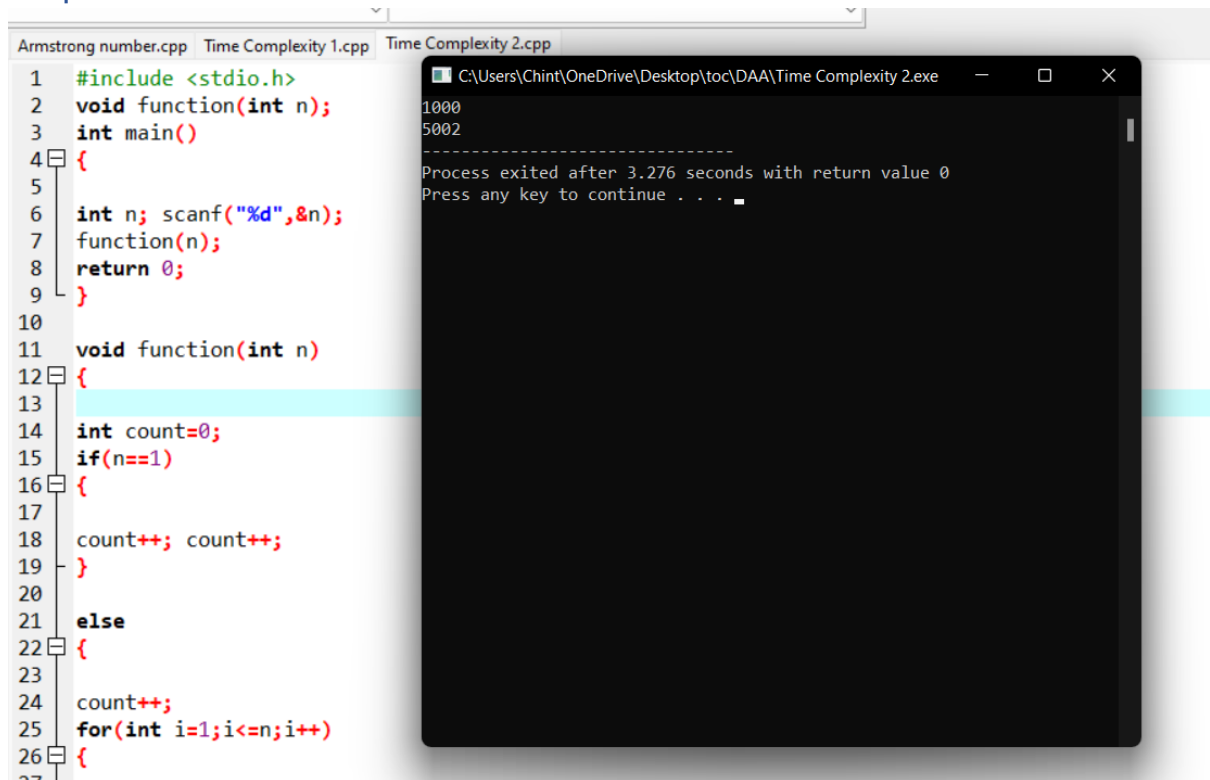
```
printf("%d",count);
```

```
}
```

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Output:

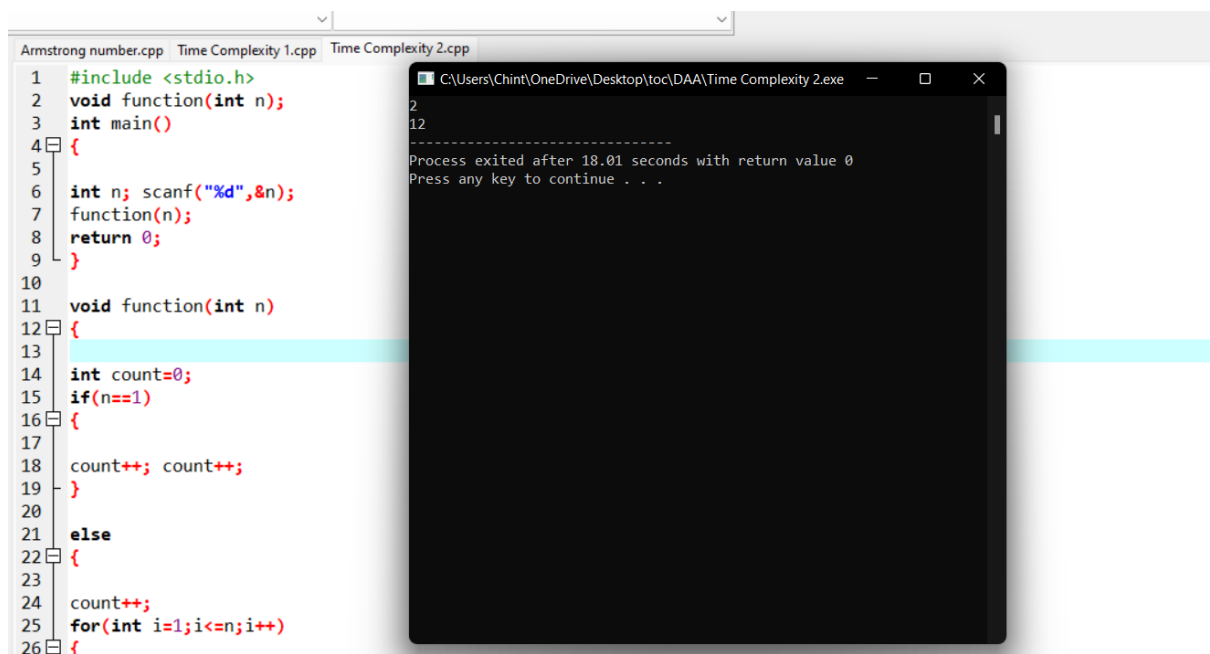


The screenshot shows a C++ IDE with three tabs: 'Armstrong number.cpp', 'Time Complexity 1.cpp', and 'Time Complexity 2.cpp'. The 'Armstrong number.cpp' tab is active, displaying the following code:

```
1 #include <stdio.h>
2 void function(int n);
3 int main()
4 {
5
6     int n; scanf("%d",&n);
7     function(n);
8     return 0;
9 }
10
11 void function(int n)
12 {
13
14     int count=0;
15     if(n==1)
16     {
17
18         count++; count++;
19     }
20
21     else
22     {
23
24         count++;
25         for(int i=1;i<=n;i++)
26         {
```

The 'Time Complexity 2.exe' window is open, showing the output of the program:

```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\Time Complexity 2.exe
1000
5002
-----
Process exited after 3.276 seconds with return value 0
Press any key to continue . . .
```



The screenshot shows a C++ IDE with three tabs: 'Armstrong number.cpp', 'Time Complexity 1.cpp', and 'Time Complexity 2.cpp'. The 'Armstrong number.cpp' tab is active, displaying the following code:

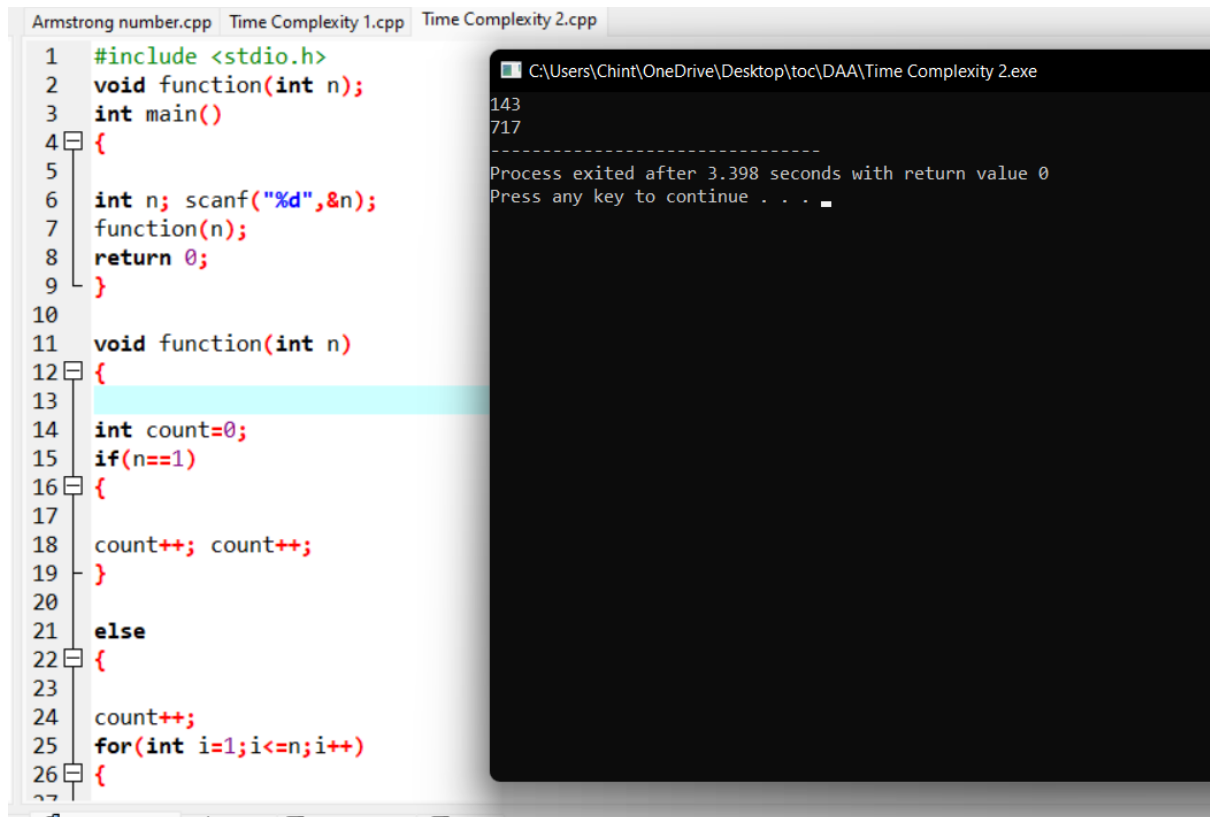
```
1 #include <stdio.h>
2 void function(int n);
3 int main()
4 {
5
6     int n; scanf("%d",&n);
7     function(n);
8     return 0;
9 }
10
11 void function(int n)
12 {
13
14     int count=0;
15     if(n==1)
16     {
17
18         count++; count++;
19     }
20
21     else
22     {
23
24         count++;
25         for(int i=1;i<=n;i++)
26         {
```

