UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY

PANJAB UNIVERSITY, CHANDIGARH

B.E. Information Technology

(2021-25)

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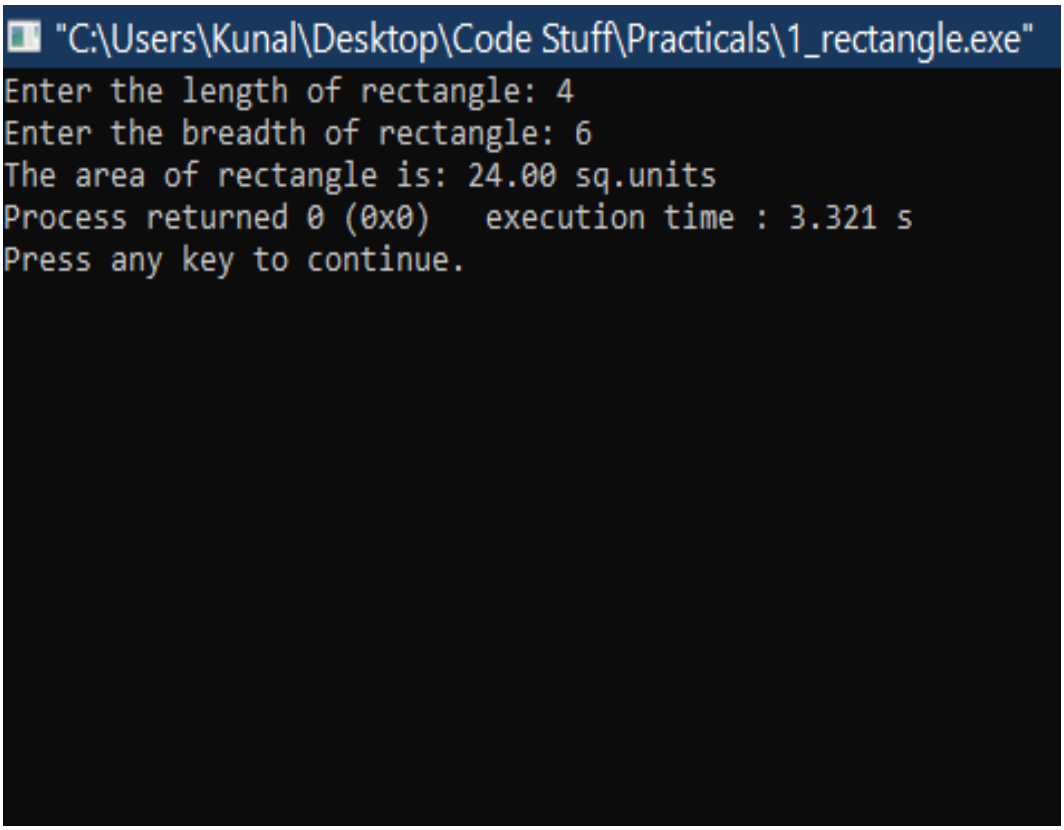
- **Section** : 2 (group-1)
- **Semester** : 1st / 2021-25 batch
- **File** : *Programming for problem solving Practical File*
- **Submitted to – Prof. Monika Meena**

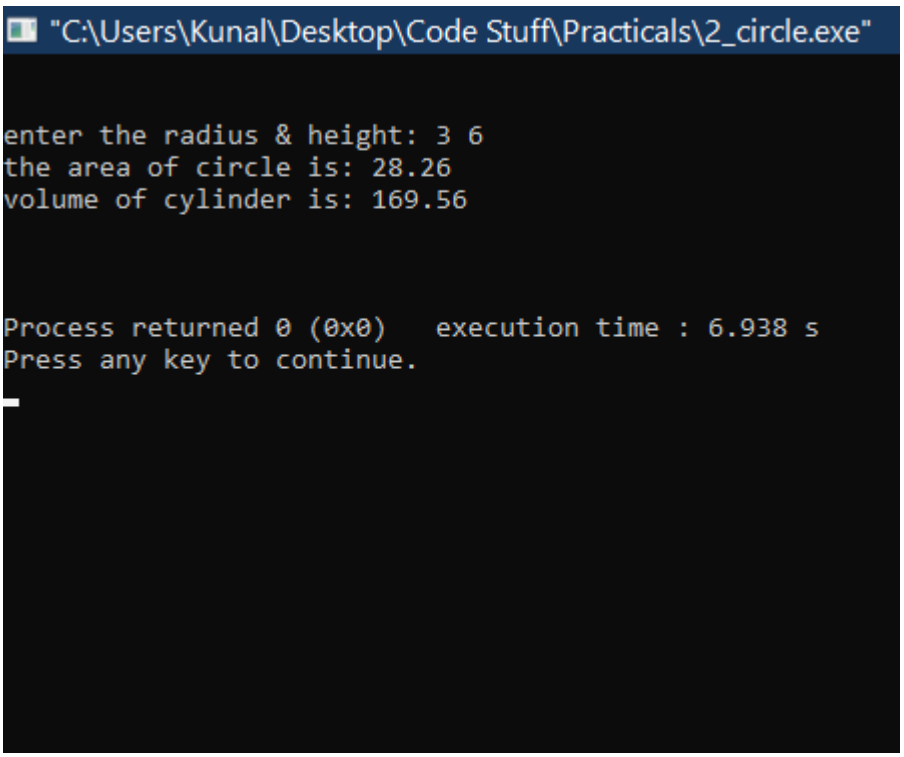
1. Program for area of rectangle:

```
#include <stdio.h>
int main( )
{
   float l;    // 'l' is length of rectangle
   float b;    // 'b' is breadth of rectangle

      printf("Enter the length of rectangle: ");
      scanf("%f", &l);

      printf("Enter the breadth of rectangle: ");
      scanf("%f", &b);

   printf("The area of rectangle is: %.2f sq.units", l*b);
   return 0;
}
```



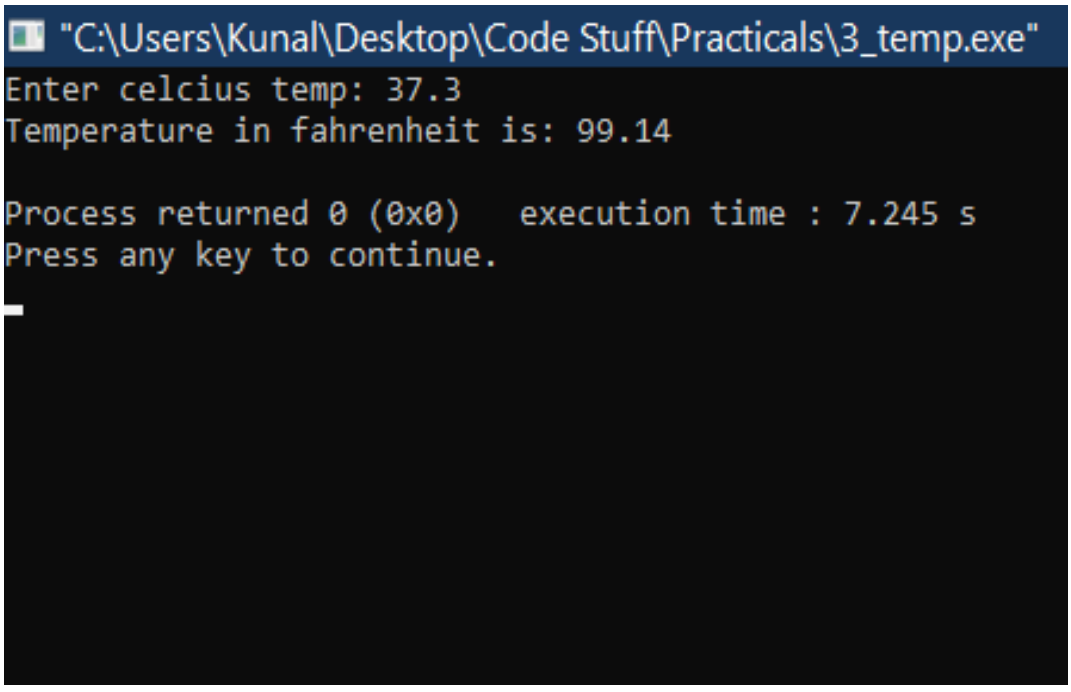
2. Program for area of circle & then volume of cylinder w.r.t. its base :

```
#include <stdio.h>
int main( )
{
   float r,area,h;
   float pi=3.14;

   printf("\n\nenter the radius & height: ");
   scanf("%f%f", &r,&h);

   area=pi*r*r;
   printf("the area of circle is: %.2f\n", area);

   printf("volume of cylinder is: %.2f\n\n\n", area*h);

   return 0;
}
```



