

CME 112- Programming Languages II

Week 11

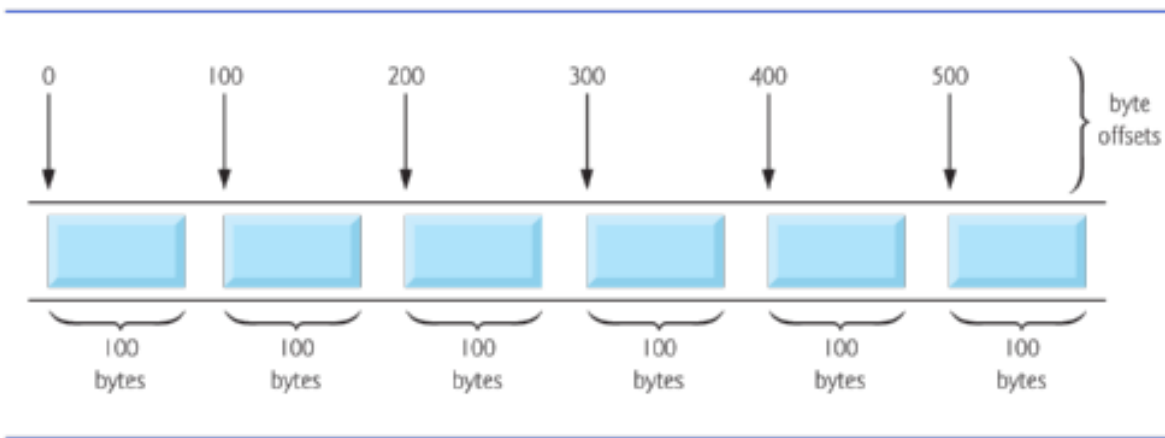
File Operations Random Access Files

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Bir insanı değerlendirmek için nelere sahip olmadığına değil, sahip olduklarıyla neler yaptığına bak

Random Access Files

- ▶ Random access files
 - Access individual records without searching through other records
 - Instant access to records in a file
 - Data can be inserted without destroying other data
 - Data previously stored can be updated or deleted without overwriting
- ▶ Implemented using fixed length records
 - Sequential files do not have fixed length records



Random Access Files

- ▶ Data in random access files stored as "raw bytes" (unformatted)
 - All data of the same type (ints, for example) uses the same amount of memory
 - All records of the same type have a fixed length
 - Data not human readable



Creating Random Access Files

▶ Unformatted I/O functions

- **fwrite**


- Transfer bytes from a location in memory to a file

- **fread**

- Transfer bytes from a file to a location in memory

▶ Example:

- **fwrite(&number, sizeof(int), 1, myPtr);**

- **&number** – Location to transfer bytes from
 - **sizeof(int)** – Number of bytes to transfer
 - **1** – For arrays, number of elements to transfer
 - In this case, "one element" of an array is being transferred
 - **myPtr** – File to transfer to or from
- 

Creating Random Access Files

- ▶ Writing struct data structure to the file
 - `fwrite(&myObject, sizeof (struct myStruct), 1, myPtr);`
 - **sizeof** – returns size in bytes of object in parentheses
- ▶ To write several array elements
 - Pointer to array as first argument
 - Number of elements to write as third argument

Creating Random Access Files

```
1 #include <stdio.h>
2
3 struct musteri{
4     int hesapNo;
5     char soyad[25];
6     char ad[20];
7     double bakiye;
8 };
9
10 int main(void)
11 {
12     int i;
13     struct musteri bosMusteri = {0, "", "", 0.0};
14     FILE *myPtr;
15     if((myPtr = fopen("musteri.dat", "w"))== NULL)
16         printf("Dosya olusturulamadi\n");
17     else
18     {
19         for(i=1; i<=100; i++)
20         {
21             fwrite(&bosMusteri, sizeof(struct musteri), 1, myPtr);
22         }
23         fclose(myPtr);
24     }
25     return 0;
26 }
```

Writing to the Random Access Files

- ▶ **fseek** : Sets file position pointer to a specific position
- ▶ **fseek(pointer, offset, symbolic_constant);**
 - ❑ **pointer** –pointer to file
 - ❑ **offset** –file position pointer (0 is first location)
 - ❑ **symbolic_constant** –specifies where in file we are reading from.
 - **SEEK_SET** – seek starts at beginning of file
 - **SEEK_CUR** –seek starts at current location in file
 - **SEEK_END** –seek starts at end of file