The 'Time Complexity 2.exe' window is open, showing the output of the program:

```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\Time Complexity 2.exe
2
12
-----
Process exited after 18.01 seconds with return value 0
Press any key to continue . . .
```

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```
Armstrong number.cpp Time Complexity 1.cpp Time Complexity 2.cpp
1  #include <stdio.h>
2  void function(int n);
3  int main()
4  {
5
6  int n; scanf("%d",&n);
7  function(n);
8  return 0;
9  }
10
11 void function(int n)
12 {
13
14 int count=0;
15 if(n==1)
16 {
17
18 count++; count++;
19 }
20
21 else
22 {
23
24 count++;
25 for(int i=1;i<=n;i++)
26 {
27
```

```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\Time Complexity 2.exe
143
717
-----
Process exited after 3.398 seconds with return value 0
Press any key to continue . . .
```

iii)

program:

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

```
int factor(int n);
```

```
int count=0;
```

```
int main()
```

```
{
```

```
int n;
```

```
scanf("%d",&n);
```

```
factor(n);
```

```
printf("%d",count);
```

```
return 0;
```

```
}
```

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```
int factor(int n)
{

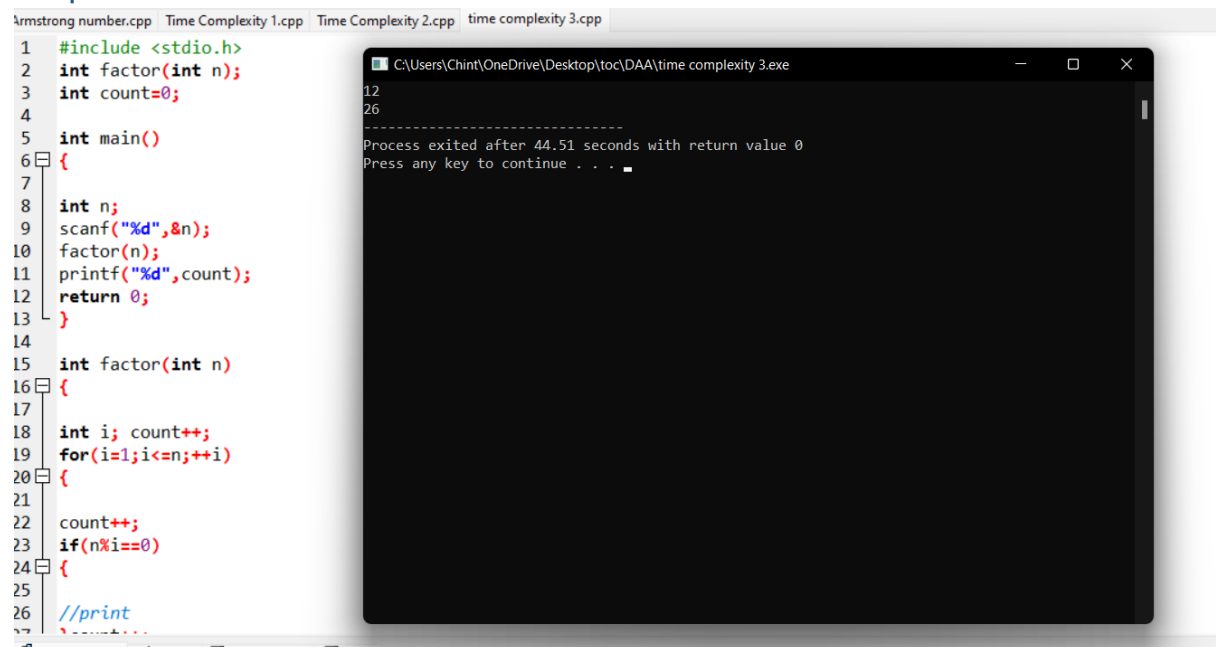
int i; count++;
for(i=1;i<=n;++i)
{

count++;
if(n%i==0)
{

//print
}count++;
}

count++;
return 0;
}
```

Output:



The screenshot displays a C++ IDE with two windows. The left window, titled 'time complexity 3.cpp', shows the source code for a program that calculates the number of factors of a given number 'n'. The code includes a header file, a function 'factor' that iterates from 1 to 'n' and counts divisors, and a 'main' function that takes input from the user and prints the result. The right window, titled 'C:\Users\Chint\OneDrive\Desktop\toc\DAA\time complexity 3.exe', shows the program's execution. It displays the input '12' and '26', followed by a separator line, and then the message 'Process exited after 44.51 seconds with return value 0' and 'Press any key to continue . . .'. The output for the input 12 is 12, and for the input 26, it is 26.

```
1  #include <stdio.h>
2  int factor(int n);
3  int count=0;
4
5  int main()
6  {
7
8  int n;
9  scanf("%d",&n);
10 factor(n);
11 printf("%d",count);
12 return 0;
13 }
14
15 int factor(int n)
16 {
17
18 int i; count++;
19 for(i=1;i<=n;++i)
20 {
21
22 count++;
23 if(n%i==0)
24 {
25
26 //print
27 }
```


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iv)

program:

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

```
void function(int n);
```

```
int main()
```

```
{
```

```
int n;
```

```
scanf("%d",&n);
```

```
function(n);
```

```
return 0;
```

```
}
```

```
void function(int n)
```

```
{
```

```
int count=0;
```

```
int c=0;
```

```
count++;
```

```
for(int i=n/2;i<n;i++)
```

```
{
```

```
count++;
```

```
for(int j=1;j<n;j=2*j)
```

```
{
```

```
count++;
```

```
for(int k=1;k<n;k=k*2)
```

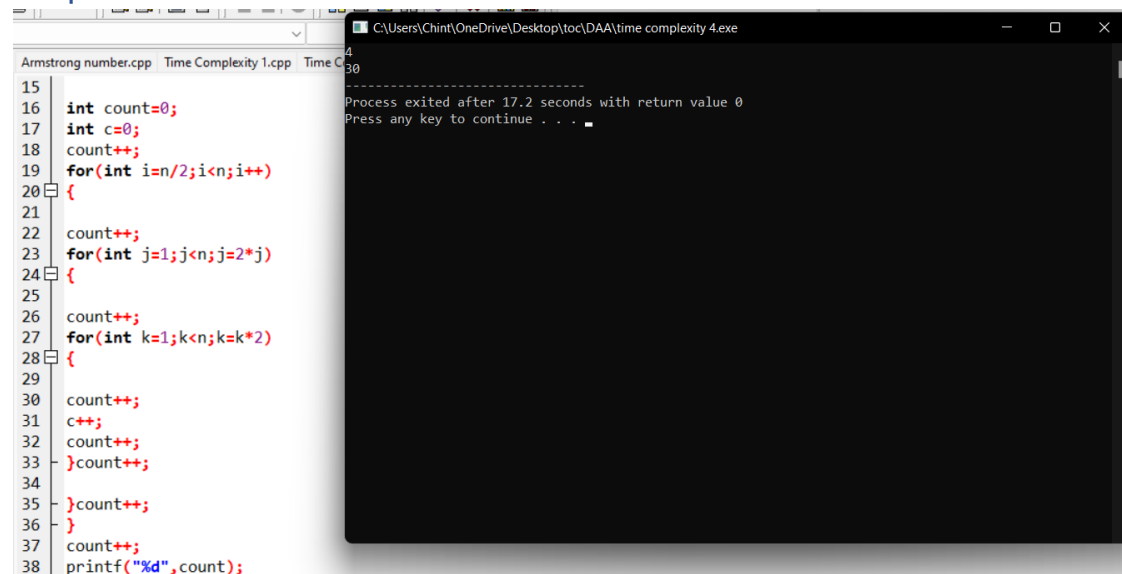
```
{
```

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```
count++;  
  
c++;  
  
count++;  
}count++;  
  
}count++;  
  
}  
  
count++;  
printf("%d",count);  
}
```

Output:



```
Armstrong number.cpp Time Complexity 1.cpp Time C  
15  
16 int count=0;  
17 int c=0;  
18 count++;  
19 for(int i=n/2;i<n;i++)  
20 {  
21  
22 count++;  
23 for(int j=1;j<n;j=2*j)  
24 {  
25  
26 count++;  
27 for(int k=1;k<n;k=k*2)  
28 {  
29  
30 count++;  
31 c++;  
32 count++;  
33 }count++;  
34  
35 }count++;  
36 }  
37 count++;  
38 printf("%d",count);
```

```
C:\Users\Chint\OneDrive\Desktop\loc\DAA\time complexity 4.exe  
-----  
Process exited after 17.2 seconds with return value 0  
Press any key to continue . . .
```

v)

program:

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

```
void reverse(int n);
```

```
int main()
```

```
{
```

```
int n;
```

```
scanf("%d",&n);
```

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```
reverse(n);
```

```
return 0;
```

```
}
```

```
void reverse(int n)
```

```
{
```

```
int count=0;
```

```
int rev=0,
```

```
remainder;
```

```
count++;
```

```
while(n!=0)
```

```
{
```

```
count++;
```

```
remainder=n%10;
```

```
count++;
```

```
rev=rev*10+remainder;
```

```
count++;
```

```
n=n/10;
```

```
count++;
```

```
}
```

```
count++;
```

```
count++;
```