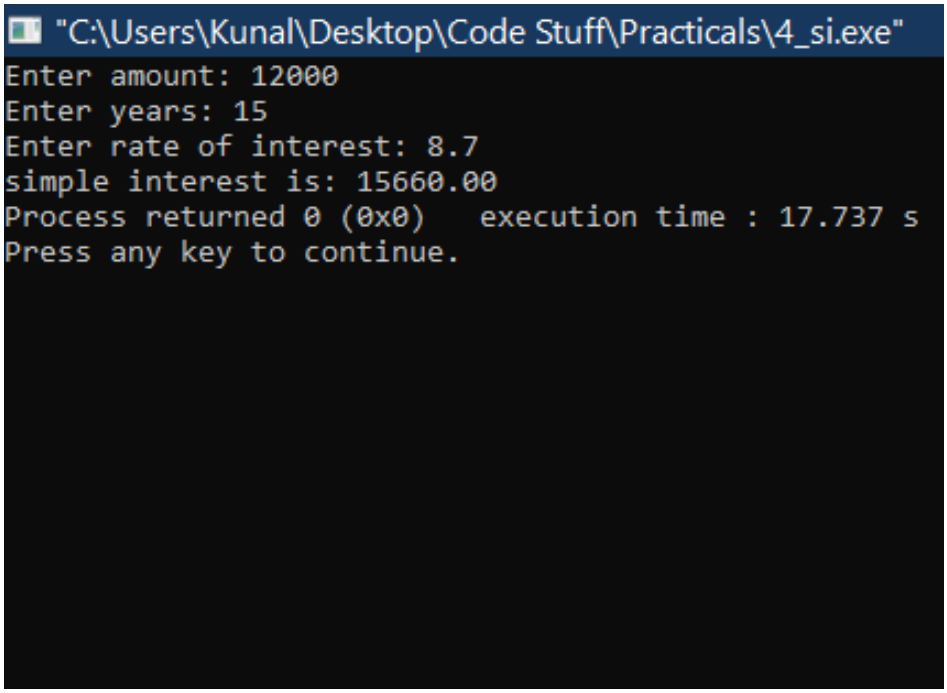
3. Program for temperature conversion :

```
#include <stdio.h>
int main( )
{
   float celc;    //temp in celcius
   float fahr;    //temp in fahrenheit
   printf("Enter celcius temp: ");
   scanf("%f", &celc);

   fahr= (celc*1.8)+32;
   printf("Temperature in fahrenheit is: %.2f\n", fahr);
   return 0;
}
```



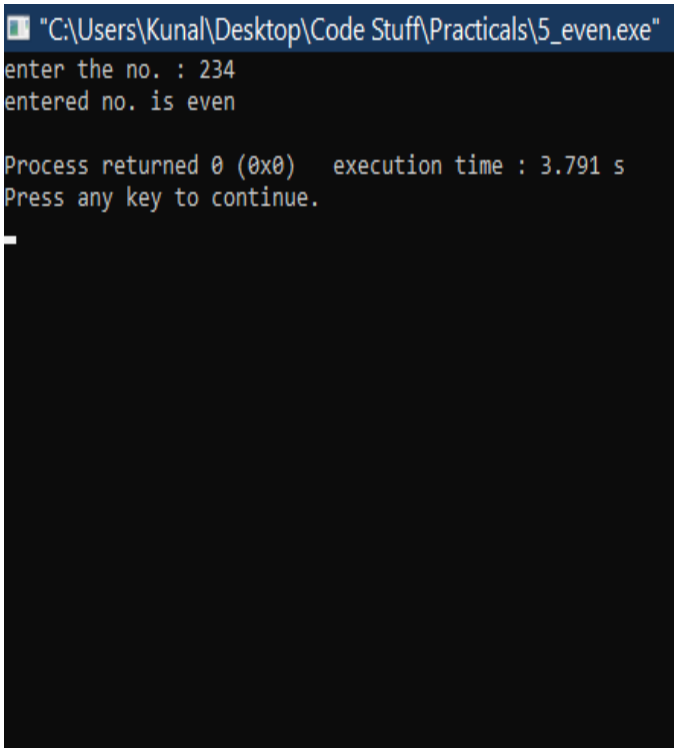
4. Program for simple interest :

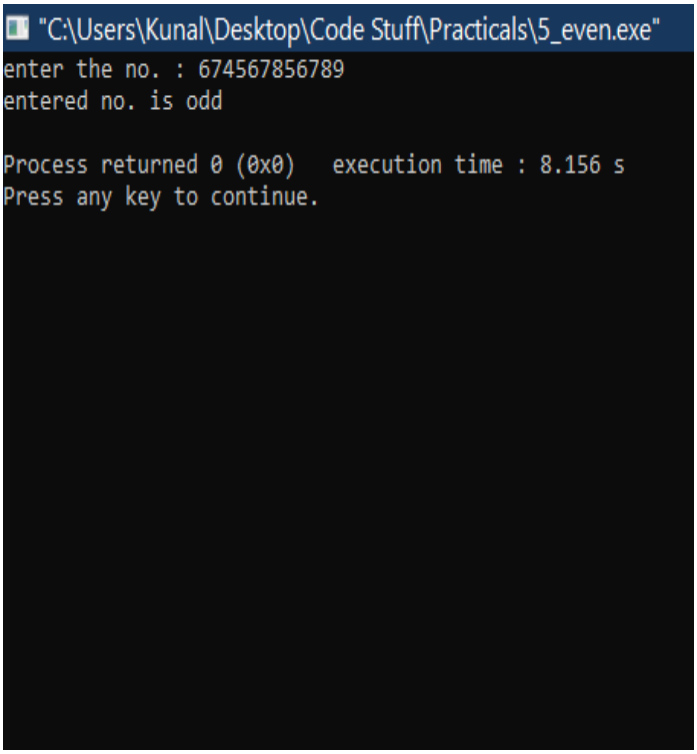
```
#include <stdio.h>
int main( ){
   int n;          //  n is years
   float p,r,si;     /* p is princple amount
                        r is rate on interest
                        si is simple interest */
   printf("Enter amount: ");  scanf("%f", &p);
   printf("Enter years: "); scanf("%d", &n);
   printf("Enter rate of interest: "); scanf("%f",&r);

   si= p*n*r/100;
   printf("simple interest is: %.2f", si);
   return 0;
}
```



5. Program for checking even/odd :

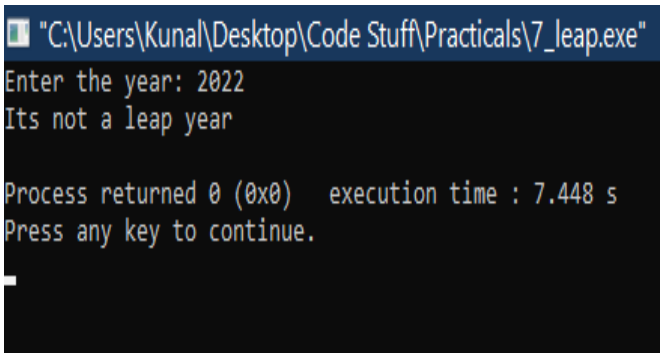
```
#include <stdio.h>
int main( ){
   int i=0;
   printf("enter the no. : ");
   scanf("%d", &i);

   if(i%2 !=0){
      printf("entered no. is odd\n");
   } else{
      printf("entered no. is even\n");
   }
return 0;
}
```

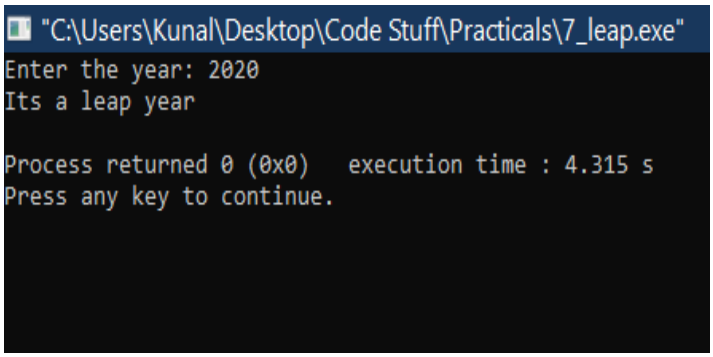


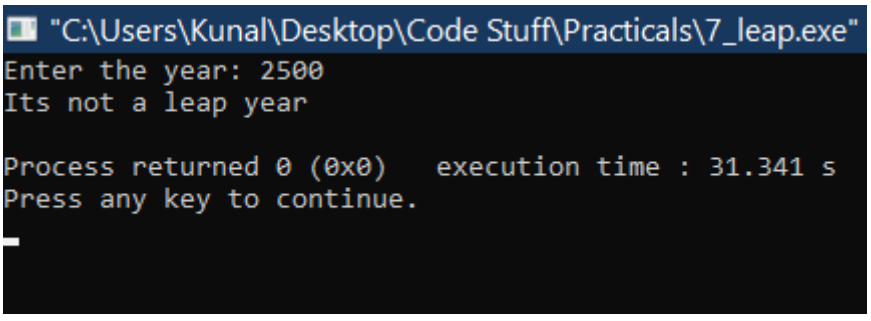


6. Program for a leap year :

```
#include <stdio.h>
int main( ){
   int y;
   int i;
   printf(“Enter the year: “);
   scanf(“%d”, &y);

   if(y%4 !=0 || (y/100)%4 !=0){
      printf(“Its not a leap year\n”);
   } else {
      printf(“Its a leap year\n”);
   }
   return 0;
   }
```

