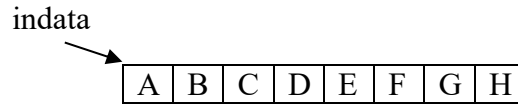


S&T2024 Advanced C Tutorial 3

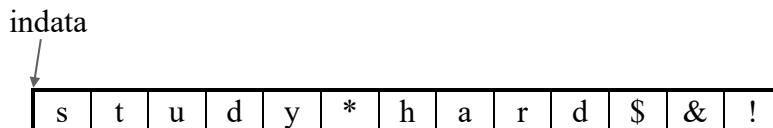
1. Let the contents of the file pointed by indata be as shown below.



What is the value of `ch` after the following code segment is executed?

```
char ch;
fseek (indata, (long) -3, * sizeof (char), SEEK_END);
fread (&ch, sizeof (char), 1, indata);
```

2. A text file contains the following characters. Suppose the file pointer `indata` points at the beginning of the file when we run the program.



What are the contents of `ch` after each `fread` instruction is executed in the following program segment ?

```
char ch;
:
:
fread (&ch, sizeof (char), 1, indata);

fseek (indata, (long) 6, SEEK_CUR);
fread (&ch, sizeof (char), 1, indata);

fseek (indata, (long) -3, SEEK_CUR);
fread (&ch, sizeof (char), 1, indata);

fseek (indata, (long) -5, SEEK_END);
fread (&ch, sizeof (char), 1, indata);

fseek (indata, (long) 3, SEEK_CUR);
fread (&ch, sizeof (char), 1, indata);

fseek (indata, (long) 4, SEEK_SET);
fread (&ch, sizeof (char), 1, indata);
:
```

3. If you are designing a big computer application system for an organization, you will be working as a system architect. This senior person usually works in the IT department of a bank, national healthcare organization, governmental ministries

etc. The project cost of this nature is usually in units of \$100,000 due to the complexity involved. So you can guess the salary of this senior person!!

If you are designing a medium-size computer application, you will be working as a system analyst. Such associated project cost is usually in units of \$10,000. In this tutorial I want you to have a feel of such medium-size project. Usually the staff is a system analyst or a programmer, but in this tutorial you will be the system analyst as well as the programmer to computerize the inventory of a hardware company. You will have to do feasibility studies, system design, and coding. In this tutorial we limit the items to 100 and we have 7 test cases, but this can be easily scaled up in the real situation.

In this project the boss of the hardware store needs to keep an inventory that can tell him what tools he has, the quantity available in store, and the cost of each one.

The system should also enable the boss to:

- Input a new record
- Update a record
- List all records
- Delete a record

We will work on these requirements from the scratch.

- (i) Write a program to create and initialize the binary file "**hardware.dat**" to have 100 empty records. Each record is a structure defined as follows:

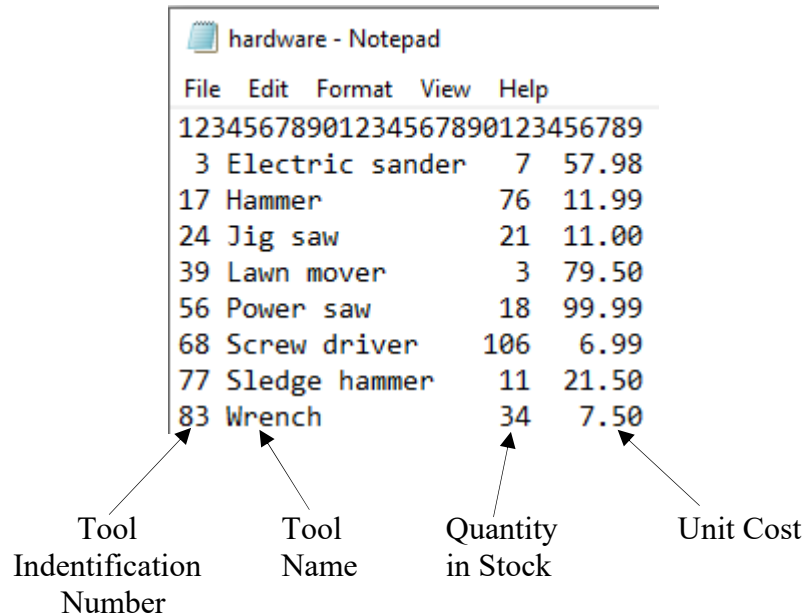
```
struct tool
{
    int rec_Num;
    char name[16];
    int quantity;
    float cost;
};
```

Once you have created the binay file, please do a backup so that you can re-used it in part (ii).