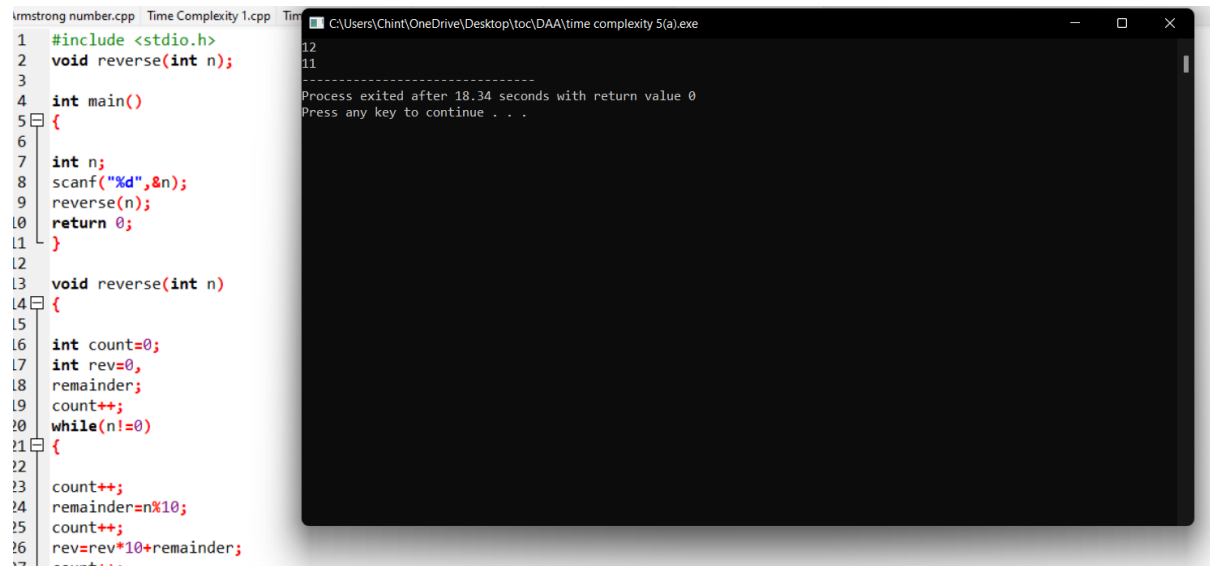
```
printf("%d",count);
```

```
}
```

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Output:



The screenshot shows a C++ program in a text editor and its execution in a command prompt. The program, named 'number.cpp', defines a function 'reverse' to reverse a number. The main function takes an integer 'n' as input and calls 'reverse(n)'. The 'reverse' function uses a while loop to extract digits from 'n' and build the reversed number 'rev' by multiplying by 10 and adding the remainder. The command prompt shows the program running and exiting after 18.34 seconds with a return value of 0.

```
1 #include <stdio.h>
2 void reverse(int n);
3
4 int main()
5 {
6
7     int n;
8     scanf("%d",&n);
9     reverse(n);
10    return 0;
11 }
12
13 void reverse(int n)
14 {
15
16     int count=0;
17     int rev=0;
18     remainder;
19     count++;
20     while(n!=0)
21     {
22
23         count++;
24         remainder=n%10;
25         count++;
26         rev=rev*10+remainder;
27     }
```

```
12
11
-----
Process exited after 18.34 seconds with return value 0
Press any key to continue . . .
```

3.Binary search:

Program:

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

```
int main()
```

```
{
```

```
    int c=0;
```

```
    int n,k,i,low,high,mid,a[50],temp;
```

```
    printf("Enter number of elements:");
```

```
    scanf("%d",&n);
```

```
    printf("Enter elements:\n");
```

```
    for(i=0;i<n;i++)
```

```
    {
```

```
        c++;
```

```
        scanf("%d",&a[i]);
```

```
    }
```

```
    c++;
```

```
    printf("Enter Element to search:");
```

```
    scanf("%d",&k);
```

```
    low=0; c++;
```

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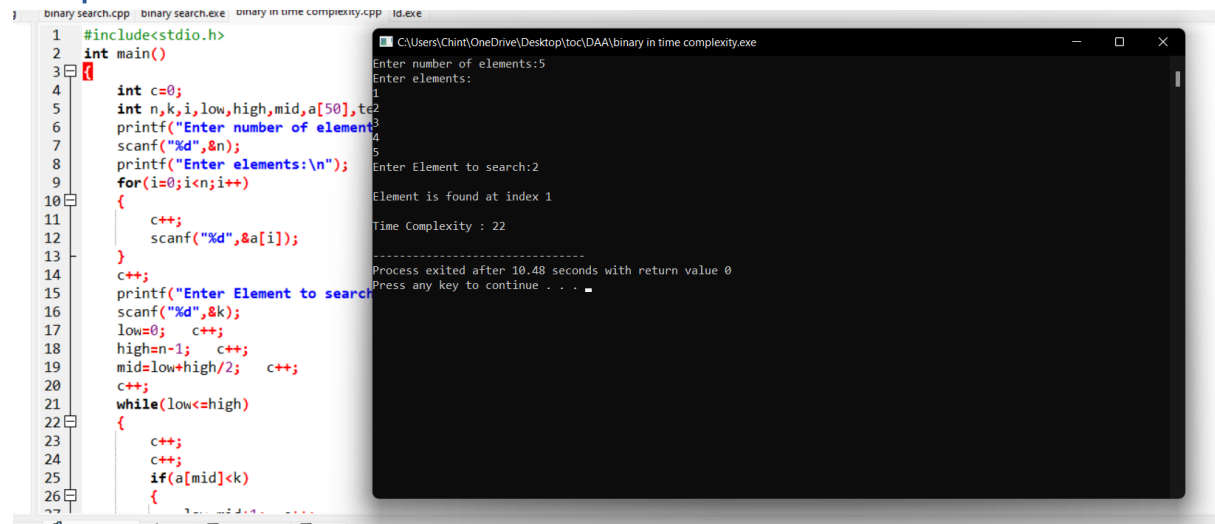
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```
high=n-1; c++;
mid=low+high/2; c++;
c++;
while(low<=high)
{
    c++;
    c++;
    if(a[mid]<k)
    {
        low=mid+1; c++;
    }
    else if(a[mid]==k)
    {
        printf("\nElement is found at index %d\n",mid);
        break;
    }
    else
    {
        high=mid-1; c++;
    }
    mid=(low+high)/2; c++;
}
c++;
c++;
if(low>high)
{
    printf("Element is not found\n");
}
printf("\nTime Complexity : %d\n",c);
}
```

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Output:



The image shows a C++ program for binary search and its execution output. The program is named 'binary_search.cpp' and is located at 'C:\Users\Chint\OneDrive\Desktop\toC\DAAB\binary in time complexity.cpp'. The code is as follows:

```
1 #include<stdio.h>
2 int main()
3 {
4     int c=0;
5     int n,k,i,low,high,mid,a[50],t;
6     printf("Enter number of elements:");
7     scanf("%d",&n);
8     printf("Enter elements:\n");
9     for(i=0;i<n;i++)
10    {
11        c++;
12        scanf("%d",&a[i]);
13    }
14    c++;
15    printf("Enter Element to search:");
16    scanf("%d",&k);
17    low=0; c++;
18    high=n-1; c++;
19    mid=low+high/2; c++;
20    c++;
21    while(low<=high)
22    {
23        c++;
24        c++;
25        if(a[mid]<k)
26        {
```

The output of the program is shown in a separate window titled 'C:\Users\Chint\OneDrive\Desktop\toC\DAAB\binary in time complexity.exe'. The output is as follows:

```
Enter number of elements:5
Enter elements:
1
2
3
4
5
Enter Element to search:2
Element is found at index 1
Time Complexity : 22
-----
Process exited after 10.48 seconds with return value 0
Press any key to continue . . .
```

4.Linear search:

Program:

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

