

1.Armstrong number

Program:

```
#include<stdio.h>
int main()
{
    int n,n1,sum=0,r;
    printf("Enter number:");
    scanf("%d",&n);
    n1=n;
    while (n1>0)
    {
        r=n1%10;
        sum=sum+(r*r*r);
        n1=n1/10;
    }
    if(sum==n)
    {
        printf("Armstrong Number");
    }
    else
    {
        printf("Not Armstrong Number");
    }
}
```

A screenshot of a Windows command prompt window. The title bar at the top shows the file path 'C:\Users\Admin\Documents\daa1.exe'. The main area of the window displays the following text: 'Enter number:153' (where '153' is user input), 'Armstrong Number' (the program's output), 'Process returned 0 (0x0) execution time : 2.656 s' (system status), and 'Press any key to continue.' (a prompt for the user to press a key).

2. Time complexity 5 programs

Program-1:

Problem Statement 2:

Convert the following algorithm into a program and find its time complexity using the counter method.

void function (int n)

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

Note: No need of counter increment for declarations and scanf() and count variable printf() st
Manually find the complexity using counter method and write the same in observation

Input:

A positive Integer n

Output:

Print the value of the counter variable

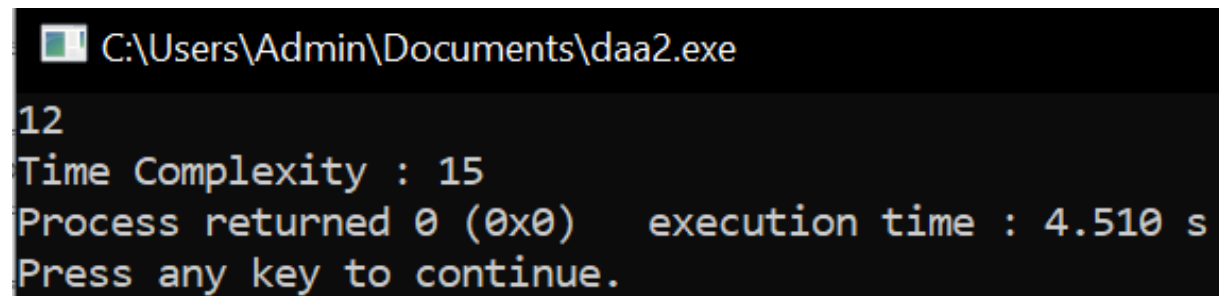
For example:

Input	Result
9	12

Program:

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

void function(int n)
{
    int c=0;
    int i=1,s=1;
    c++;
    c++;
    while(s<=n)
    {
        c++;
        i++;
        c++;
        s+=i;
        c++;
    }
    c++;
    printf("Time Complexity : %d",c);
}
```



```
C:\Users\Admin\Documents\daa2.exe
12
Time Complexity : 15
Process returned 0 (0x0)   execution time : 4.510 s
Press any key to continue.
```

Program-2:

Problem

Statement 3:

Convert the following algorithm into a program and find its time complexity using the counter method.

```
void func(int n)
```

```
{
    if
(n==1)
    {
        printf("");
    }
    else
    {
        for
(int i=1; i<=n; i++)
        {
            for
(int j=1; j<=n; j++)
            {
                printf
("");
                printf("");
                break;
            }
        }
    }
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() st
Manually find the complexity using counter method and write the same in observation

Input:

A positive Integer n

Output:

Print the value of the counter variable

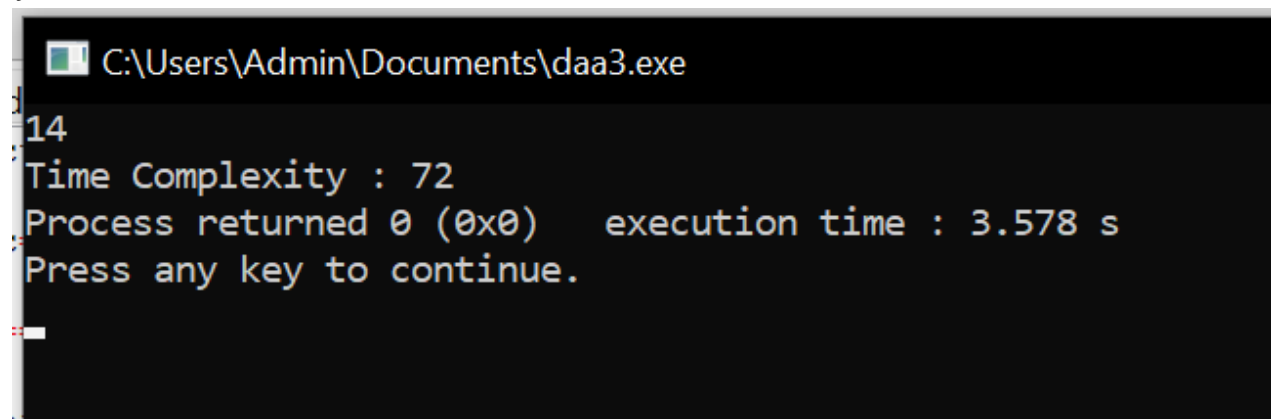
Program:

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

```

    return 0;
}
void function(int n)
{
    int c=0;
    c++;
    if(n==1)
    {
        printf("");
        c++;
    }
    else
    {
        for(int i=1;i<=n;i++)
        {
            c++;
            for(int j=1;j<=1;j++)
            {
                c++;
                printf("");c++;
                printf("");c++;
                break;
            }
            c++;
        }
        c++;
    }
    printf("Time Complexity : %d",c);
}

```



```

C:\Users\Admin\Documents\daa3.exe
14
Time Complexity : 72
Process returned 0 (0x0)   execution time : 3.578 s
Press any key to continue.

```

Program-3:

Problem Statement 4:

Convert the following algorithm into a program and find its time complexity using counter method.

```
Factor(n) {
    {
        for (i = 1; i <= num;++i)
        {
            if (num % i== 0)
            {
                printf("%d ", i);
            }
        }
        return 0;
    }
}
```

Note: No need of counter increment for declarations and scanf() and printf() statements. Manually find the complexity using counter method and write the same in observation

Input:

A positive Integer n

Output:

Print the value of the counter variable

Program:

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

```
int main()
```

```
{
```

```
    int n;
```

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

```
    Factor(n);
```

```
    return 0;
```

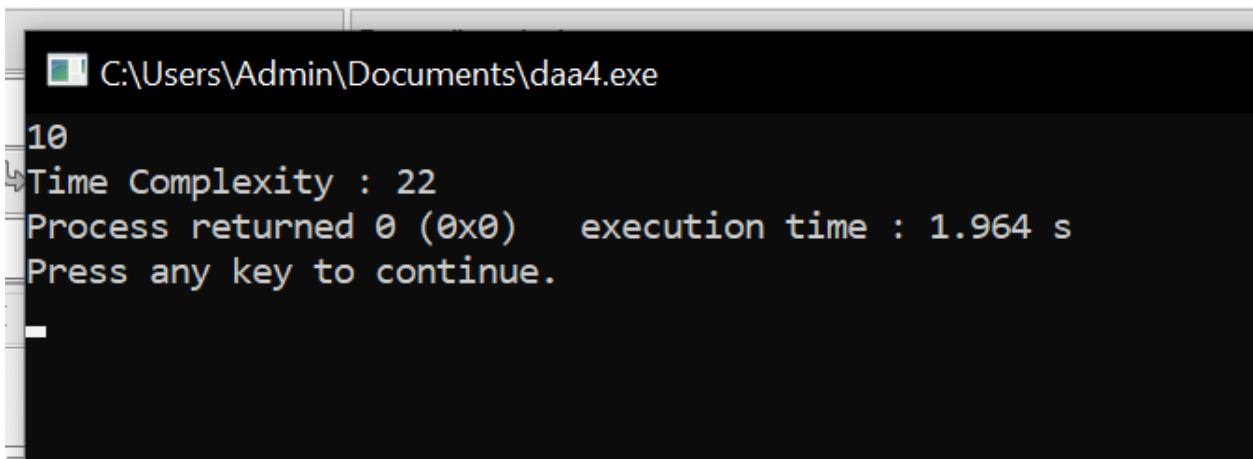
```
}
```

```
int Factor(int n)
```

```
{
```

```
int c=0;
int i=0;
c++;
for(int i=1;i<=n;i++)
{
    c++;
    c++;
    if(n%i==0)
    {
        //printf("%d\n",i);

    }
}
c++;
printf("Time Complexity : %d",c);
return 0;
}
```



```
C:\Users\Admin\Documents\daa4.exe
10
Time Complexity : 22
Process returned 0 (0x0)   execution time : 1.964 s
Press any key to continue.
```