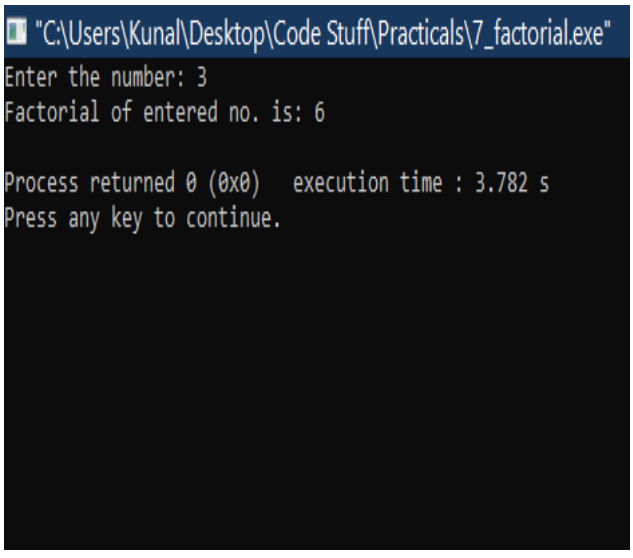


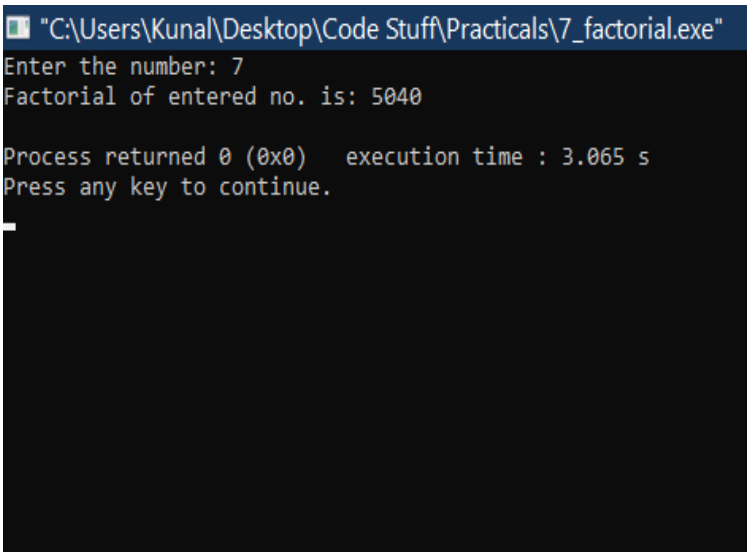




7. Program for factorial of any no. entered through keyboard :

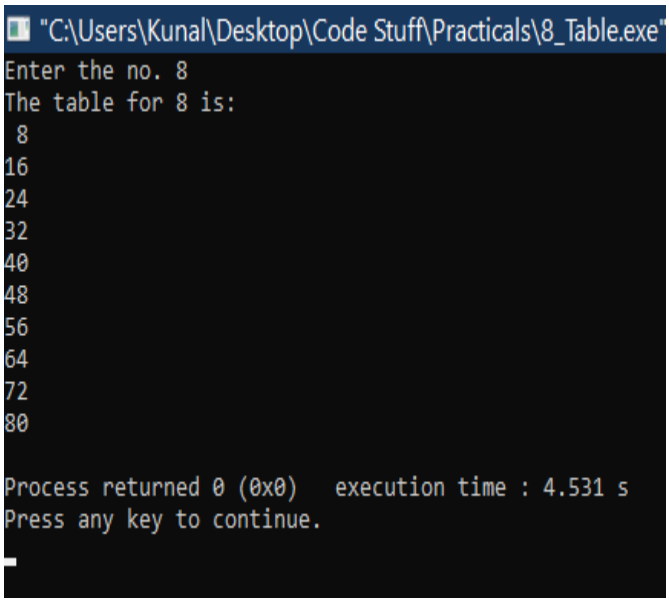
```
#include <stdio.h>
int main( ){
   int i;
   int k;
   int factorial_i =1;

   printf("Enter the number: ");
   scanf("%d", &i);

   for(k=1;k<=i;k++){
     factorial_i *= k;
   }
     printf("Factorial of entered no. is: %d\n", factorial_i);
     return 0;
}
```

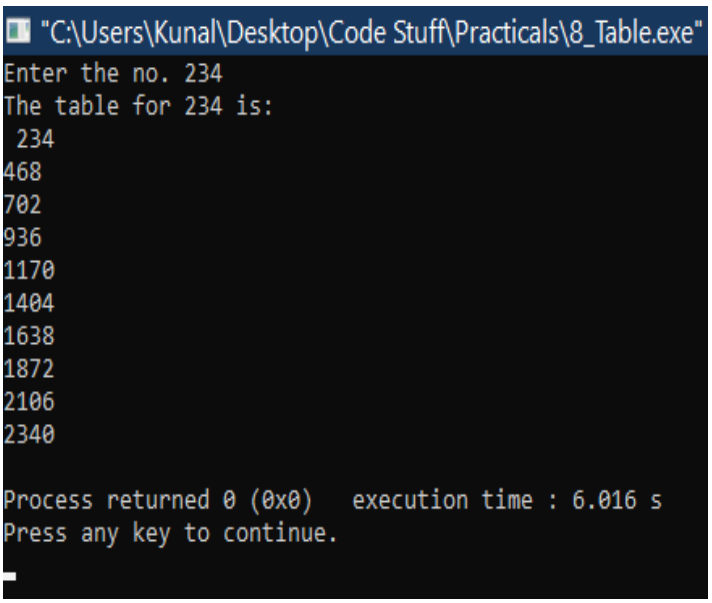




8. Program for calculating table of a no. entered through keyboard :

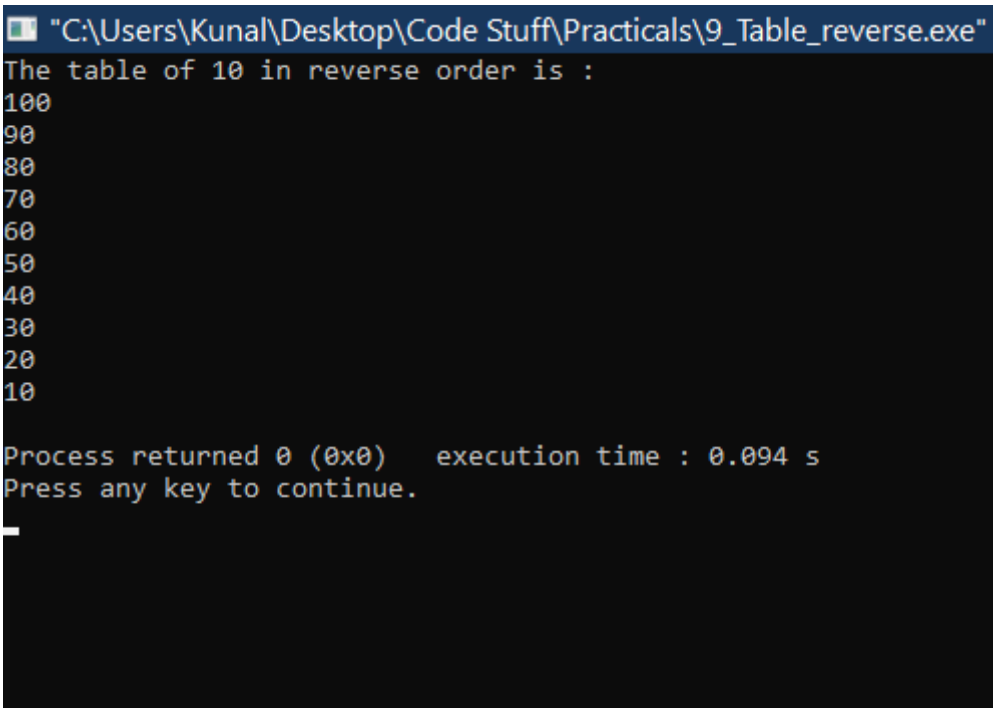
```
#include <stdio.h>
int main( ){
   int i;
   printf("Enter the no. ");
   scanf("%d", &i);

   printf("The table for %d is:\n ", i);

   for(int k=1; k<=10; k++){
      int t;
      t= k*i;
      printf("%d\n", t);
   }
   return 0;
}
```