```
int main()
```

```
{
```

```
    int c=0;
```

```
    int n,k,i,j,f=0,a[50];
```

```
    c++;
```

```
    printf("Enter number of elements:");
```

```
    scanf("%d",&n);
```

```
    printf("Enter elements:\n");
```

```
    for(i=0;i<n;i++)
```

```
    {
```

```
        c++;
```

```
        scanf("%d",&a[i]);
```

```
    }
```

```
    c++;
```

```
    printf("Enter Element to search:");
```

```
    scanf("%d",&k);
```

```
    for(i=0;i<n;i++)
```

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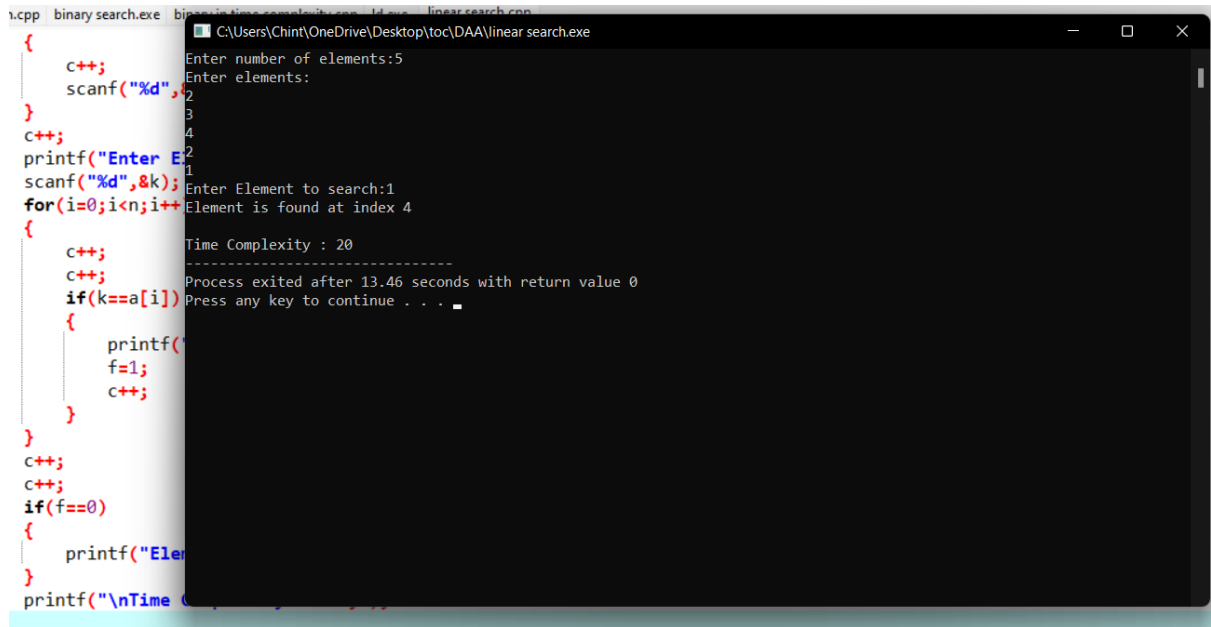
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```
{
    c++;
    c++;
    if(k==a[i])
    {
        printf("Element is found at index %d\n",i);
        f=1;
        c++;
    }
}
c++;
c++;
if(f==0)
{
    printf("Element is not found");
}
printf("\nTime Complexity : %d",c);
}
```

Output:

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```
i.cpp binary search.exe b... C:\Users\Chint\OneDrive\Desktop\toe\DAA\linear search.exe
{
    c++;
    scanf("%d", &2);
}
c++;
printf("Enter Element to search:");
scanf("%d", &k);
for(i=0; i<n; i++)
{
    c++;
    if(k==a[i])
    {
        printf("Element is found at index %d", i);
        f=1;
        c++;
    }
}
c++;
c++;
if(f==0)
{
    printf("Element not found");
}
printf("\nTime Complexity : %d", c);
}
```

```
Enter number of elements:5
Enter elements:
2
3
4
2
1
Enter Element to search:1
Element is found at index 4
Time Complexity : 20
Process exited after 13.46 seconds with return value 0
Press any key to continue . . .
```

5.Reverse a number:

Program:

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

```
int main() {
```

```
    int n, reverse = 0, remainder;
```

```
    printf("Enter an integer: ");
```

```
    scanf("%d", &n);
```

```
    while (n != 0) {
```

```
        remainder = n % 10;
```

```
        reverse = reverse * 10 + remainder;
```

```
        n /= 10;
```

```
    }
```

```
    printf("Reversed number = %d", reverse);
```

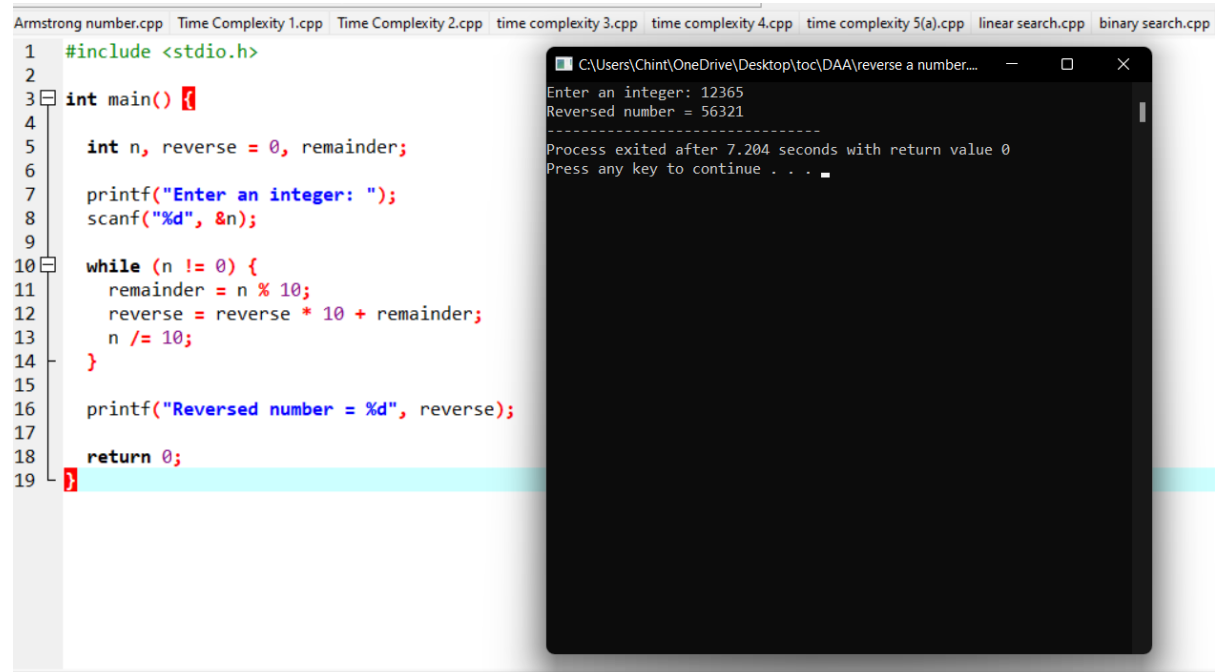

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return 0;

}

Output:



The screenshot shows a C++ IDE with a file explorer at the top listing several files: Armstrong number.cpp, Time Complexity 1.cpp, Time Complexity 2.cpp, time complexity 3.cpp, time complexity 4.cpp, time complexity 5(a).cpp, linear search.cpp, and binary search.cpp. The main editor displays a C++ program to reverse a number. The code is as follows:

```
1 #include <stdio.h>
2
3 int main() {
4     int n, reverse = 0, remainder;
5
6     printf("Enter an integer: ");
7     scanf("%d", &n);
8
9
10    while (n != 0) {
11        remainder = n % 10;
12        reverse = reverse * 10 + remainder;
13        n /= 10;
14    }
15
16    printf("Reversed number = %d", reverse);
17
18    return 0;
19 }
```

Overlaid on the right is a terminal window titled "C:\Users\Chint\OneDrive\Desktop\toc\DAA\reverse a number...". It shows the program's execution: "Enter an integer: 12365", "Reversed number = 56321", a separator line, "Process exited after 7.204 seconds with return value 0", and "Press any key to continue . . .".

6.Matrix multiplication:

Program:

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

```
int main(){
```

```
int a[2][2], b[2][2], c[2][2], i, j, count=0;
```

```
int m1, m2, m3, m4 , m5, m6, m7;
```

```
printf("Enter the 4 elements of first matrix:");
```

```
count++;
```

```
for(i = 0; i < 2; i++)
```

```
{
```

```
count++;
```

```
for(j = 0; j < 2; j++)
```

```
{
```

```
count++;
```

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```
        scanf("%d", &a[i][j]);
    }
}
count++;
count++;

        printf("Enter the 4 elements of second matrix: ");
for(i = 0; i < 2; i++)
{
count++;
    for(j = 0; j < 2; j++)
    {
        count++;
        scanf("%d", &b[i][j]);
    }
}
count++;
count++;

        printf("\nThe first matrix is\n");
for(i = 0; i < 2; i++){
count++;
    printf("\n");
    for(j = 0; j < 2; j++){
count++;
        printf("%d\t", a[i][j]);
    }
}

count++;
count++;
```

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```
printf("\nThe second matrix is\n");
    for(i = 0;i < 2; i++){
        count++;
        printf("\n");
        for(j = 0;j < 2; j++){
            count++;
            printf("%d\t", b[i][j]);
        }
    }
count++;
    count++;
m1= (a[0][0] + a[1][1]) * (b[0][0] + b[1][1]);
count++;
m2= (a[1][0] + a[1][1]) * b[0][0];
count++;
m3= a[0][0] * (b[0][1] - b[1][1]);
count++;
m4= a[1][1] * (b[1][0] - b[0][0]);
count++;
m5= (a[0][0] + a[0][1]) * b[1][1];
count++;
m6= (a[1][0] - a[0][0]) * (b[0][0]+b[0][1]);
count++;
    m7= (a[0][1] - a[1][1]) * (b[1][0]+b[1][1]);
    count++;

