EXAMPLES of TEXT file operations using the library <stdio.h>

TEXT files containing sequences of numbers:

TXT- 1: Calculator - summing two numbers stored in a text file
(**fopen**, **fscanf**, **fprintf**, **fclose**)

TXT- 2: Example (TXT-1) extended with error checking file operations
(opening the file, reading, writing errors)

TXT- 3: Summing succesive numbers loaded from text file
(Iterative processing of numbers eith loop **while(fscanf(...)==2){...}**)

TXT- 4: Iterative processing of sequence of numbers stored in file
(counting the numbers, calculating the sum, the mean, the max)

TXT- 5: File operations on ARRAY of numbers
(**fprintf**, **fscanf**, reading and writing elements of array)

TXT- 6: Filtering – copying elements matching specified criteria
(**fscanf**, **fprintf**)

TXT- 7: Removing the selected elements/numbers from the middle of the file
(by copying a file into another one, skipping selected values)

Example TXT-1: Calculatora (version without error chcecking)

Input file: **data.txt**

```
20.5
2.5
```

Output file: **result.txt**

```
23.00
```

```
// The program calculates the sum of two floating numbers (of type double).
// Summed numbers are downloaded from existing disk file "data.txt"
// Result of the calculation, the sum, is stored in a newly created file "result.txt"

#include <stdio.h>
int main()
{
   double a,b,sum;

   // read the two numbers <double> from the text file into variables <a> and <b>
   FILE* file;
   file =fopen("data.txt", "rt");
   fscanf(file,"%lf %lf",&a,&b);
   fclose(file);

   // calculate tehe sum and display the result on console (write to stdout?)
   sum = a + b;
   printf( "The result:  %.2f + %.2f = %.2f\n\n", a, b, sum );

   // zwrite the calcilation result (the sum) into the new text file
   file =fopen("result.txt","wt");
   fprintf(file,"%.2f",sum);
   fclose(file);

   printf("The result has been saved in the file \"result.txt\"");
   getchar();
   return 0;
}
```

Used functions:

fopen – open the file,
parameter **"rt"** means „read" „text"
parameter **"wt"** means „write" „text"

fscanf – read formated data (fileds) from a text file,
parameter **"%lf"** means: convert the number into **double**

fprintf – write formated data to a text file,
parameter **"%f"** means: print **float** or **double**
parameter **".2"** sets precision (2 numbers after decimal dot)

fclose – close the file

Example TXT-2: Calculator (version with “error checking”)

```
#include <stdio.h>
int main()
{   double a,b,sum;
    FILE* file = fopen("data.txt", "rt");
    if( file==NULL )
      {  printf("Error while opening the file!");
         getchar();
         return;
      }
    else
      {  int read_count;
         read_count = fscanf(file,"%lf %lf",&a,&b);
         fclose(file);
         if( read_count != 2 )
           {  printf("Error while reading the data!");
              getchar();
              return;
           }
         else
           {  sum = a + b;
              printf("Result of summation: %.2f + %.2f = %.2f\n\n", a, b, sum);

              file = fopen("result.txt","wt");
              if( file==NULL )
                {  printf("Error while opening the output file!");
                   getchar();
                   return;
                }
              else
                {  int write_count;
                   write_count = fprintf(file,"%.2f",sum);
                   fclose(file);
                   if( write_count==EOF )
                     {  printf("Error saving the result!");
                        getchar();
                        return;
                     }
                   else
                     {  printf("The result has been saved in the file");
                        getchar();
                        return;
                     }
                }
           }
      }
    return 0;
}
```

Example TXT-3: Summing succesive numbers loaded from text file

Input file: **data.txt**

```
1  1
2  5
5  -4
-500 -50
```


Output file: **sum.txt**

```
2
7
1
-550
```

```
#include <stdio.h>
int main()
{
   int a,b,sum;
   FILE* input_file, *sum_file;


   input_file=fopen("data.txt", "rt");
   sum_file=fopen("sumy.txt", "wt");


   if( input_file==NULL || sum_file==NULL)
      {
         printf("Error while opening files!");
         getchar();
      }
   else
      {


         while( fscanf(input_file,"%d%d",&a,&b)==2 )
            {
               sum = a + b;
               fprintf(sum_file, "%d\n", sum);
               fprintf(stdout, "%d\n", sum);
            }

         fprintf(stdout,"End of program");
         getchar();
      }

   fclose(input_file);
   fclose(sum_file);

   return 0;
}
```

Przykład TXT-4: Iterative processing of sequence of numbers

Input file: **data.txt**

```
7
-2
1.5
5
```

Result: ***numbers on the screen***

```
Count of loaded numbers = 4
Sum  = 11.500
Mean = 2.875
```