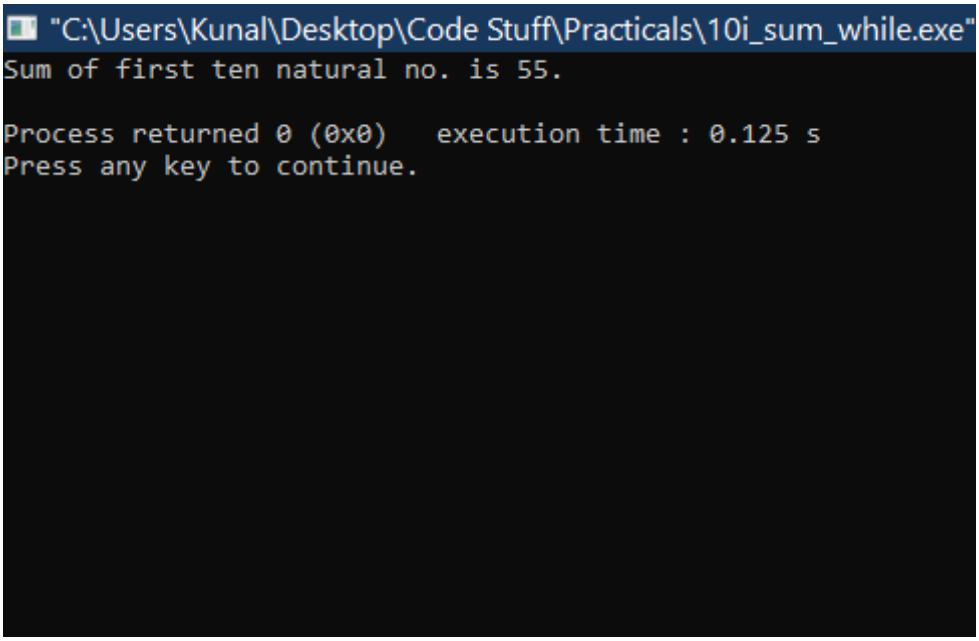
9. Program for table of 10 in reverse order :

```
#include <stdio.h>

int main(){
   printf("The table of 10 in reverse order is :\n");

   for(int i=10; i>=1; i--){
      int t;
      t= i*10;
      printf("%d\n", t);
   }
return 0;
}
```



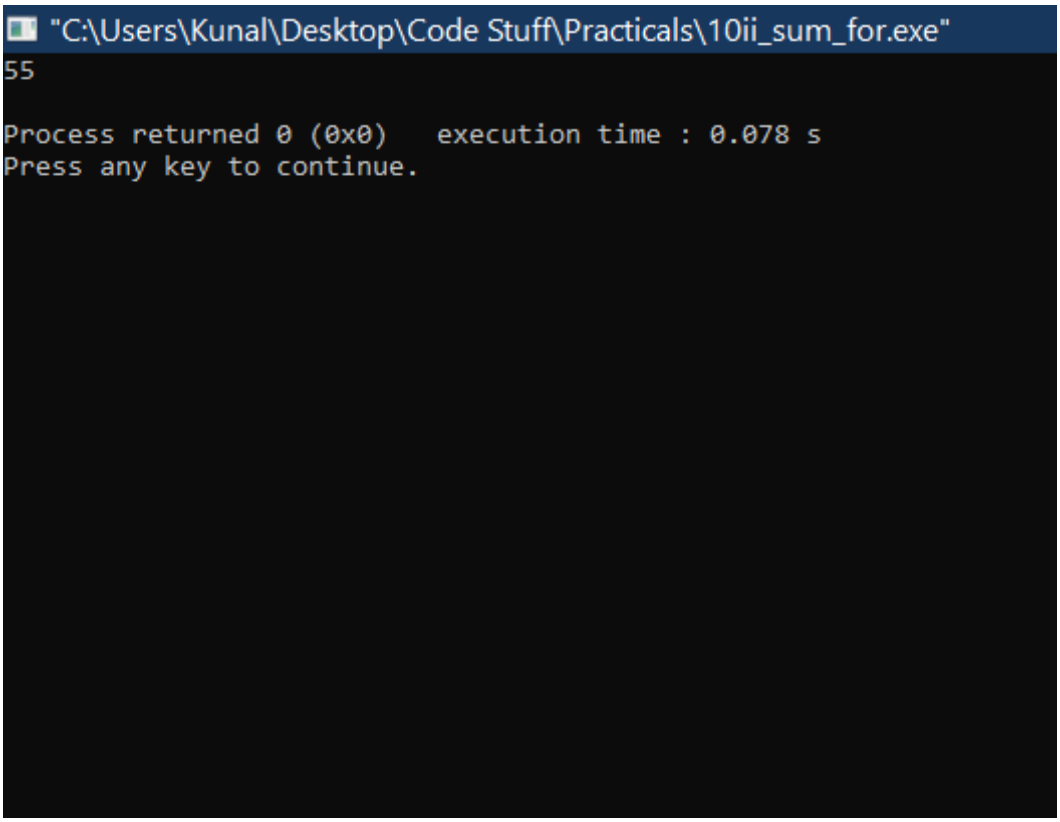
10. (i) Program to sum first ten natural numbers (using while loop)

```
#include <stdio.h>
int main(){
   int i=1;
   int sum=0;
   while (i<=10)
   {
      sum +=i;
      i++;
   }
   printf("Sum of first ten natural no. is %d.\n", sum);
   return 0;
}
```



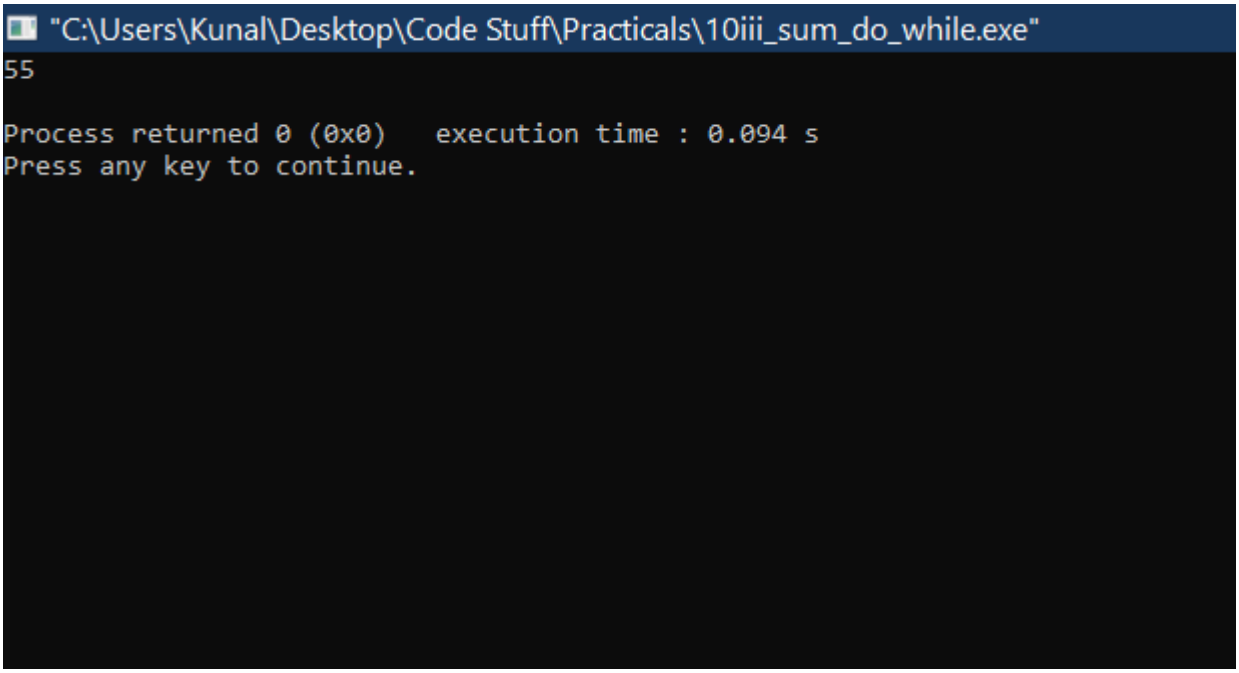
10 .(ii) Program to sum first ten natural numbers (using for loop) :

```
#include <stdio.h>
int main(){
   int sum=0;
   for (int i= 1; i < 11; i++)
   {
      sum +=i;
   }
   printf("%d\n", sum);

   return 0;
}
```