c[0][0] = m1 + m4- m5 + m7;
count++;
    c[0][1] = m3 + m5;
    count++;
    c[1][0] = m2 + m4;
```

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count++;

$c[1][1] = m1 - m2 + m3 + m6;$

count++;

printf("\nAfter multiplication using Strassen's algorithm \n");

for(i = 0; i < 2 ; i++){

count++;

printf("\n");

for(j = 0; j < 2; j++){

count++;

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

}

}

count++;

count++;

printf(" time complexity is %d",count);

return 0;

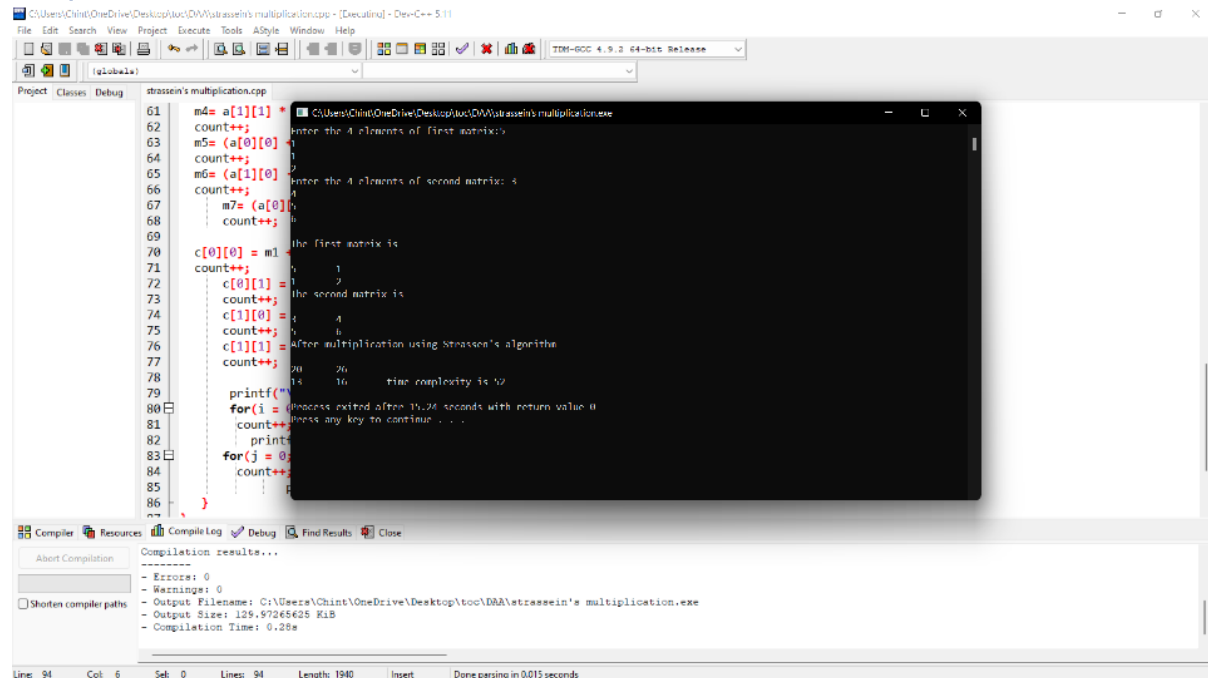
}

}

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Output;



The screenshot displays a C++ IDE with the source code for 'strassen's multiplication.cpp' on the left and its execution output on the right. The source code includes matrix initialization, recursive calls for Strassen's algorithm, and a final loop for printing the result matrix. The output window shows the program's execution, including prompts for matrix elements, the resulting matrix, and a message indicating the process exited after 15.24 seconds.

```
61 m4= a[1][1]
62 count++;
63 m5= (a[0][0]
64 count++;
65 m6= (a[1][0]
66 count++;
67 m7= (a[0]
68 count++;
69
70 c[0][0] = m1
71 count++;
72 c[0][1] =
73 count++;
74 c[1][0] =
75 count++;
76 c[1][1] = After multiplication using Strassen's algorithm
77 count++;
78
79 printf("
80 for(i = 0; process exited after 15.24 seconds with return value 0
81 count++;
82 printf
83 for(j = 0;
84 count++;
85
86 }
```

Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Chint\OneDrive\Desktop\toc\DDA\strassen's multiplication.exe
- Output Size: 129,972,656 B
- Compilation Time: 0.38s

GCD:

Program:

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

```
int main()
```

```
{
```

```
int n1, n2, i, GCD_Num;
```

```
int count=0;
```

```
printf ( " Enter any two numbers: \n ");
```

```
scanf ( "%d %d", &n1, &n2);
```

```
for( i = 1; i <= n1 && i <= n2; ++i)
```

```
{
```

```
count++;
```

```
if (n1 % i == 0 && n2 % i == 0)
```

```
GCD_Num = i;
```

```
count++;
```

```
}
```

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```
count++;
```

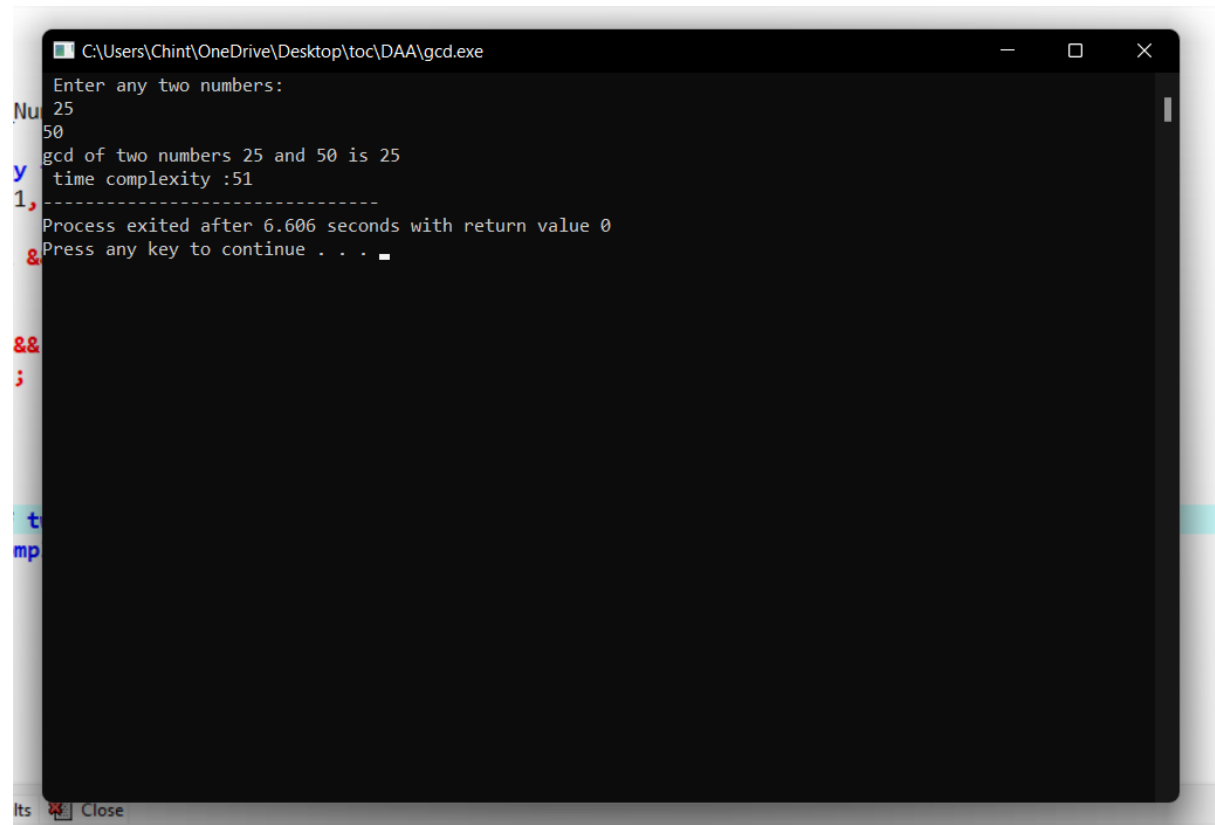
```
printf("gcd of two numbers %d and %d is %d \n ", n1, n2, GCD_Num);
```

```
printf("time complexity :%d ",count);
```

```
return 0;
```

```
}
```

Output:



The screenshot shows a Windows command prompt window titled "C:\Users\Chint\OneDrive\Desktop\toc\DAA\gcd.exe". The window displays the following text:

```
Enter any two numbers:
Nu 25
50
gcd of two numbers 25 and 50 is 25
time complexity :51
-----
Process exited after 6.606 seconds with return value 0
Press any key to continue . . .
```

9.Pascal triangle:

Program:

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

```
int main()
```

```
{
```

```
int rows, coef = 1, space, i, j;
```

```
int count=0;
```

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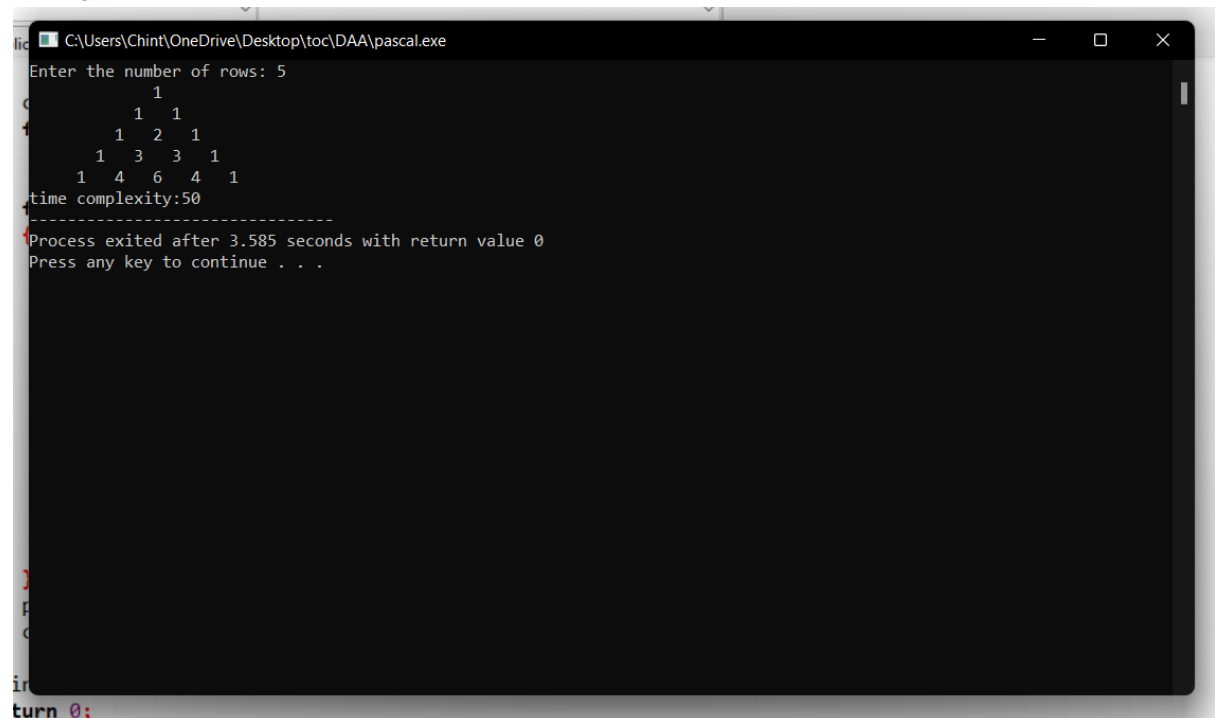
```
printf("Enter the number of rows: ");
scanf("%d", &rows);
for (i = 0; i<rows; i++)
{
    count++;
    for (space = 1; space <= rows - i; space++)
        printf(" ");
    count++;
    for (j = 0; j <= i; j++)
    {
        count++;
        if(j == 0 || i == 0){
            coef = 1;
            count++;
        }

        else
        {
            coef = coef * (i - j + 1) / j;
        }
        count++;
        printf("%4d", coef);
    }
    printf("\n");
    count++;
}
printf("time complexity:%d",count);
return 0;
}
```