Writing to the Random Access Files

```
1 #include <stdio.h>
2
3 struct musterisi{
4     int hesapNo;
5     char soyad[25];
6     char ad[20];
7     double bakiye;
8 };
9
10 int main(void)
11 {
12     struct musterisi hesapBilgi = {0, "", "", 0.0};
13     FILE *myPtr;
14     if((myPtr = fopen("musterisi.dat", "r+")) == NULL)
15         printf("Dosya acilamadi\n");
16     else
17     {
18         printf("Hesap no gir (1-100 arasi deger)\n"
19             "Veri girisini bitirmek icin 0 gir");
20         scanf("%d", &hesapBilgi.hesapNo);
21         while(hesapBilgi.hesapNo != 0)
22         {
23             printf("Soyad Ad ve Bakiye gir\n?");
24             fscanf(stdin, "%s%s%lf", hesapBilgi.soyad,
25                 hesapBilgi.ad, &hesapBilgi.bakiye);
```


Writing to the Random Access Files

```
26
27     fseek(myPtr,(hesapBilgi.hesapNo-1)*
28           sizeof(struct musteriler),SEEK_SET);
29
30     fwrite(&hesapBilgi,sizeof(struct musteriler),1,myPtr);
31
32     printf("Hesap no gir\n?");
33     scanf("%d",&hesapBilgi.hesapNo);
34 }
35 fclose(myPtr);
36 }
37 return 0;
38 }
```

Reading from Random Access Files

▶ fread

- Reads a specified number of bytes from a file into memory

▶ `fread(&client, sizeof (struct clientData), 1,myPtr);`

- ❖ Can read several fixed-size array elements.
 - Provide pointer to array
 - Indicate number of elements to read
- ❖ To read multiple elements, specify in third argument

Reading from Random Access Files

```
1 #include <stdio.h>
2
3 struct musterisi{
4     int hesapNo;
5     char soyad[25];
6     char ad[20];
7     double bakiye;
8 };
9
10 int main(void)
11 {
12     struct musterisi hesapBilgi = {0, "", "", 0.0};
13     FILE *myPtr;
14     if((myPtr = fopen("musterisi.dat", "r")) == NULL)
15         printf("Dosya acilamadi\n");
16     else
17     {
18         printf("%-10s%-16s%-11s%10s\n", "HesapNo", "Soyad", "Ad", "Bakiye");
19         while(!feof(myPtr))
20         {
21             fread(&hesapBilgi, sizeof(struct musterisi), 1, myPtr);
22             if(hesapBilgi.hesapNo != 0)
23                 printf("%-10d%-16s%-11s%10.2f\n", hesapBilgi.hesapNo,
24                     hesapBilgi.soyad, hesapBilgi.ad, hesapBilgi.bakiye);
25         }
26         fclose(myPtr);
27     }
28     getchar();
29     return 0;
30 }
```

Sample Application

- ▶ This program
 - Demonstrates using random access files to achieve instant access processing of a bank's account information
- ▶ We will
 - Update existing accounts
 - Add new accounts
 - Delete accounts
 - Store a formatted listing of all accounts in a text file

Sample Application

```
1 #include <stdio.h>
2
3 struct musteriy{
4     int hesapNo;
5     char soyad[25];
6     char ad[20];
7     double bakiye;
8 };
9 int secimGir(void);
10 void textDosya(FILE *);
11 void kayitGuncelle(FILE *);
12 void yeniKayit(FILE *);
13 void kayitSil(FILE *);
14 void listele(FILE *);
15
16 int main(void)
17 {
18     FILE *myPtr;
19     int secim;
20     if((myPtr = fopen("musteriy.dat","r+"))== NULL)
21         printf("Dosya acilamadi\n");
22     else
23     {
24         while((secim = secimGir()) != 6)
25         {
```

Sample Application

```
26         switch(secim)
27         {
28             case 1:textDosya(myPtr);break;
29             case 2:kayitGuncelle(myPtr);break;
30             case 3:yeniKayit(myPtr);break;
31             case 4:kayitSil(myPtr);break;
32             case 5:listeLe(myPtr);break;
33         }
34     }
35     fclose(myPtr);
36 }
37 }
```

Sample Application

```
39 int secimGir()
40 {
41     int menuSecim;
42     printf("\n Secimini yap\n"
43           "1-musteri.dat dosyasinin icerigini\n"
44           "  formatli olarak \"hesaplar.dat\" dosyasina yaz\n"
45           "2-hesap guncelle\n"
46           "3-yeni hesap ekle\n"
47           "4-hesap sil\n"
48           "5-musteri.dat dosyasinin icerigini listele\n"
49           "6-cikis\n?");
50     scanf("%d",&menuSecim);
51     return menuSecim;
52 }
```

Sample Application

```
54 void textDosya(FILE *okuPtr)
55 {
56     FILE *yazPtr;
57     struct musteriler hesapBilgi = {0, "", "", 0.0};
58     if((yazPtr = fopen("hesaplar.dat", "w")) == NULL)
59         printf("Dosya acilamadi\n");
60     else
61     {
62         rewind(okuPtr);
63         fprintf(yazPtr, "%-10s%-16s%-11s%10s\n", "HesapNo", "Soyad", "Ad", "Bakiye");
64         while(!feof(okuPtr))
65         {
66             fread(&hesapBilgi, sizeof(struct musteriler), 1, okuPtr);
67             if(hesapBilgi.hesapNo != 0)
68                 fprintf(yazPtr, "%-10d%-16s%-11s%10.2f\n", hesapBilgi.hesapNo,
69                     hesapBilgi.soyad, hesapBilgi.ad, hesapBilgi.bakiye);
70         }
71         fclose(yazPtr);
72     }
73 }
```