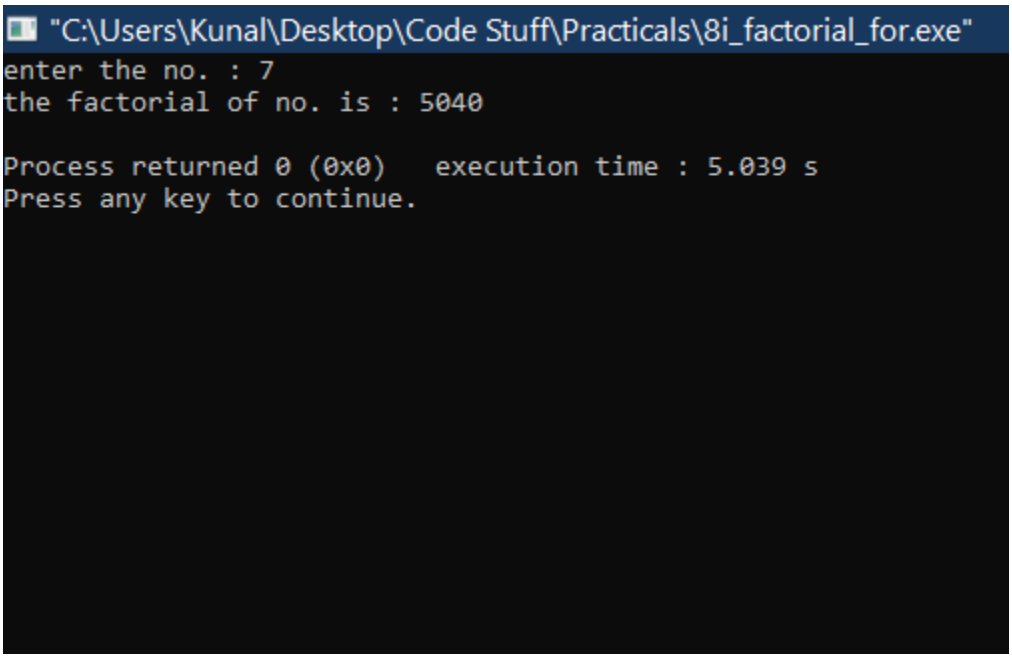
10. (iii) Program to sum first ten natural numbers (using do- while loop):

```
#include <stdio.h>
int main(){
   int i=1;
   int sum=0;

   do
   {
      sum+=i;
      i++;
   } while (i>=1 && i<11  );

   printf("%d\n", sum);
   return 0;
}
```



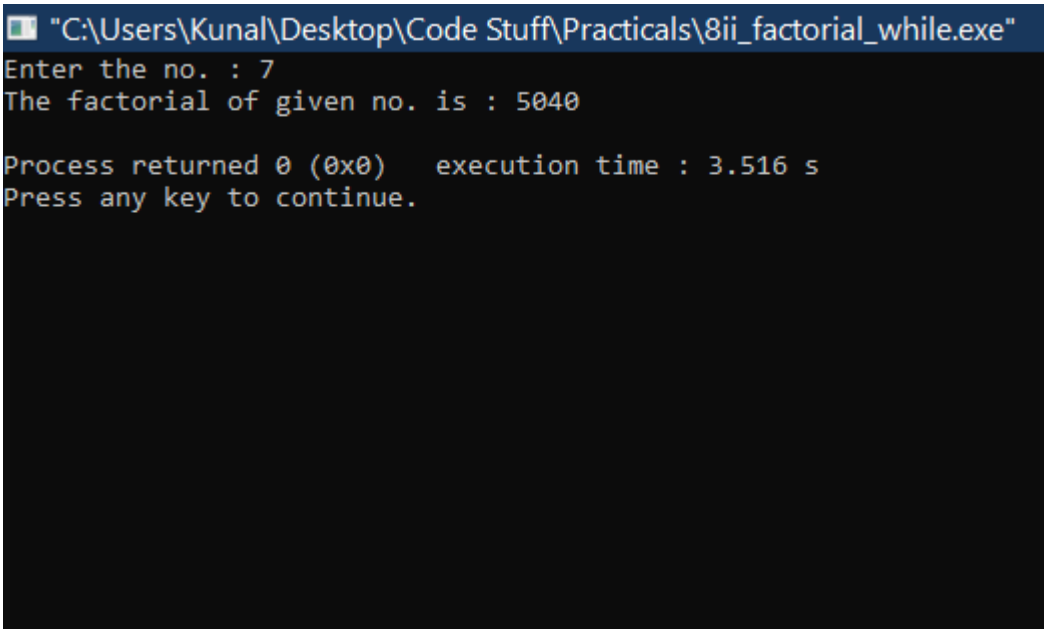
*11 . (i) Program for factorial of a number (**using 'for' loop**) :*

```
#include <stdio.h>
int main(){
   int x;    // number
   int f=1;   // factorial

   printf("enter the no. : ");
   scanf("%d", &x);

   for(int i=1; i<=x; i++){
      f*= i;
   }
   printf("the factorial of no. is : %d\n", f);
   return 0;
}
```



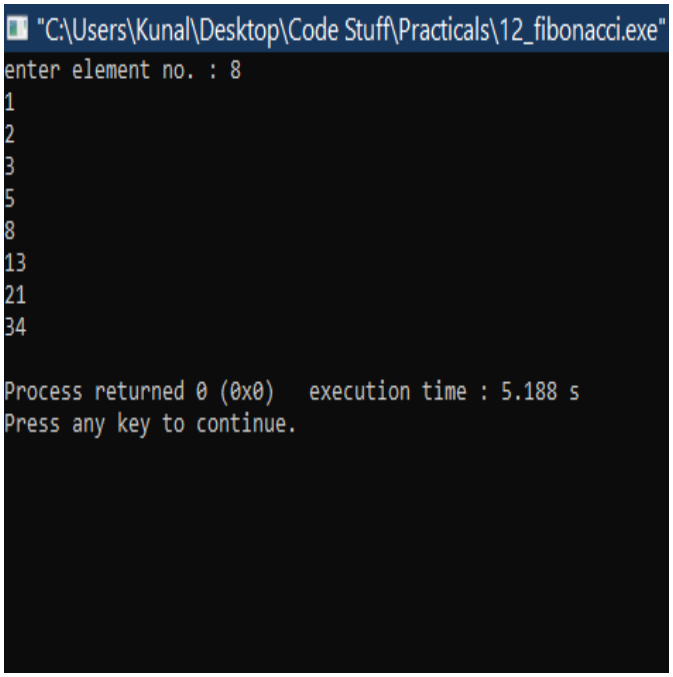
*11 . (ii) Program for factorial of a number (**using 'while' loop**) :*

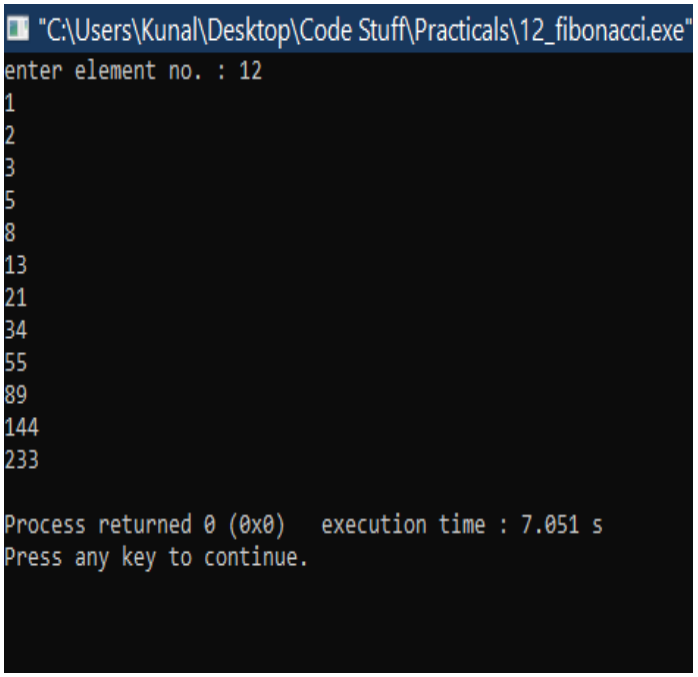
```
#include <stdio.h>
int main(){
   int i=1;
   int fact=1;
   printf("Enter the no. : ");
   scanf("%d",&i);

   while (i>=1){
      fact *= i;
      i--;
   }
   printf("The factorial of given no. is : %d\n", fact);
   return 0;
}
```



12 . Program to calculate nth element of Fibonacci sequence :

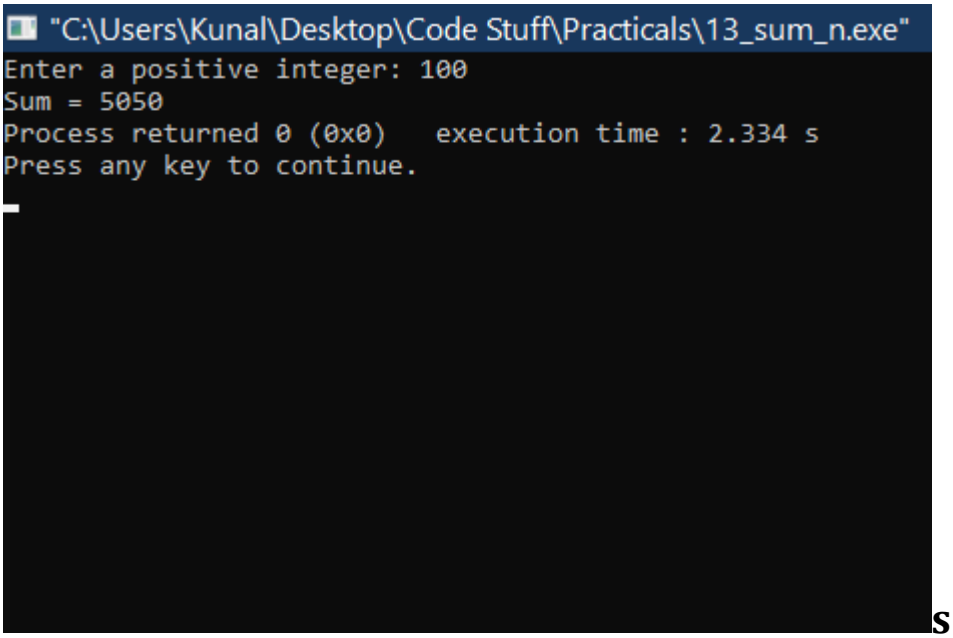
```
#include <stdio.h>
int fibo(int i);
int  main() {
  int i;
  int x;
  printf("enter element no. : ");
  scanf("%d",&x);
  for (i = 1; i <= x; i++) {
    printf("%d\t\n", fibo(i));
  }
  return 0;
}
int fibo(int i){
  if(i==0) {
    return 1;
  }
  if(i==1){
     return 1;
  }
  return fibo(i-1) + fibo(i-2);
}
```