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Output:



```
C:\Users\Chint\OneDrive\Desktop\toe\DAA\pascal.exe
Enter the number of rows: 5
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1
time complexity:50
-----
Process exited after 3.585 seconds with return value 0
Press any key to continue . . .
```

10.Largest number:

Program:

```
#include <stdio.h>

int main() {
    int n;
    int count=0;
    double arr[100];
    printf("Enter the number of elements (1 to 100): ");
    scanf("%d", &n);
    count++;
    for (int i = 0; i < n; ++i) {
        count++;
        printf("Enter number%d: ", i + 1);
        scanf("%lf", &arr[i]);
    }
    for (int i = 1; i < n; ++i) {
```

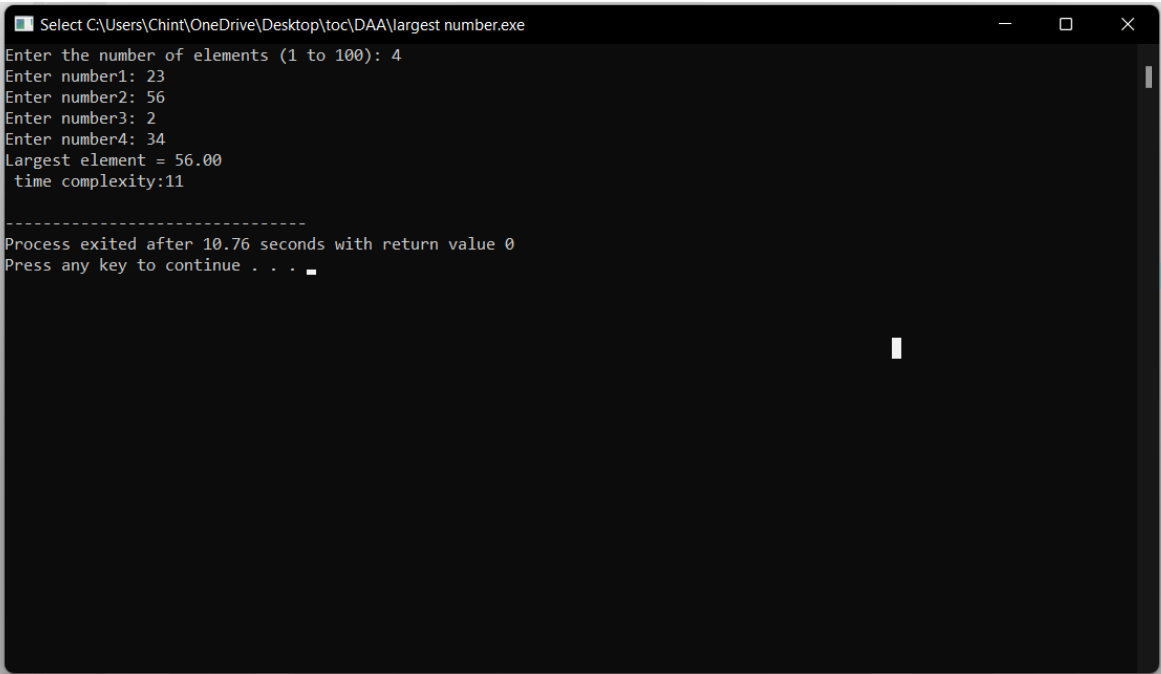

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```
        count++;
    if (arr[0] < arr[i]) {
        arr[0] = arr[i];
    }
    count++;
}

printf("Largest element = %.2lf \n ", arr[0]);
printf("time complexity:%d\n",count);
return 0;
}
```

Output:



```
Select C:\Users\Chint\OneDrive\Desktop\toc\DAA\largest number.exe
Enter the number of elements (1 to 100): 4
Enter number1: 23
Enter number2: 56
Enter number3: 2
Enter number4: 34
Largest element = 56.00
time complexity:11

-----
Process exited after 10.76 seconds with return value 0
Press any key to continue . . .
```

Factorial:

Program:

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

```
int main() {
```

```
    int n, i;
```

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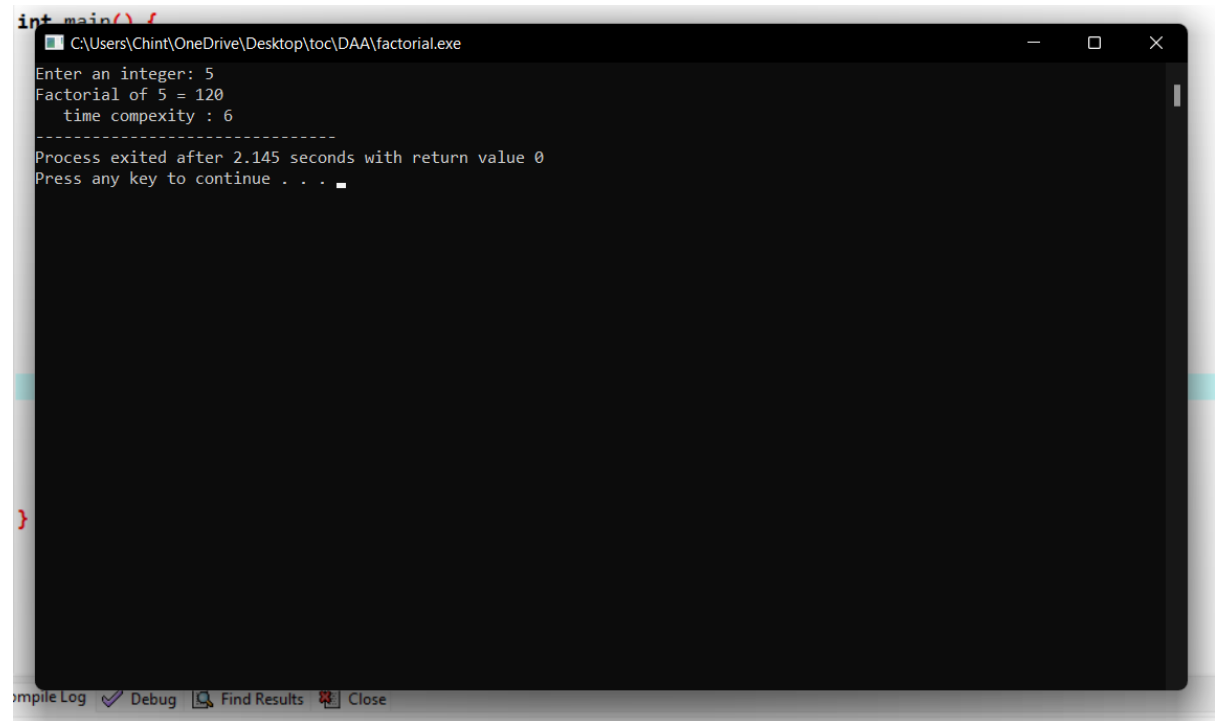
```
int count=0;
unsigned long long fact = 1;
printf("Enter an integer: ");
scanf("%d", &n);
count++;
if (n < 0)
    printf("Error! Factorial of a negative number doesn't exist.");
else {
    for (i = 1; i <= n; ++i) {
        fact *= i;
        count++;
    }
    printf("Factorial of %d = %llu \n ", n, fact);
    printf(" time compexity : %d ",count);
}

return 0;
}
```

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Output:



```
int main() {  
    Enter an integer: 5  
    Factorial of 5 = 120  
    time compexity : 6  
    -----  
    Process exited after 2.145 seconds with return value 0  
    Press any key to continue . . .  
}
```

12.Perfect numbers:

Program:

```
/**  
 * C program to print all Perfect numbers between 1 to n  
 */  
  
#include <stdio.h>  
  
int main()  
{  
    int i, j, end, sum;  
  
    /* Input upper limit to print perfect number */  
    printf("Enter upper limit: ");  
    scanf("%d", &end);
```

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```
printf("All Perfect numbers between 1 to %d:\n", end);
```

```
/* Iterate from 1 to end */
```

```
for(i=1; i<=end; i++)
```

```
{
```

```
    sum = 0;
```

```
    /* Check whether the current number i is Perfect number or not */
```

```
    for(j=1; j<i; j++)
```

```
    {
```

```
        if(i % j == 0)
```

```
        {
```

```
            sum += j;
```

```
        }
```

```
    }
```

```
    /* If the current number i is Perfect number */
```

```
    if(sum == i)
```

```
    {
```

```
        printf("%d, ", i);
```

```
    }
```

```
}
```