Program-4:

Problem Statement 5:

Convert the following algorithm into a program and find its time complexity using counter method.

```
void function(int n)
{
    int c= 0;
    for(int i=n/2; i<n; i++)
        for(int j=1; j<n; j = 2 * j)
            for(int k=1; k<n; k = k * 2)
                c++;
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() st
Manually find the complexity using counter method and write the same in observation

Input:

A positive Integer n

Output:

Print the value of the counter variable

Program:

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

```
int main()
```

```
{
```

```
    int n;
```

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

```
    function(n);
```

```
    return 0;
```

```
}
```

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

```
{
```

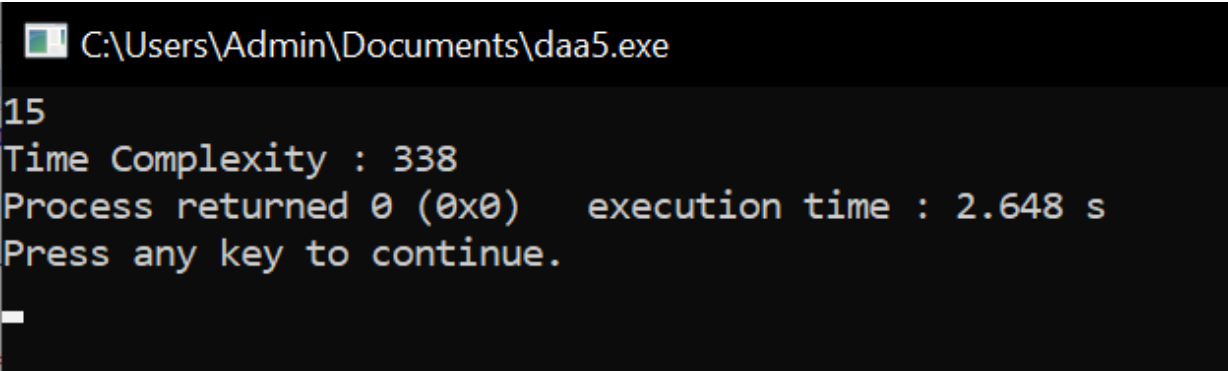
```
    int c=0,cn=0;
```

```
    cn++;
```

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



```
{
    cn++;
    for(int j=1;j<n;j=2*j)
    {
        cn++;
        for(int k=1;k<n;k=k*2)
        {
            cn++;
            c++;
            cn++;
        }
        cn++;
    }
    cn++;
}
printf("Time Complexity : %d",cn);
}
```



A screenshot of a Windows command prompt window. The title bar shows the file path "C:\Users\Admin\Documents\daa5.exe". The command prompt displays the following output: "15", "Time Complexity : 338", "Process returned 0 (0x0) execution time : 2.648 s", and "Press any key to continue.". A cursor is visible on the line "Press any key to continue.".

```
C:\Users\Admin\Documents\daa5.exe
15
Time Complexity : 338
Process returned 0 (0x0) execution time : 2.648 s
Press any key to continue.
```

Program-5:

Problem Statement 6:

Convert the following algorithm into a program and find its time complexity using counter method.

```
void reverse(int n)
{
    int rev = 0, remainder;
    while (n != 0)
    {
        remainder = n % 10;
        rev = rev * 10 + remainder;
        n /= 10;
    }
    print(rev);
}
```

Note: No need of counter increment for declarations and scanf() and count variable printf() st
Manually find the complexity using counter method and write the same in observation

Input:

A positive Integer n

Output:

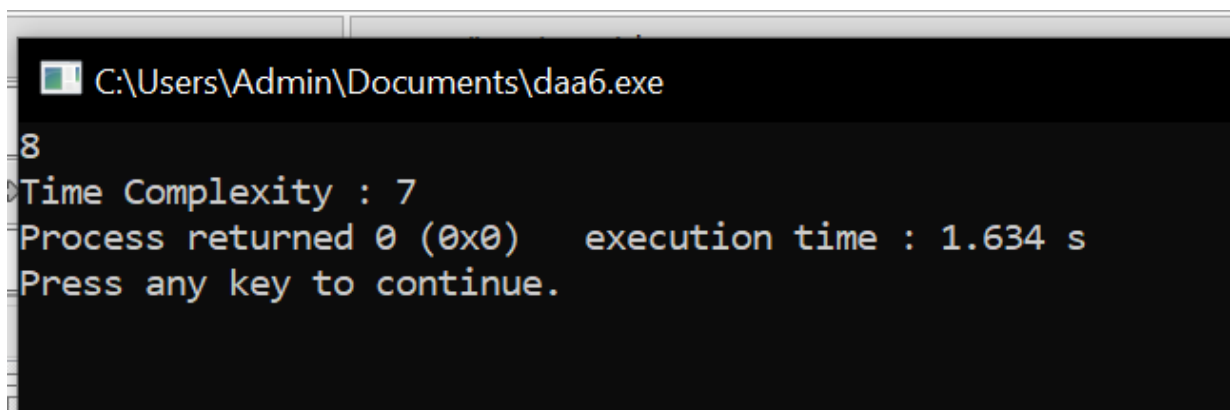
Print the value of the counter variable

Program:

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

void reverse(int n)
{
```

```
int c=0;
int rev=0,remainder;
c++;
while(n!=0)
{
    c++;
    remainder=n%10;
    c++;
    rev=rev*10+remainder;
    c++;
    n/=10;
    c++;
}
c++;
//printf("%d",rev);
c++;
printf("Time Complexity : %d",c);
}
```