13. Program for calculating sum of first n natural no. :

```
#include <stdio.h>

int addNumbers(int n);

int main() {

  int num;
  printf("Enter a positive integer: ");
  scanf("%d", &num);

  printf("Sum = %d", addNumbers(num));
  return 0;
}

int addNumbers(int n) {
  if (n != 0)
    return n + addNumbers(n - 1);
  else
    return n;
}
```



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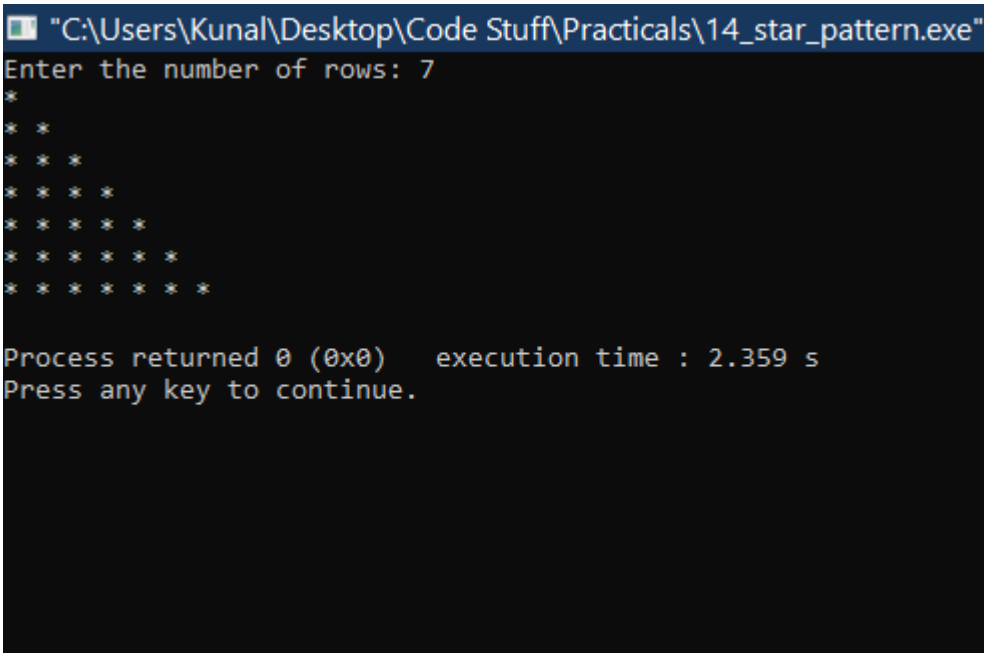
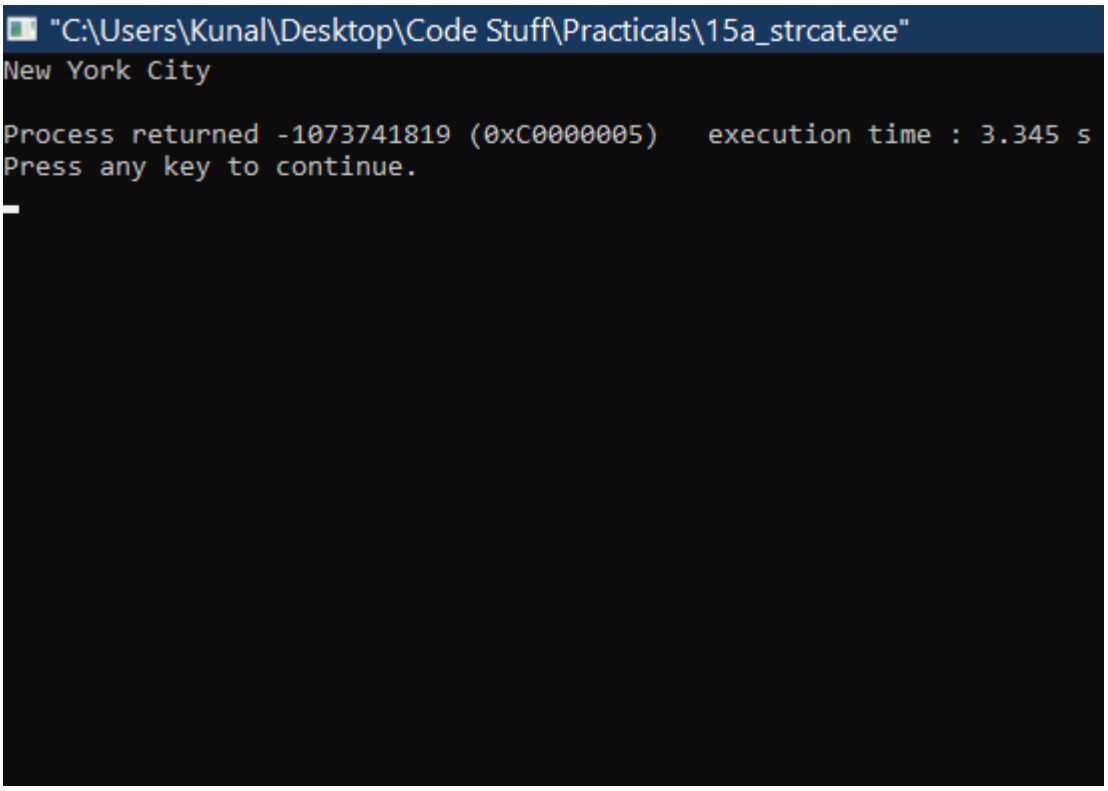
14 . Program for printing star pattern :

```
#include <stdio.h>
int rows;
int star(rows);
int main() {

  printf("Enter the number of rows: ");
  scanf("%d", &rows);
  star(rows);
  return 0;
}

int star(rows){
   int i, j;
   for (i = 1; i <= rows; ++i) {
         for (j = 1; j <= i; ++j) {
         printf("* ");
     }
     printf("\n");
  }
  return 0;
}
```



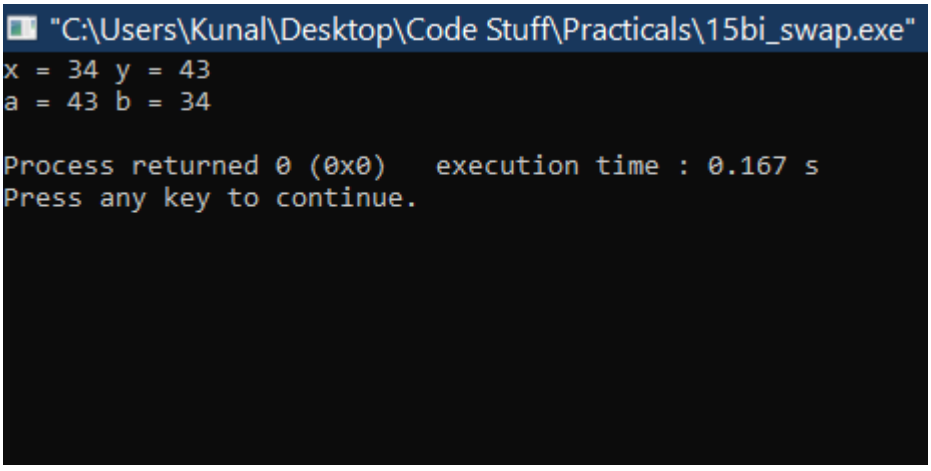
15.(a). Program for inserting sub-string:

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

int main() {

  char n[] = "New";
  char y[] = " York";
  char c[] = " City";

  strcat(n, y);
  strcat(n, c);

  printf("%s\n", n);
}
```



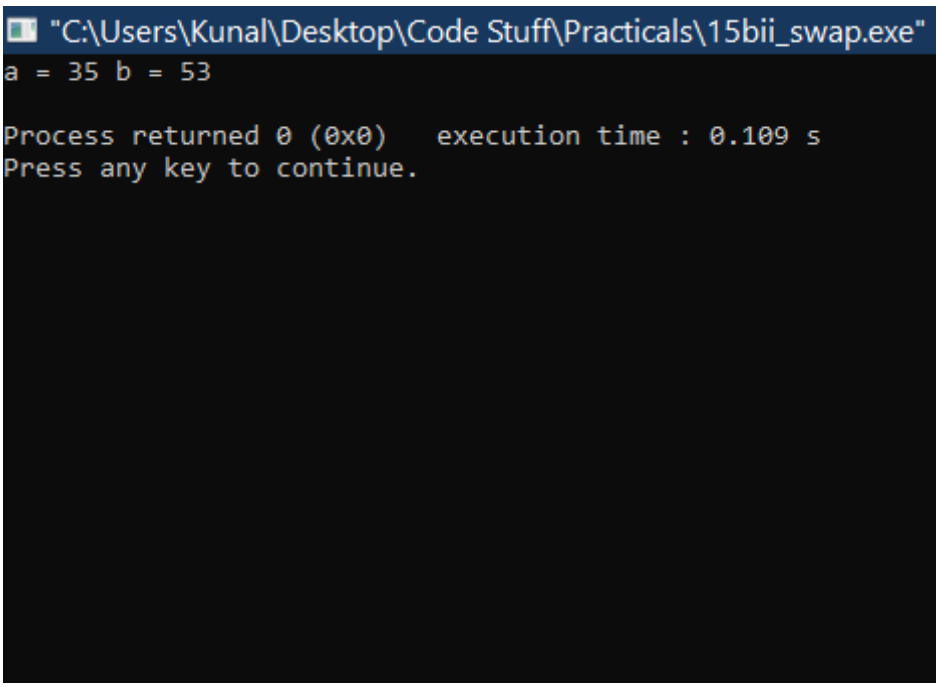
15.(b). (i) Program for swapping values (call by value) :

```
#include <stdio.h>
void swapv ( int x, int y ) ;
int main( )
{
int a = 43, b = 34 ;
swapv ( a, b ) ;
printf ( "a = %d b = %d\n", a, b ) ;
return 0 ;
}
void swapv ( int x, int y )
{
int t ;
t = x ;
x = y ;
y = t ;
printf ( "x = %d y = %d\n", x, y ) ;
}
```



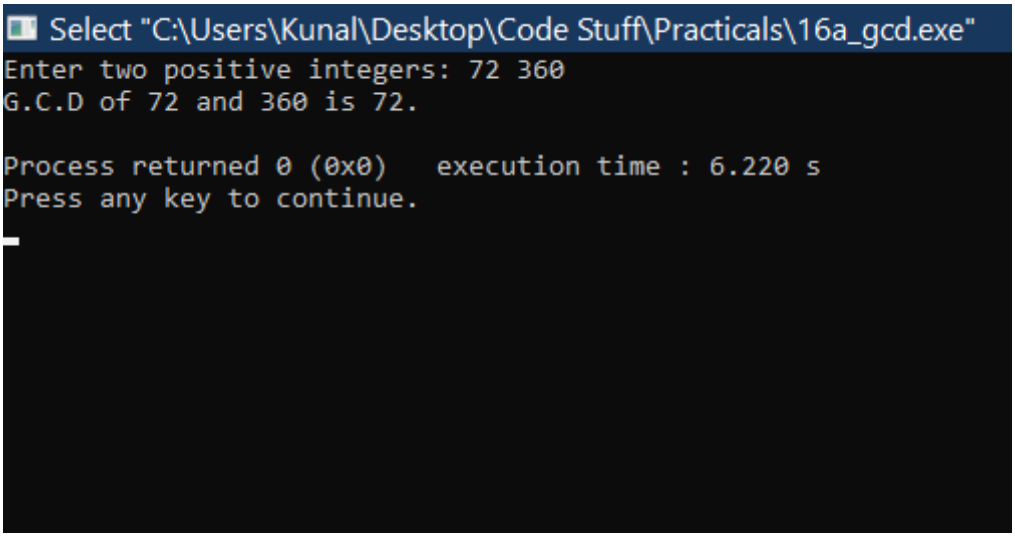
15.(b). (ii) Program for swapping values (call by reference) :

```
# include <stdio.h>

void swapr ( int *, int * ) ;

int main( )
{
int a = 53, b = 35 ;

swapr ( &a, &b ) ;

printf ( "a = %d b = %d\n", a, b ) ;
return 0 ;
}

void swapr ( int *x, int *y )
{
int t ;
t = *x ;
*x = *y ;
*y = t ;
}
```



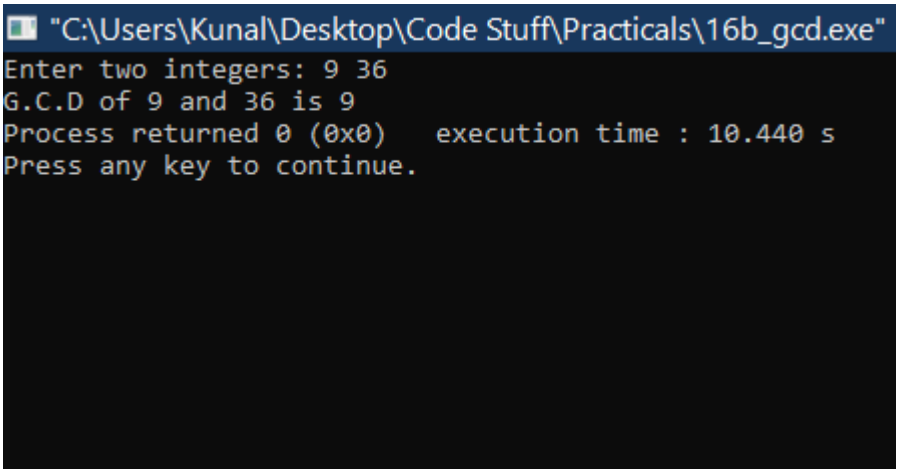
16.(a). Program for finding GCD of two numbers (using recursion) :

```
#include <stdio.h>
int hcf(int n1, int n2);
int main() {
   int n1, n2;
   printf("Enter two positive integers: ");
   scanf("%d %d", &n1, &n2);
   printf("G.C.D of %d and %d is %d.\n ", n1, n2, hcf(n1, n2));
   return 0;
}

int hcf(int n1, int n2) {
   if (n2 != 0)
      return hcf(n2, n1 % n2);
   else
      return n1;
}
```



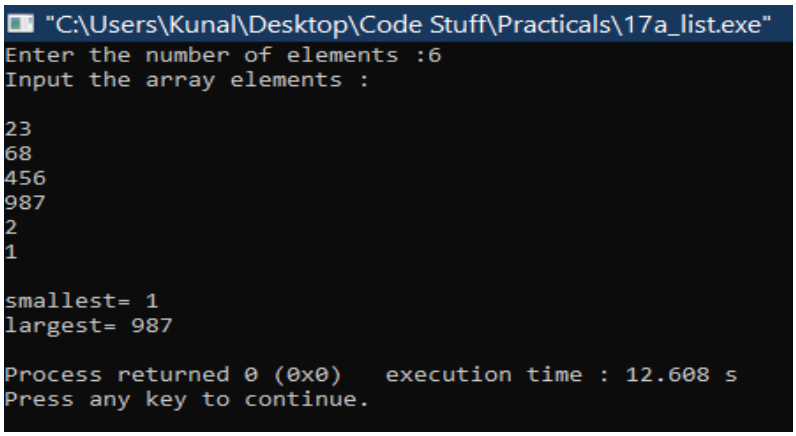
16.(b). Program for finding GCD of two numbers (using non- recursion) :

```
#include <stdio.h>
int main()
{
   int n1, n2, i, gcd;
   printf("Enter two integers: ");
   scanf("%d %d", &n1, &n2);