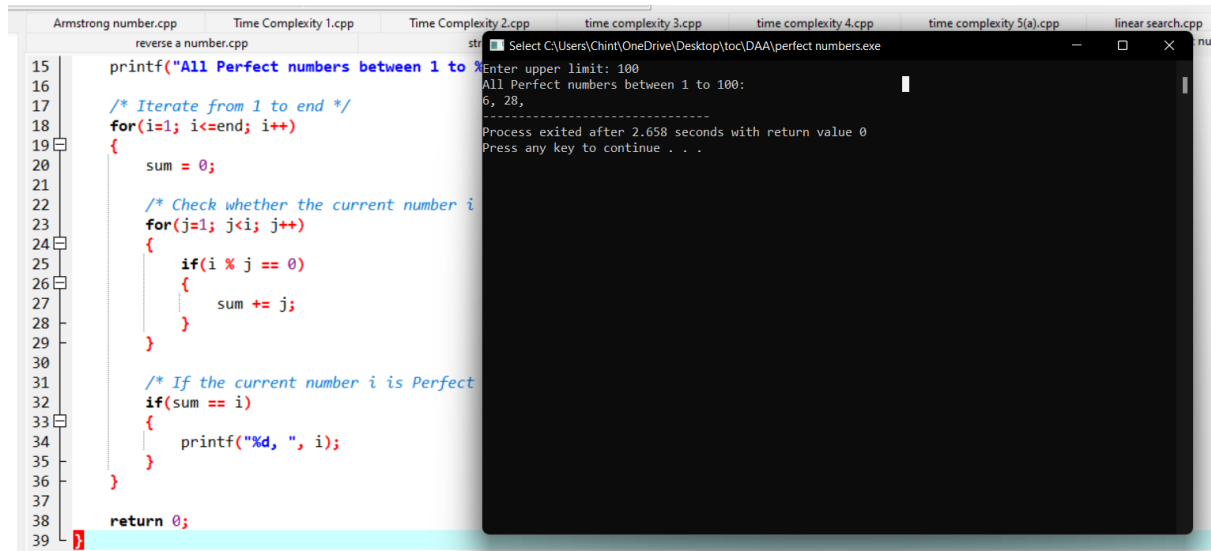
```
return 0;
```

```
}
```

Output:

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```
15 printf("All Perfect numbers between 1 to 100:");
16
17 /* Iterate from 1 to end */
18 for(i=1; i<=end; i++)
19 {
20     sum = 0;
21
22     /* Check whether the current number i is Perfect */
23     for(j=1; j<i; j++)
24     {
25         if(i % j == 0)
26         {
27             sum += j;
28         }
29     }
30
31     /* If the current number i is Perfect */
32     if(sum == i)
33     {
34         printf("%d, ", i);
35     }
36 }
37
38 return 0;
39
```

Enter upper limit: 100
All Perfect numbers between 1 to 100:
6, 28,

Process exited after 2.658 seconds with return value 0
Press any key to continue . . .

13.Palindrome:

Program:

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

```
int main()
```

```
{
```

```
int i,n,r,s=0;
```

```
printf("\n Enter Integer Number:");
```

```
scanf("%d",&n);
```

```
//LOOP TO FIND REVERSE OF A NUMBER
```

```
for(i=n;i>0; )
```

```
{
```

```
    r=i%10;
```

```
    s=s*10+r;
```

```
    i=i/10;
```

```
}
```

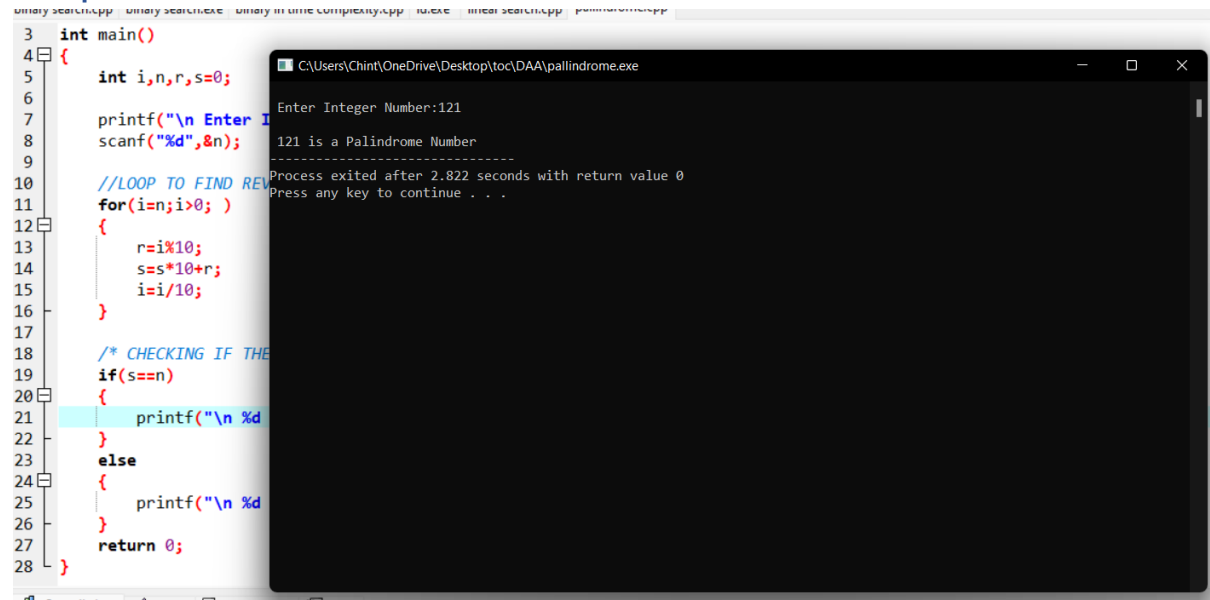
```
/* CHECKING IF THE NUMBER ENTERED AND THE REVERSE NUMBER IS EQUAL OR NOT */
```

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```
if(s==n)
{
    printf("\n %d is a Palindrome Number",n);
}
else
{
    printf("\n %d is not a Palindrome Number",n);
}
return 0;
}
```

Output:



```
3 int main()
4 {
5     int i,n,r,s=0;
6
7     printf("\n Enter Integer Number:");
8     scanf("%d",&n);
9
10    //LOOP TO FIND REVERSE
11    for(i=n;i>0; )
12    {
13        r=i%10;
14        s=s*10+r;
15        i=i/10;
16    }
17
18    /* CHECKING IF THE NUMBER IS PALINDROME */
19    if(s==n)
20    {
21        printf("\n %d is a Palindrome Number",n);
22    }
23    else
24    {
25        printf("\n %d is not a Palindrome Number",n);
26    }
27    return 0;
28 }
```

Enter Integer Number:121
121 is a Palindrome Number

Process exited after 2.822 seconds with return value 0
Press any key to continue . . .

14.Bubble sort:

Program;

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

```
int main(){
    int ele,count=0;

    printf("Enter total element: ");
```

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```
scanf("%d",&ele);
```

```
int arr[ele];
```

```
printf("Enter the elements: ");
```

```
for (int i = 0; i < ele; i++){
```

```
    count++;
```

```
    scanf("%d",&arr[i]);
```

```
}count++;
```

```
for (int i = 0; i < ele; i++)
```

```
{
```

```
count++;
```

```
    for (int j =i+1; j < ele; j++)
```

```
    {
```

```
count++;
```

```
        if (arr[i]>arr[j])
```

```
        {
```

```
            count++;
```

```
            int temp=arr[i];
```

```
            count++;
```

```
            arr[i]=arr[j];
```

```
            count++;
```

```
            arr[j]=temp;
```

```
            count++;
```

```
        }
```

```
    }count++;
```

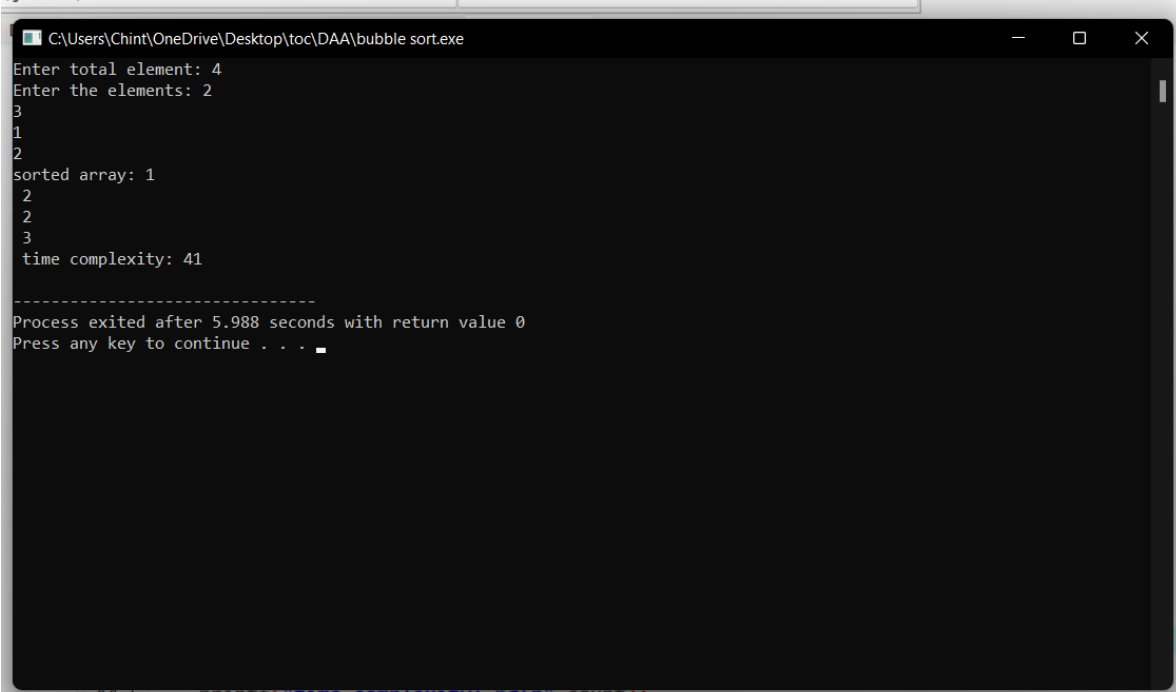
```
}count++;
```

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```
printf("sorted array: ");
for (int i = 0; i < ele; i++)
{
    count++;
    count++;
    printf("%d \n ",arr[i]);
}
count++;
printf("time complexity: %d\n",count);
}
```