The screenshot shows a Windows command prompt window with the title bar "C:\Users\Admin\Documents\daa6.exe". The window has a black background with white text. The text displayed is as follows:

```
8
Time Complexity : 7
Process returned 0 (0x0)   execution time : 1.634 s
Press any key to continue.
```

3. Write a program to search a number in a list using binary search and estimate time complexity

Program:

```
#include<stdio.h>

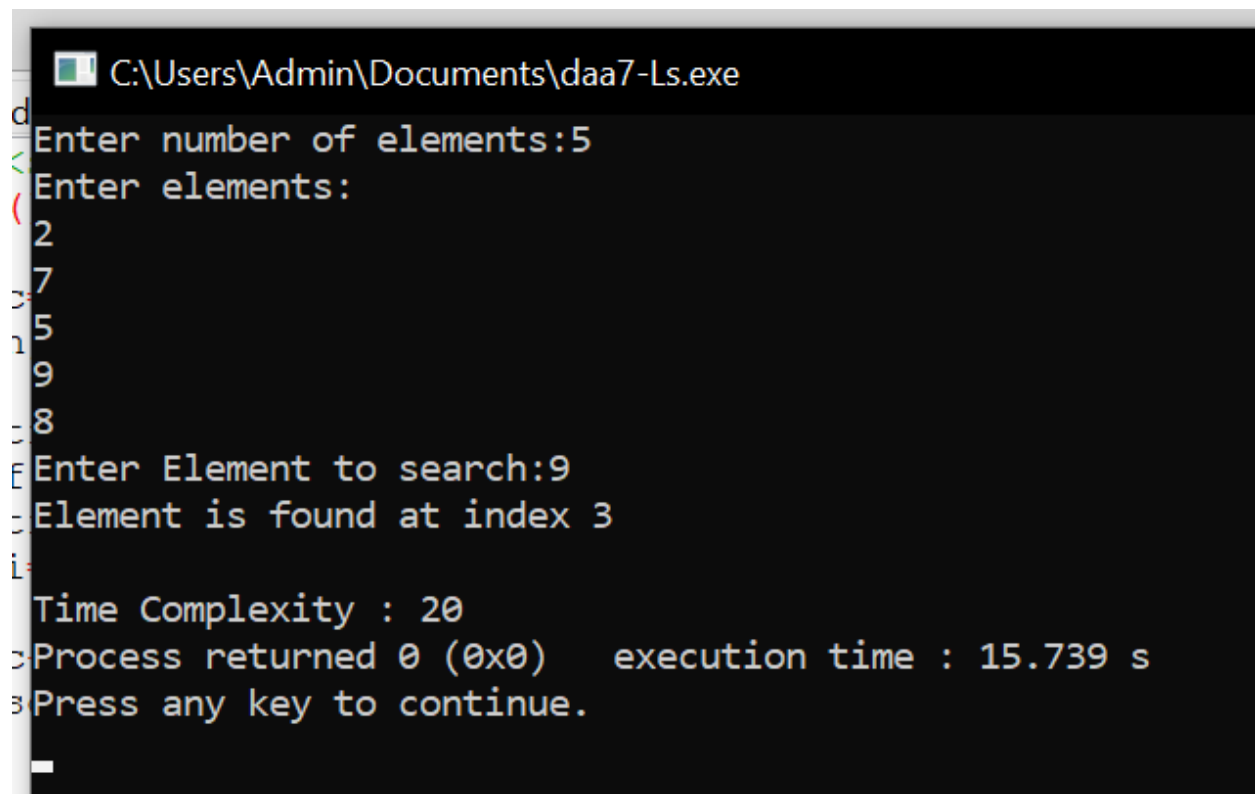
int main()
{
    int c=0;
    int n,k,i,j,f=0,a[50];

    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++)
    {
        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);
}

