

# Computer Programming

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**Session: Directly Accessing and Updating Records in a File**

# Quick Recap

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- We wrote a program to create a binary file
  - Containing fixed length records
- Each record had values of four fields for one student
  - sroll, sname, sbatch, smarks

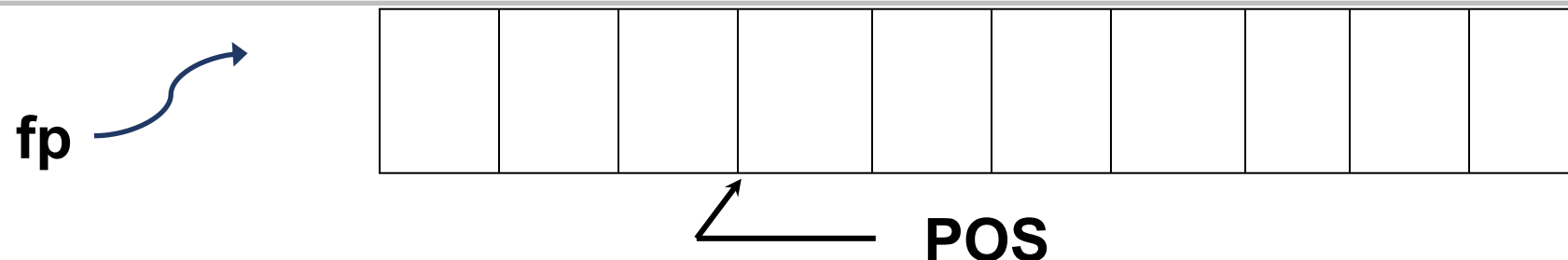
# Overview

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- In this session, We will use C++ functions to directly access and update records for students

# Accessing records in a binary file on disk



- A 'position indicator' is maintained by C++ for each file
  - Reading/writing will occur at this byte position
  - Indicator is automatically advanced by number of bytes read/written
- Current position can be found using a function `ftell()`  
`long POS; POS = ftell(fp);`
- One can set the indicator to any desired position, say P bytes  
`fseek (fp, P, SEEK_SET); //Count from starting point`

# Some relevant C++ functions

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- For reading a record in struct variable S  
`fread(&s, rec_size, 1, fp);` // Note use of pointer to struct
- For writing one record from a struct variable  
`fwrite(&s, rec_size, 1, fp);`
- To reset internal pointer to beginning of file  
`Rewind(fp);`

# Program to process studentdb

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```
#include <iostream>
#include <cstdio>
using namespace std;
struct studentinfo{
    int roll;
    char name[30];
    int batch;
    float marks;
};
```

# Program ...

---



```
int main() {  
    struct studentinfo s;  
    int r, recnum, rec_size, found =0; long POS;  
    rec_size = sizeof(struct studentinfo);  
    cout << "Size of each record is: " << rec_size << endl;
```

# Program ...

```
FILE *fp;  
fp = fopen("studentdb", "rb+" );  
if (fp == NULL){  
    cout << "Could not open database file" << endl;  
    return -1;  
}  
int count=0; found=0;
```



# Program ...



```
rewind(fp);  
cout << " -----"<<endl;  
cout << "searching sequentially for marks of roll 10105";  
cout << endl;  
r = 10105; found =0;  
POS = ftell(fp);  
// find marks for roll number 10105
```

# Program ...



```
do {  
    fread(&s,rec_size,1, fp);  
    if (s.roll ==r){  
        // found student, print record  
        cout << endl << "Found roll " << r;  
        found = POS/rec_size +1;  
        cout << " at record no. " << found << "\nThe name and marks are: ";  
        printf("%s %5.2f \n", s.name,s.marks);  
        break;  
    }  
}
```

# Program ...

```
else{
    POS= ftell(fp);
    fread(&s,rec_size, 1, fp);
}
} while (!feof (fp));
if (found == 0){
    cout << "\nroll number not found in database\n";
}
cout << " -----"<<endl;
```

## Program ...



```
cout << "demonstrating direct access to records" << endl;
cout << "read and display 6th record"<< endl<< endl;
// find and print 6th record in database file
recnum = 6;
POS = (recnum-1) * rec_size;
```

## Program ...



```
fseek (fp, POS, SEEK_SET); // set the file position
fread(&s, rec_size, 1, fp);
cout << "Record starting at byte position " << POS << " is\n";
printf("%5d %30s %3d %5.2f \n", s.roll, s.name, s.batch,
      s.marks);
cout << "Record Number is: " << recnum << endl;
```

# Program ...



```
// update Nilamani's marks to 93.5
// His roll number is 10108.
// We access 8th record starting at 7 * rec_size)
cout << " -----"<<endl;
cout << "read and update Nilamani Raut's marks" << endl;
cout << "Nilamani's roll number is 10108"<< endl;
r = 10108;
```

# Program ...



```
recnum = r-10100;  
POS = (recnum-1)*rec_size;  
fseek (fp, POS, SEEK_SET);  
fread(&s,rec_size, 1,fp);  
cout << "Record for Nilamani is\n";  
printf("%5d %30s %3d %5.2f \n", s.roll, s.name,s.batch,  
      s.marks);
```

# Program ...



```
s.marks = 93.5;
// previous read has advanced the internal position indicator
fseek (fp, POS, SEEK_SET);
fwrite(&s, rec_size,1, fp);
// verify correct data is written
fseek (fp, POS, SEEK_SET);
fread(&s, rec_size, 1,fp);
cout << "-----Updated record in database file is\n";
printf("%5d %30s %3d %5.2f \n", s.roll, s.name,s.batch, s.marks);
```



# Program ...

---



```
fclose(fp);  
return 0;  
}
```

 Z:\CS101X\cppfiles\process\_student\_db.exe

Size of each record is: 44

-----  
searching sequentially for marks of roll 10105

Found roll 10105 at record no. 4

The name and marks are: Nandan 67.00

-----  
demonstrating direct access to records  
read and display 6th record

Record starting at byte position 220 is

10106                                      Avinash 112 65.00

Record Number is: 6

-----  
read and update Nilamani Raut's marks

Nilamani's roll number is 10108

Record for Nilamani is

10108                                      Nilmani 111 91.50

-----Updated record in database file is

10108                                      Nilmani 111 93.50

Process returned 0 (0x0)      execution time : 0.180 s

Press any key to continue.

# Summary

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- Records in binary files can be directly accessed and processed
  - We typically search on a key attribute, such as roll\_number
- Need to know the record number of the desired record
  - We need a mapping from roll\_number to record position
- Refer to C++ tutorials and reference section on the web at:  
<http://www.cplusplus.com/reference/cstdio>
- Handouts posted this week will provide a summary of file processing, along with the program listings