   for(i=1; i <= n1 && i <= n2; ++i)
   {
      // Checks if i is factor of both integers
      if(n1%i==0 && n2%i==0)
         gcd = i;
   }
   printf("G.C.D of %d and %d is %d", n1, n2, gcd);
   return 0;
}
```



17. (a) Program for finding largest & smallest number in a list :

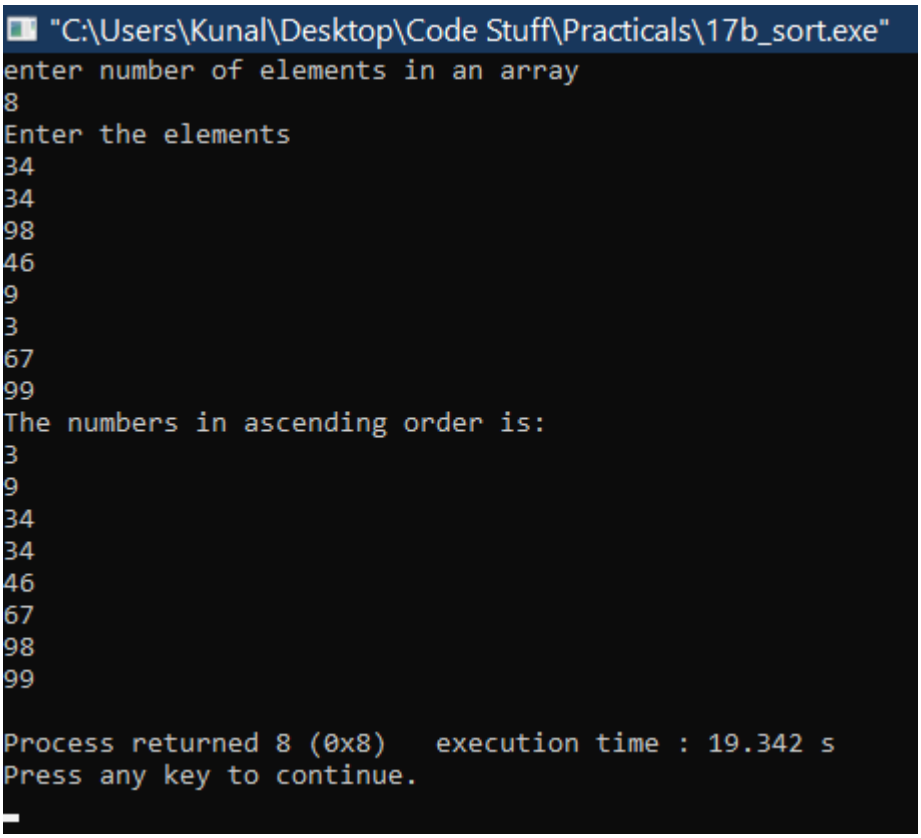
```
#include<stdio.h>
int main(){
  int a[50],i,num,large,small;
  printf("Enter the number of elements :");
  scanf("%d",&num);
  printf("Input the array elements :\n\n");
  for(i=0;i<num;++i)
    scanf("%d",&a[i]);
  large=small=a[0];
  for(i=1;i<num;++i){
    if(a[i]>large)
      large=a[i];
    if(a[i]<small)
      small=a[i];
  }
  printf("\nsmallest= %d\n",small);
  printf("largest= %d\n",large);
  return 0; }
```



17.(b). Program for sorting array in ascending order :

```
#include <stdio.h>
void main ( ){

  int num[20];
  int i, j, a, n;
  printf("enter number of elements in an array\n");
  scanf("%d", &n);
  printf("Enter the elements\n");

  for (i = 0; i < n; ++i)
    scanf("%d", &num[i]);


  for (i = 0; i < n; ++i){
    for (j = i + 1; j < n; ++j){
      if (num[i] > num[j]){
        a = num[i];
        num[i] = num[j];
        num[j] = a;
      }
    }
  }
```

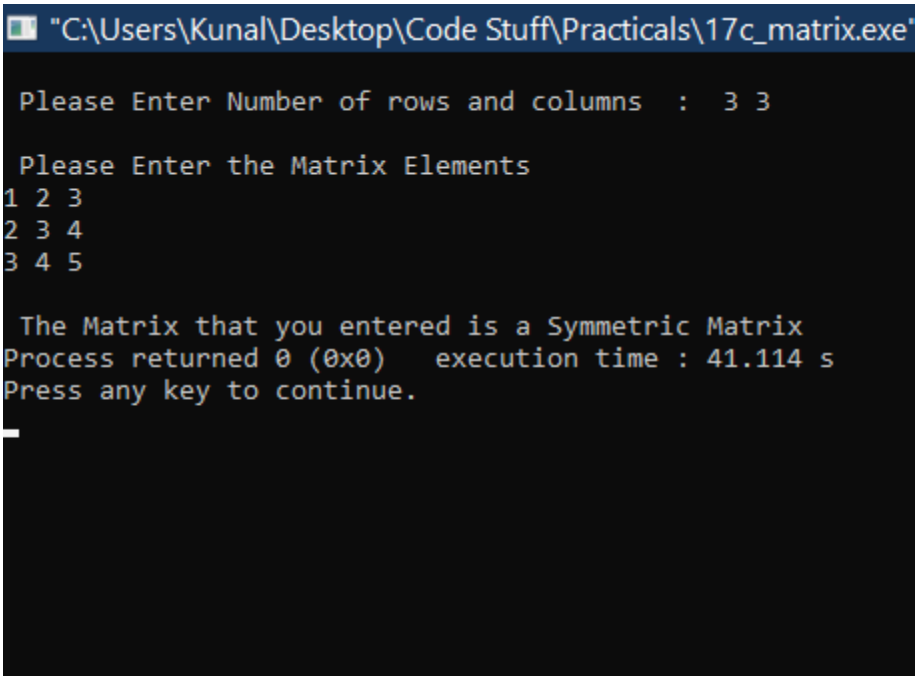
```
   printf("The numbers in ascending order is:\n");
   for (i = 0; i < n; ++i){
      printf("%d\n", num[i]);
   }
}
```



17.(c) Program for checking if a matrix is symmetric or not :

```
#include<stdio.h>
int main()
{
 int i, j, rows, columns, a[10][10], b[10][10], Count = 1;

 printf("\n Please Enter Number of rows and columns  :  ");
 scanf("%d %d", &i, &j);
 printf("\n Please Enter the Matrix Elements \n");
 for(rows = 0; rows < i; rows++){
  for(columns = 0;columns < j;columns++){
    scanf("%d", &a[rows][columns]);
   }
}
  //Transpose of matrix
for(rows = 0; rows < i; rows++){
  for(columns = 0;columns < j; columns++){
    b[columns][rows] = a[rows][columns];
 }
}
 for(rows = 0; rows < i; rows++){
    for(columns = 0; columns < j; columns++){
       if(a[rows][columns] != b[rows][columns]){
          Count++;
```

```
break;
        }
     }
  }
  if(Count == 1) {
  printf("\n The Matrix that you entered is a Symmetric Matrix ");
}else
{
printf("\n The Matrix that you entered is Not a Symmetric Matrix ");
 }
return 0;
}
```

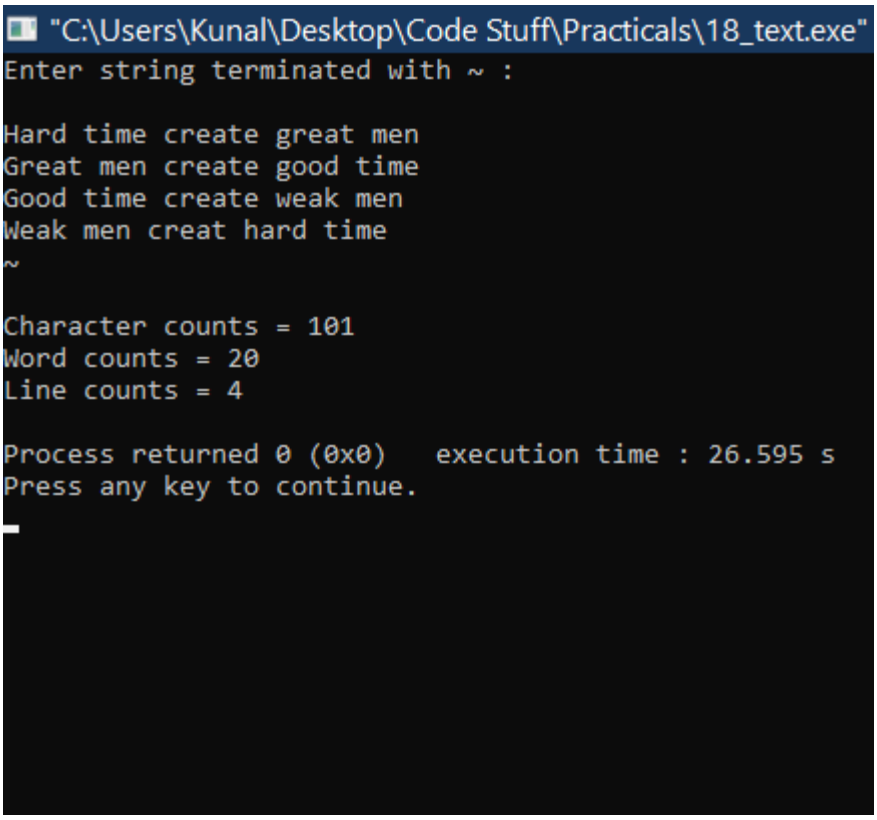


18. Program to count the number of lines, words and characters in a given text :

```
#include<stdio.h>

int main()
{
  // declare variables
  char str[200];
  int line, word, ch;

  // initialize count variables with zero
  line = word = ch = 0;

  // read multiline string
  printf("Enter string terminated with ~ :\n\n");
  scanf("%[^~]", str);

  // check every character
  for(int i=0; str[i]!='\0'; i++)
  {
    // if it is new line then
    // one line and one word completed

    if(str[i]=='\n')
    {
      line++;
```

```
    word++;
  }

  // else it is a character
  else
  {
    // if character is space or tab
    // then one word is also completed
    if(str[i]==' '||str[i]=='\t')
    {
      word++;
      ch++;
    }

    // it was not '\n', sapace or tab
    // it is a normal character

    else {
      ch++;
    }
  }
}
```

```
// display count values
   printf("\nCharacter counts = %d\n", ch);
   printf("Word counts = %d\n", word);
   printf("Line counts = %d\n", line);

   return 0;
}
```



.....THE – END