Sample Application

```
75 void kayitGuncelle(FILE *fPtr)
76 {
77     int hesapID;
78     double islemMiktari;
79     struct musteriler hesapBilgi = {0, "", "", 0.0};
80     printf("Guncellenecek hesap no gir[1-100]:");
81     scanf("%d",&hesapID);
82     fseek(fPtr,(hesapID-1)*sizeof(struct musteriler),SEEK_SET);
83     fread(&hesapBilgi,sizeof(struct musteriler),1,fPtr);
84     if(hesapBilgi.hesapNo==0)
85         printf("%d nolu hesap için bilgi girilmemiş\n",hesapID);
86     else
87     {
88         printf("%-10d%-16s%-11s%10.2f\n\n",hesapBilgi.hesapNo,
89             hesapBilgi.soyad,hesapBilgi.ad,hesapBilgi.bakiye);
90         printf("Hesaba yatacak (+) veya hesaptan çekilecek (-) tutari gir:");
91         scanf("%lf",&islemMiktari);
92         hesapBilgi.bakiye += islemMiktari;
93         printf("%-10d%-16s%-11s%10.2f\n\n",hesapBilgi.hesapNo,
94             hesapBilgi.soyad,hesapBilgi.ad,hesapBilgi.bakiye);
95         fseek(fPtr,(hesapID-1)*sizeof(struct musteriler),SEEK_SET);
96         fwrite(&hesapBilgi,sizeof(struct musteriler),1,fPtr);
97     }
98 }
```

Sample Application

```
100 void kayitSil(FILE *fPtr)
101 {
102     struct musterisi hesapBilgi, bosHesap = {0, "", "", 0.0};
103     int hesapID;
104     printf("Silinecek hesap no gir[1-100]:");
105     scanf("%d",&hesapID);
106     fseek(fPtr,(hesapID-1)*sizeof(struct musterisi),SEEK_SET);
107     fread(&hesapBilgi,sizeof(struct musterisi),1,fPtr);
108     if(hesapBilgi.hesapNo==0)
109         printf("Silinecek %d nolu hesap yok",hesapID);
110     else
111     {
112         fseek(fPtr,(hesapID-1)*sizeof(struct musterisi),SEEK_SET);
113         fwrite(&bosHesap,sizeof(struct musterisi),1,fPtr);
114     }
115 }
```

Sample Application

```
117 void yeniKayit(FILE *fPtr)
118 {
119     int hesapID;
120     struct musteriler hesapBilgi = {0, "", "", 0.0};
121     printf("Yeni hesap no gir[1-100]:");
122     scanf("%d",&hesapID);
123     fseek(fPtr,(hesapID-1)*sizeof(struct musteriler),SEEK_SET);
124     fread(&hesapBilgi,sizeof(struct musteriler),1,fPtr);
125     if(hesapBilgi.hesapNo!=0)
126         printf("%d nolu hesap zaten mevcut\n",hesapID);
127     else
128     {
129         printf("Soyad, Ad ve bakiye gir:");
130         scanf("%s%s%lf",hesapBilgi.soyad,hesapBilgi.ad,&hesapBilgi.bakiye);
131         hesapBilgi.hesapNo = hesapID;
132         fseek(fPtr,(hesapID-1)*sizeof(struct musteriler),SEEK_SET);
133         fwrite(&hesapBilgi,sizeof(struct musteriler),1,fPtr);
134     }
135 }
```

Sample Application

```
137 void listele(FILE *fPtr)
138 {
139     struct musteriler hesapBilgi = {0, "", "", 0.0};
140
141     printf("%-10s%-16s%-11s%10s\n", "HesapNo", "Soyad", "Ad", "Bakiye");
142     while(!feof(fPtr))
143     {
144         fread(&hesapBilgi, sizeof(struct musteriler), 1, fPtr);
145         if(hesapBilgi.hesapNo != 0)
146             printf("%-10d%-16s%-11s%10.2f\n", hesapBilgi.hesapNo,
147                 hesapBilgi.soyad, hesapBilgi.ad, hesapBilgi.bakiye);
148     }
149     fclose(fPtr);
150     getchar();
151 }
```

Homework

▶ Patient Following System

- Define a struct included patient name, age, and a set of illness information.
- Insert a number of patient.
- Find any patient who has got some key data.
- Delete a patient record.
- Modify a patient record.
- List all patients info

Next Week

- ▶ Bitwise Operations



References

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Q u e s t i o n s
A n y
?



Thanks for listening

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