```



```

C:\Users\Admin\Documents\daa7-Ls.exe
Enter number of elements:5
Enter elements:
2
7
5
9
8
Enter Element to search:9
Element is found at index 3
Time Complexity : 20
Process returned 0 (0x0)   execution time : 15.739 s
Press any key to continue.

```

4. Write a program to search a number in a list using linear search and estimate time complexity

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++;
    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);
}

```

```

C:\Users\Admin\Documents\daa8-Bs.exe
Enter number of elements:6
Enter elements:
2
3
5
7
8
9
Enter Element to search:7

Element is found at index 3

Time Complexity : 23

Process returned 0 (0x0)   execution time : 6.250 s
Press any key to continue.

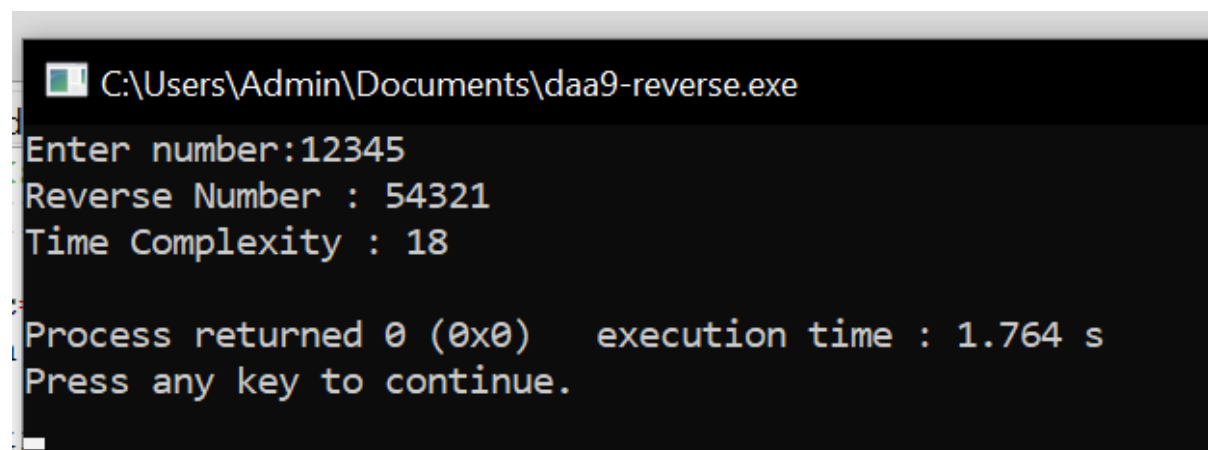
```

5. Write a program to find the reverse of a given number.

Program:

```
#include<stdio.h>

int main()
{
    int c=0;
    int n,r,rev=0;
    c++;
    printf("Enter number:");
    scanf("%d",&n);
    c++;
    while (n!=0)
    {
        r=n%10; c++;
        rev=(rev*10)+r; c++;
        n=n/10; c++;
    }
    c++;
    printf("Reverse Number : %d",rev);
    printf("\nTime Complexity : %d\n",c);
}
```

A screenshot of a Windows command prompt window. The title bar shows the file path "C:\Users\Admin\Documents\daa9-reverse.exe". The prompt displays the following text: "Enter number:12345", "Reverse Number : 54321", and "Time Complexity : 18". At the bottom, it shows "Process returned 0 (0x0) execution time : 1.764 s" and "Press any key to continue." with a cursor on a new line.

