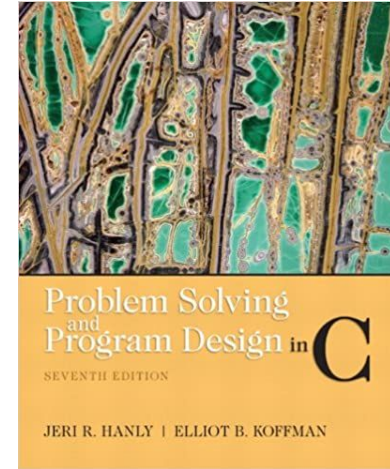


Faculty of Engineering and Technology Department of Computer Science

Introduction to Computers and Programming (Comp 133)



References :

Book : Problem Solving and Program Design in C (7th Edition) 7th Edition

Slides : Dr. Radi Jarrar , Dr. Abdallah Karakra , Dr. Majdi Mafarja.

STUDENTS-HUB.com

Text and Binary File Processing

Chapter 11



Chapter 11

- Text and Binary File Processing
 - Text File

Text File

- Text file a named collection of characters saved in secondary storage. (e.g., on a disk)
- To mark the end of a text file, the computer places a special end-of-file character, which we will denote **EOF**

```
This is a text file!<newline>  
It has two lines.<newline><eof>
```

- **input (output) stream** continuous stream of character codes representing textual input (or output) data (on disk)

```
This is a text file!<newline>It has two lines.<newline><eof>
```

Read Text File

```
int main()
{
    /* Pointer to the file */
    FILE *fp1;
    /* Character variable to read the content of file */
    char c;

    /* Opening a file in r mode*/
    fp1= fopen ("newfile.txt", "r");

    /* Infinite loop -I have used break to come out of the loop*/
    while(1)
    {
        c = fgetc(fp1);
        if(c==EOF)
            break;
        else
            printf("%c", c);
    }
    fclose(fp1);
    return 0;
}
```

Write to Text File

```
int main()
{
    char ch;
    FILE *fpw;
    fpw = fopen("C:\\test.txt", "w");

    printf("Enter any character: ");
    scanf("%c", &ch);

    fprintf(fpw, "%c", ch);
    fclose(fpw);

    return 0;
}
```



Chapter 11

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Binary File

- **Binary file** :file containing **binary numbers (0,1)** that are the computer's internal representation of each file component.
- For example, the following code fragment creates a binary file named "nums.bin" , which contains the even integers from 2 to 500.

FIGURE 11.3 Creating a Binary File of Integers

```
1. FILE *binaryp;  
2. int    i;  
3.  
4. binaryp = fopen("nums.bin", "wb");  
5.  
6. for (i = 2; i <= 500; i += 2)  
7.     fwrite(&i, sizeof (int), 1, binaryp);  
8.  
9. fclose(binaryp);
```

"wb" (write binary) for output files
"rb" (read binary) for input files.
"ab" Append to binary file.

Binary File

- The **fread** and **fwrite** use with Binary file instead of **fscanf** , **fprintf**
- **fwrite** requires four arguments:
 - Address of value to be written to a memory.
 - Size of each element.
 - Maximum number of elements to be written to the binary file
 - File pointer to a binary file opened in mode "**wb**" using function fopen
 - **fwrite(&i, sizeof (int), 1, binaryptr);** //write one integer to the binary file
 - **fwrite(score, sizeof (int), 10, binaryptr);** / write an array of 10 integers

Function Output

- Returns the number of elements written
- If return value is different than count, there was an error

Binary File

- Function **fread** also requires four arguments
 - Address of first memory cell to fill.
 - Size of each element to read value.
 - Maximum number of elements to copy from the file into memory.
 - File pointer to a binary file opened in mode "rb" using function fopen .

Function Output

- Returns number of elements read.
- If return value is different than count, there was an error or the end of the file was reached.

Creating a Binary File of Integers

```
FILE *binaryp;  
int i;  
  
binaryp=fopen("num.bin","wb");  
for(i=2;i<500;i+=2)  
    fwrite(&i,sizeof(int),1,binaryp);  
  
fclose(binaryp);
```

sizeof operator used to find the number of bytes used for storage of a data type.

Writing to a binary file

```
#include <stdio.h>
#define SIZE 100
int main()
{
    int x=20,A[SIZE]={0,1,2,3};
    FILE* fptr_out=fopen("out.bin", "wb");

    fwrite(&x, sizeof(int),1,fptr_out);
    fwrite(A, sizeof(int),SIZE,fptr_out);
    fclose(fptr_out);
    return 0;
}
```

sizeof operator used to finds the number of bytes used for storage of a data type.