Output:



```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\bubble sort.exe
Enter total element: 4
Enter the elements: 2
3
1
2
sorted array: 1
2
2
3
time complexity: 41
-----
Process exited after 5.988 seconds with return value 0
Press any key to continue . . .
```

15.Reverse string:

Program:

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

```
int main(){
    char val[25];
```


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```
printf("enter the value: ");
```

```
scanf("%s",&val);
```

```
int count=0,c=0;
```

```
while (val[count]!='\0'){
```

```
    count++;
```

```
    c++;
```

```
}c++;
```

```
for(int i=count-1;i>=0;i--){
```

```
    c++;
```

```
    printf("%c",val[i]);
```

```
}c++;
```

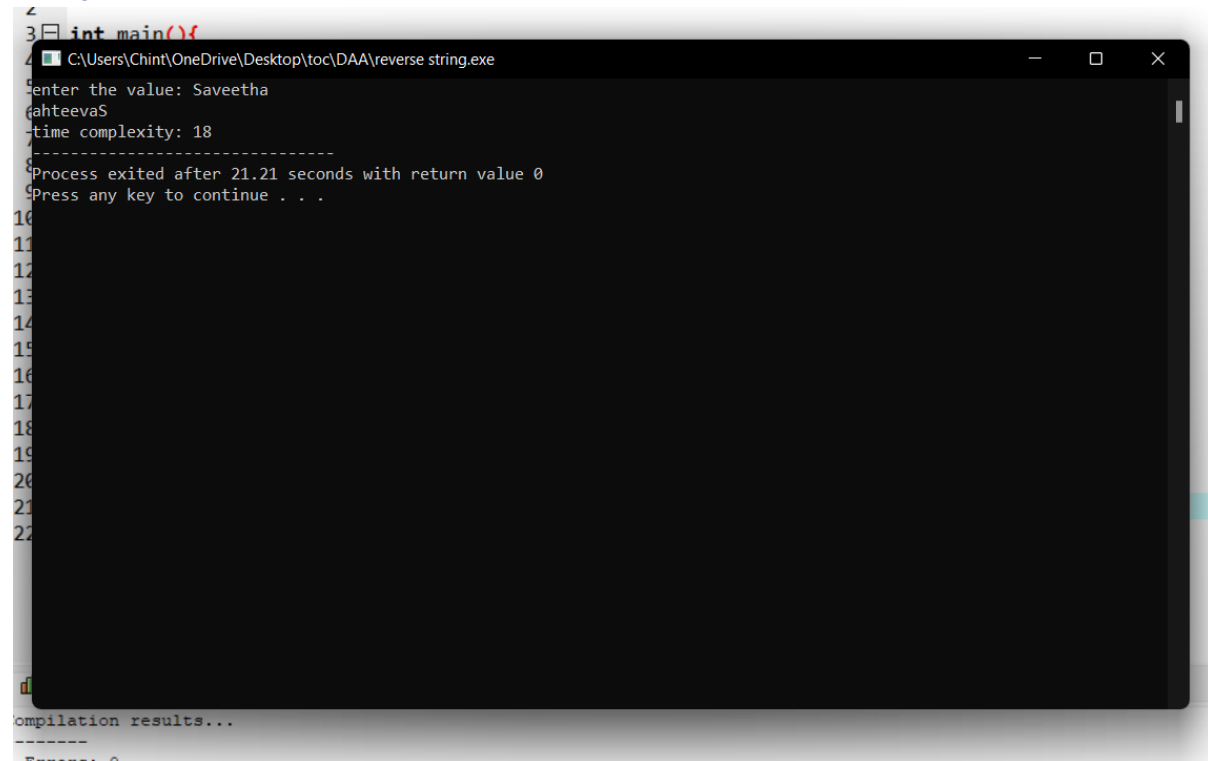
```
printf("\ntime complexity: %d",c);
```

```
}
```

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Output:



```
3 int main(){
4
5 Enter the value: Saveetha
6 sahteevaS
7 time complexity: 18
8 -----
9 Process exited after 21.21 seconds with return value 0
10 Press any key to continue . . .
11
12
13
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16
17
18
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```

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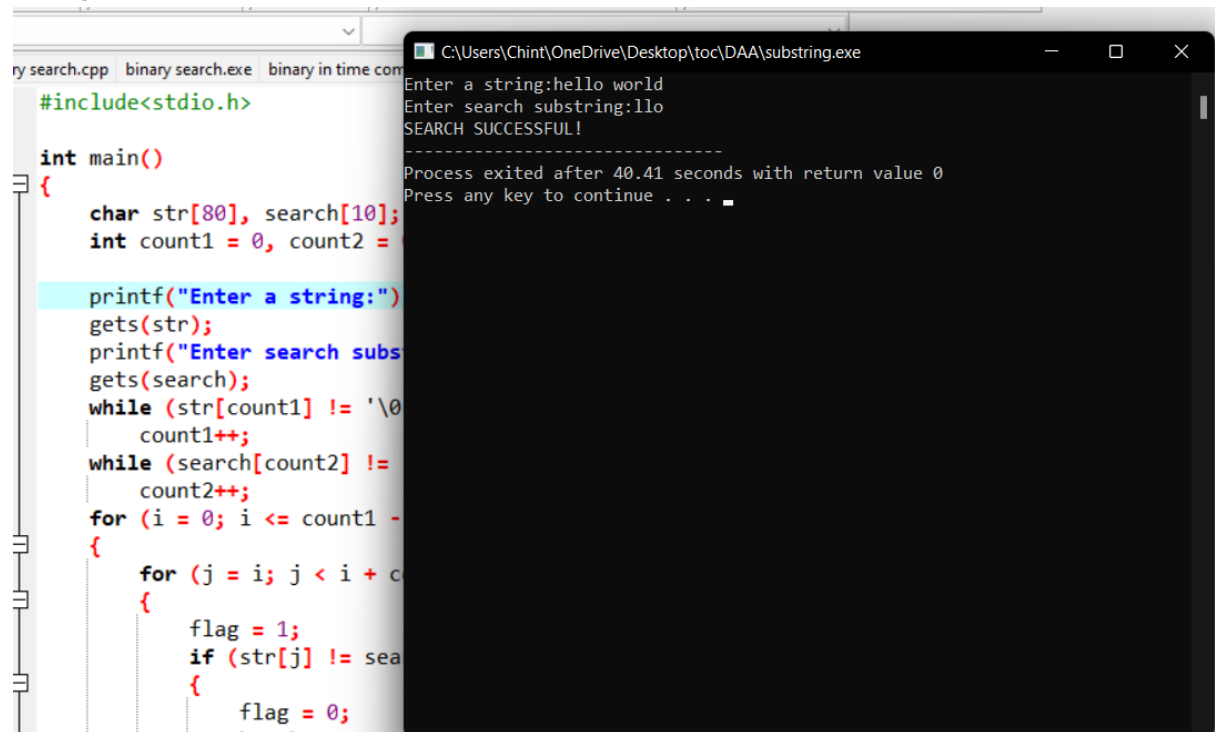
```
gets(str);
printf("Enter search substring:");
gets(search);
while (str[count1] != '\0')
    count1++;
while (search[count2] != '\0')
    count2++;
for (i = 0; i <= count1 - count2; i++)
{
    for (j = i; j < i + count2; j++)
    {
        flag = 1;
        if (str[j] != search[j - i])
        {
            flag = 0;
            break;
        }
    }
    if (flag == 1)
        break;
}
if (flag == 1)
    printf("SEARCH SUCCESSFUL!");
else
    printf("SEARCH UNSUCCESSFUL!");

return 0;
}
```

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Output:



The image shows a C++ IDE with a file named `substring.cpp` open. The code implements a substring search algorithm. It prompts the user to enter a string and a search substring. In the execution output, the user entered "hello world" and "llo", and the program successfully found the substring.

```
#include<stdio.h>

int main()
{
    char str[80], search[10];
    int count1 = 0, count2 = 0;

    printf("Enter a string:");
    gets(str);
    printf("Enter search substring:");
    gets(search);

    while (str[count1] != '\0')
        count1++;
    while (search[count2] != '\0')
        count2++;

    for (i = 0; i <= count1 - count2; i++)
    {
        for (j = i; j < i + count2; j++)
        {
            if (str[j] != search[j - i])
            {
                flag = 0;
                break;
            }
            else
            {
                flag = 1;
            }
        }
        if (flag == 1)
        {
            printf("SEARCH SUCCESSFUL!\n");
            break;
        }
    }

    if (flag == 0)
        printf("SEARCH NOT FOUND!\n");

    printf("Process exited after 40.41 seconds with return value 0\n");
    printf("Press any key to continue . . . ");
    getch();
}
```

Execution Output:

```
C:\Users\Chint\OneDrive\Desktop\toc\DAA\substring.exe
Enter a string:hello world
Enter search substring:llo
SEARCH SUCCESSFUL!
Process exited after 40.41 seconds with return value 0
Press any key to continue . . .
```