- (ii) Write another program to batch input the data from a text file named "**hardware.inf**" to the records in the binary file "**hardware.dat**".

Use the following information in the batch upload. The contents of "**hardware.inf**" and the alignment in text form are as follows:

3	Electric sander	7	57.98
17	Hammer	76	11.99
24	Jig saw	21	11.00
39	Lawn mover	3	79.50
56	Power saw	18	99.99
68	Screw driver	106	6.99
77	Sledge hammer	11	21.50
83	Wrench	34	7.50



Once you have batch uploaded the text data to the binary file, please do a backup so that you can re-use it in part (iii).

- (iii) Write another program to let the boss input the data concerning new tool, list all tools, delete a record for a tool that he no longer has, and update any information in the file. The tool identification number should be used as the record number. (Offset from the beginning of the binary file starts from 0.)

These two additional C functions can be used in part (iii) if desired:

int fflush (FILE * stream);

If the given stream was open for writing (or if it was open for updating and the last i/o operation was an output operation) any unwritten data in its output buffer is written to the file.

void rewind (FILE * stream);

Sets the position indicator associated with stream to the beginning of the file.

Although the size of this project has been scaled down, with this tutorial I hope you can appreciate the work involved in the application system development. The pay is definitely good.

- A/Prof Tay

This is the test run:

```
C:\Windows\system32\cmd.exe

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 3
Record #  Tool Name          Quantity    Cost
3         Electric sander    7           57.98
17        Hammer          76          11.99
24        Jig saw           21          11.00
39        Lawn mover       3           79.50
56        Power saw        18          99.99
68        Screw driver    106         6.99
77        Sledge hammer   11          21.50
83        Wrench          34          7.50

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 1
Enter the record #> 15
Tool name > Nail
Enter Quantity and Cost for 'Nail'
1000 0.5

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 3
Record #  Tool Name          Quantity    Cost
3         Electric sander    7           57.98
15        Nail            1000        0.50
17        Hammer          76          11.99
24        Jig saw           21          11.00
39        Lawn mover       3           79.50
56        Power saw        18          99.99
68        Screw driver    106         6.99
77        Sledge hammer   11          21.50
83        Wrench          34          7.50
```

```

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 2
Enter the record #> 83
Tool name > Copper wrench
Enter Quantity and Cost for 'Copper wrench'
10 10

```

```

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 3

```

Record #	Tool Name	Quantity	Cost
3	Electric sander	7	57.98
15	Nail	1000	0.50
17	Hammer	76	11.99
24	Jig saw	21	11.00
39	Lawn mover	3	79.50
56	Power saw	18	99.99
68	Screw driver	106	6.99
77	Sledge hammer	11	21.50
83	Copper wrench	10	10.00

```

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 4
Enter the record #> 77

```

```

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option-> 3

```

Record #	Tool Name	Quantity	Cost
3	Electric sander	7	57.98
15	Nail	1000	0.50
17	Hammer	76	11.99
24	Jig saw	21	11.00
39	Lawn mover	3	79.50
56	Power saw	18	99.99
68	Screw driver	106	6.99
83	Copper wrench	10	10.00

```

1. Input a new record
2. Update a record
3. List all records
4. Delete a record
5. Quit
Your option->

```

4. What can go wrong in the following code segment at run time? Why?

```
int *num, *this1;  
int sum;  
  
num = (int *) malloc(2*sizeof(int));  
  
num[0] = num[1] = 10;  
  
this1 = &num[0];  
  
realloc (num, 3*sizeof(int));  
  
*(this1+2) = 10;  
  
sum = num[0] + num[1] + num[2];
```

- End -