

Operating Systems Lab

Experiment No. 10

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Aim

Implement all file allocation strategies :

- **Contiguous Allocation**
- **Linked Allocation**
- **Indexed Allocation.**

Theory

The allocation methods define how the files are stored in the disk blocks. There are three main disk space or file allocation methods.

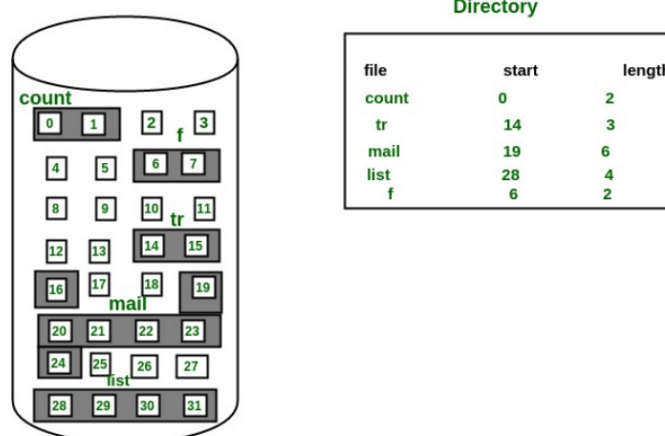
1. **Contiguous Allocation**
2. **Linked Allocation**
3. **Indexed Allocation.**

Contiguous Allocation

In this scheme, each file occupies a contiguous set of blocks on the disk. For example, if a file requires n blocks and is given a block b as the starting location, then the blocks assigned to the file will be: $b, b+1, b+2, \dots, b+n-1$. This means that given the starting block address and the length of the file (in terms of blocks required), we can determine the blocks occupied by the file.

The directory entry for a file with contiguous allocation contains

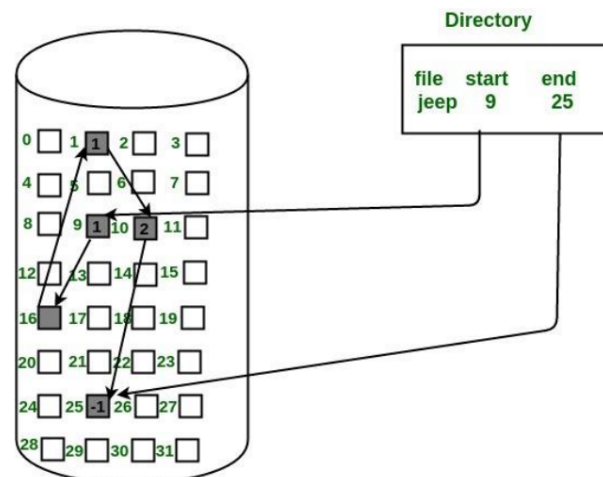
- Address of starting block
- Length of the allocated portion.



Linked Allocation

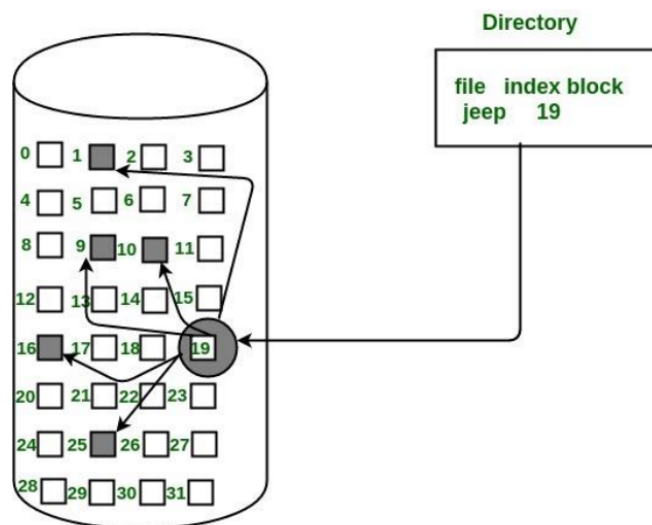
In this scheme, each file is a linked list of disk blocks which need not be contiguous. The disk blocks can be scattered anywhere on the disk.

The directory entry contains a pointer to the starting and the ending file block. Each block contains a pointer to the next block occupied by the file.



Indexed Allocation

In this scheme, a special block known as the Index block contains the pointers to all the blocks occupied by a file. Each file has its own index block. The i th entry in the index block contains the disk address of the i th file block. The directory entry contains the address of the index block as shown in the image:



Program

[contiguous.c](#)

```
Terminal
~/Desktop/file_alloc
> gcc contiguous.c -o contiguous.out

~/Desktop/file_alloc
> ./contiguous.out
Enter the starting block & length of file :- 2 6

2->1
3->1
4->1
5->1
6->1
7->1
The file is allocated to disk
To enter more files?(y-1/n-0)1
Enter the starting block & length of file :- 6 4
Block already allocated
To enter more files?(y-1/n-0)0

~/Desktop/file_alloc took 16s
> |
```

[indexed.c](#)

```
Terminal
~/Desktop/file_alloc
> gcc indexed.c -o indexed.out

~/Desktop/file_alloc
> ./indexed.out
Enter index block: 3
Enter no of files on index 3 :2

Enter files for index 3 :41 43

Allocated Successfully
3->41:1
3->43:1
To enter more files?(y-1/n-0)0

~/Desktop/file_alloc took 17s
> |
```

[linked.c](#)

```
Terminal
~/Desktop/file_alloc
> gcc linked.c -o linked.out

~/Desktop/file_alloc
> ./linked.out
Enter how many blocks that are already allocated:-3

Enter the blocks nos that are already allocated:-1 2 3
Enter the starting index block & length:-4 6

4->1
5->1
6->1
7->1
8->1
9->1
If u want to enter one more file? (yes-1/no-0)1
Enter the starting index block & length:-2 5

2->file is already allocated:-
3->file is already allocated:-
4->file is already allocated:-
5->file is already allocated:-
6->file is already allocated:-
7->file is already allocated:-
8->file is already allocated:-
9->file is already allocated:-
10->1
11->1
12->1
13->1
14->1
If u want to enter one more file? (yes-1/no-0)0

~/Desktop/file_alloc took 44s
> |
```

Thank You