Reading from a binary file

```
#include <stdio.h>
#define SIZE 100
int main()
{
    int x,A[SIZE];
    FILE* fptr_inp=fopen("in.bin", "rb");

    fread(&x, sizeof(int), 1, fptr_inp);
    fread(A, sizeof(int), SIZE, fptr_inp);
    fclose(fptr_inp);
    return 0;
}
```

Binary File example

```
struct rec
{
    int x,y,z;
};

int main()
{
    int counter;
    FILE *ptr_myfile;
    struct rec my_record;

    ptr_myfile=fopen("test.bin","wb");
    if (!ptr_myfile)
    {
        printf("Unable to open file!");
        return 1;
    }
    for ( counter=1; counter <= 10; counter++)
    {
        my_record.x= counter;
        fwrite(&my_record, sizeof(struct rec), 1, ptr_myfile);
    }
    fclose(ptr_myfile);
    return 0;
}
```

Binary File example

```
struct rec
{
    int x,y,z;
};

int main()
{
    int counter;
    FILE *ptr_myfile;
    struct rec my_record;

    ptr_myfile=fopen("test.bin","rb");
    if (!ptr_myfile)
    {
        printf("Unable to open file!");
        return 1;
    }
    for ( counter=1; counter <= 10; counter++)
    {
        fread(&my_record,sizeof(struct rec),1,ptr_myfile);
        printf("%d\n",my_record.x);
    }
    fclose(ptr_myfile);
    return 0;
}
```

Text File Vs Binary File

Example	Text File I/O	Binary File I/O	Purpose
1	<pre>plan_txt_inp = fopen("planets.txt", "r"); doub_txt_inp = fopen("nums.txt", "r");</pre>	<pre>plan_bin_inp = fopen("planets.bin", "rb"); doub_bin_inp = fopen("nums.bin", "rb");</pre>	Open for input a file of planets and a file of numbers, saving file pointers for use in calls to input functions.
2	<pre>plan_txt_outp = fopen("pl_out.txt", "w"); doub_txt_outp = fopen("nm_out.txt", "w");</pre>	<pre>plan_bin_outp = fopen("pl_out.bin", "wb"); doub_bin_outp = fopen("nm_out.bin", "wb");</pre>	Open for output a file of planets and a file of numbers, saving file pointers for use in calls to output functions.
3	<pre>fscanf(plan_txt_inp, "%s%lf%d%lf%lf", a_planet.name, &a_planet.diameter, &a_planet.moons, &a_planet.orbit_time, &a_planet.rotation_time);</pre>	<pre>fread(&a_planet, sizeof (planet_t), 1, plan_bin_inp);</pre>	Copy one planet structure into memory from the data file.
4	<pre>fprintf(plan_txt_outp, "%s %e %d %e %e", a_planet.name, a_planet.diameter, a_planet.moons, a_planet.orbit_time, a_planet.rotation_time);</pre>	<pre>fwrite(&a_planet, sizeof (planet_t), 1, plan_bin_outp);</pre>	Write one planet structure to the output file.

(continued)

Text File Vs Binary File

Example	Text File I/O	Binary File I/O	Purpose
5	<pre>for (i = 0; i < MAX; ++i) fscanf(doub_txt_inp, "%lf", &nums[i]);</pre>	<pre>fread(nums, sizeof (double), MAX, doub_bin_inp);</pre>	Fill array nums with type double values from input file.
6	<pre>for (i = 0; i < MAX; ++i) fprintf(doub_txt_outp, "%e\n", nums[i]);</pre>	<pre>fwrite(nums, sizeof (double), MAX, doub_bin_outp);</pre>	Write contents of array nums to output file.
7	<pre>n = 0; for (status = fscanf(doub_txt_inp, "%lf", &data); status != EOF && n < MAX; status = fscanf(doub_txt_inp, "%lf", &data)) nums[n++] = data;</pre>	<pre>n = fread(nums, sizeof (double), MAX, doub_bin_inp);</pre>	Fill nums with data until EOF encountered, setting n to the number of values stored.
8	<pre>fclose(plan_txt_inp); fclose(plan_txt_outp); fclose(doub_txt_inp); fclose(doub_txt_outp);</pre>	<pre>fclose(plan_bin_inp); fclose(plan_bin_outp); fclose(doub_bin_inp); fclose(doub_bin_outp);</pre>	Close all input and output files.



Thank You.