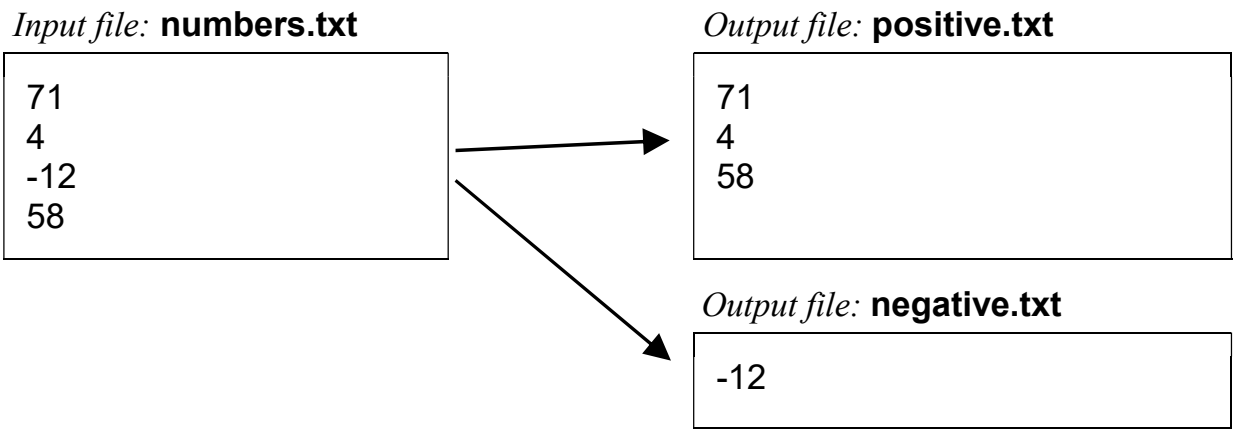
```
#include <stdio.h>
int main()
{  FILE* file;

   file=fopen("data.txt", "rt");
   if( file==NULL)
      {  printf("Error opening the file!");
         getchar();
      }
   else
      {  float number, sum=0;
         int count=0;

         while( fscanf(file,"%f",&number)==1 )
            {
               count++;
               sum += number;
               printf("%d – loaded value = %7.2f\n",count,number);
            }
         fclose(file);

         if(count==0)
           printf("No numbers. Can not calculate the mean value");
         else
            {  float avg=sum/count;
               printf("\nCount of loaded numbers = %d \n", count);
               printf("Sum  = %.3f\n", sum);
               printf("Mean = %.3f\n", avg);
            }
         getchar();
      }
   return 0;
}
```

Example TXT-5: File operations on ARRAY of numbers

```
#include <stdio.h>
#include <stdlib.h>
int main()
{  const  TAB_SIZE_A = 10;
   long tab_A[TAB_SIZE_A];


   for( int i=0; i< TAB_SIZE_A; i++)
      tab_A[i] = rand()%201 -100;


   for(int i=0; i< TAB_SIZE_A; i++)
      printf("tab[%2d]=%4ld\n", i, tab_A[i] );


   FILE* file = fopen("array_of_numers.txt", "wt");
   for( int i=0; i< TAB_SIZE_A; i++)
      fprintf(file,"%4ld\n", tab_A[i] );
   fclose(file);
   return 0;
}
```

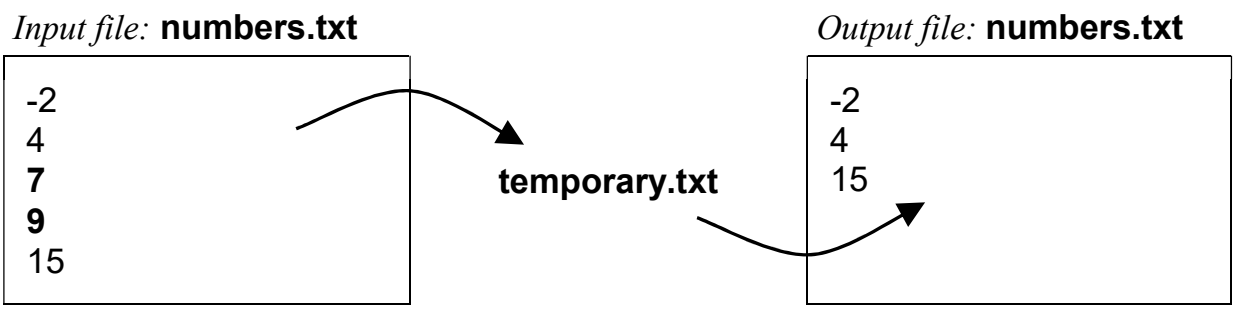
```
int main()
{  const int TAB_SIZE_B = 15;
   long tab_B[TAB_SIZE_B]={0};


   printf("\nRead the file and display the loaded array");
   FILE* file = fopen("array_of_numbers.txt", "rt");


   int read_count=0;
   while(  read_count< TAB_SIZE_B &&
           fscanf(file,"%ld",&tab_B[ read_count ]) ==1 )
                read_count++;
   fclose(file);


   printf("\nCount of loaded numbers  = %d\n",read_count);
   for(int i=0; i<read_count; i++)
      printf("tab[%2d]=%4ld\n", i, tab_B[i] );
   getchar();
   return 0;
 }
```

Example TXT- 6: Filtering elements matching specified criteria




```
#include <stdio.h>
int main()
{
   FILE* file, *file_positive, *file_negative;

   file = fopen("numbers.txt", "rt");
   file_positive = fopen("positive.txt", "wt");
   file_negative = fopen("negative.txt", "wt");

   if( file && file_positive && file_negative )
      {
         float number;

         while( fscanf(file,"%f ",&number)==1 )
            {
               if(number>0)
                  fprintf(file_positive,"%.8f ",number);
               else
                  fprintf(file_negative,"%.8f ",number);
            }
      }

   fclose(file);
   fclose(file_positive);
   fclose(file_negative);

   return 0;
}
```

Example TXT-7: Removing the numbers from the middle of the file




```
#include <stdio.h>
int main()
{
   FILE* file = fopen("numbers.txt", "rt");
   FILE* temp_file = fopen("temporary.txt", "wt");

   if( file && temp_file )
      {
         float number;
         while( fscanf(file,"%f ",&number)==1 )
            if( number<5 || number>10 )
               fprintf(temp_file,"%.3f\n",number);
            else
               {
                  // Numbers in the range [5,10] are not copied,
                  // we can just  skip them
                  // or display on the screen, to verify the program
                  printf("%.3f\n",number);
               }
      }
   fclose(file);
   fclose(temp_file);

   // physical deletion of initial file "numbers.txt" from the disk
   remove("numbers.txt");

   // renaming the temporary file into "numbers.txt"
   rename("temporary.txt","numbers.txt");

   return 0;
}
```