```
C:\Users\Admin\Documents\daa9-reverse.exe
Enter number:12345
Reverse Number : 54321
Time Complexity : 18

Process returned 0 (0x0)   execution time : 1.764 s
Press any key to continue.
```

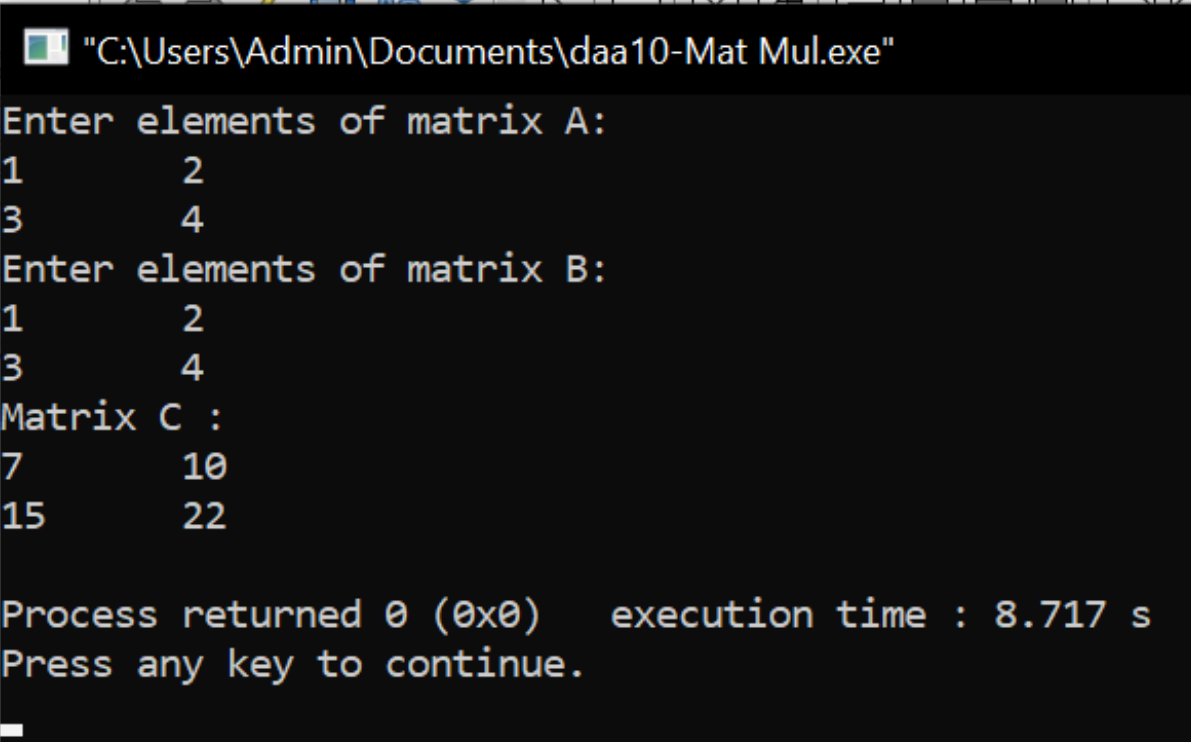

6. Write a C program to perform Strassen's Matrix Multiplication for the 2*2 matrix elements and Estimate time complexity.

Program:

```
#include<stdio.h>

int main()
{
    int a[2][2],b[2][2],c[2][2],i,j;
    printf("Enter elements of matrix A:\n");
    for(i=0;i<=1;i++)
    {
        for(j=0;j<=1;j++)
        {
            scanf("%d",&a[i][j]);
        }
    }
    printf("Enter elements of matrix B:\n");
    for(i=0;i<=1;i++)
    {
        for(j=0;j<=1;j++)
        {
            scanf("%d",&b[i][j]);
        }
    }
    c[0][0]=(a[0][0]*b[0][0])+(a[0][1]*b[1][0]);
    c[0][1]=(a[0][0]*b[0][1])+(a[0][1]*b[1][1]);
    c[1][0]=(a[1][0]*b[0][0])+(a[1][1]*b[1][0]);
    c[1][1]=(a[1][0]*b[0][1])+(a[1][1]*b[1][1]);
```

```
printf("Matrix C : \n");  
for(i=0;i<=1;i++)  
{  
    for(j=0;j<=1;j++)  
    {  
        printf("%d\t",c[i][j]);  
    }  
    printf("\n");  
}  
}
```



```
"C:\Users\Admin\Documents\daa10-Mat Mul.exe"  
Enter elements of matrix A:  
1      2  
3      4  
Enter elements of matrix B:  
1      2  
3      4  
Matrix C :  
7      10  
15     22  
  
Process returned 0 (0x0)   execution time : 8.717 s  
Press any key to continue.  
_
```