

*National University of Singapore*  
**CS2106 Operating System**  
Second Half Summary Notes

*Dong Shaocong A0148008J*

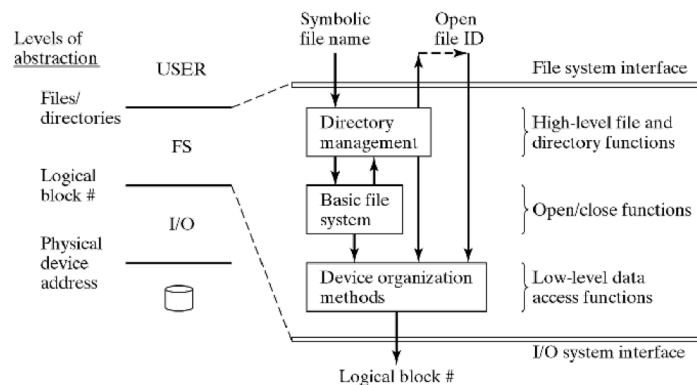
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## 1 File System

### Definition 1.1. File system

- Present logical (abstract) view of files and directories
  - Accessing a disk is very complicated: (2D or 3D structure, track/surface/sector, seek, rotation, ...)
  - Hide complexity of hardware devices
- Facilitate efficient use of storage devices: Optimise access e.g. to disk.
- Support sharing
  - Files persist even when owner/creator is not currently active (unlike main memory)
  - Key issue: Provide protection (control access)

### Definition 1.2. Hierarchical View of File system



- **Directory management:** map logical name to unique Id, file descriptor
- **Basic file system:** open/close files
- **Physical device organization:** map file data to disk blocks

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Penghao is the best L<sup>A</sup>T<sub>E</sub>X writer.

```
def func():  
    print("Penghao is cool!")
```

oo

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

1. 123
2. 123
3. 123

|    | M1 | M2  | M3  | M4  | M5  |
|----|----|-----|-----|-----|-----|
| M1 | 0  | 108 | 180 | 228 | 396 |
| M2 |    | 0   | 72  | 168 | 288 |
| M3 |    |     | 0   | 48  | 144 |
| M4 |    |     |     | 0   | 128 |
| M5 |    |     |     |     | 0   |

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**Algorithm 1** title

1: 123

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## References

- [1] Albert Einstein. *Zur Elektrodynamik bewegter Körper*. (German) [*On the electrodynamics of moving bodies* [www.google.com.sg](http://www.google.com.sg)]. Annalen der Physik, 322(10):891921, 1905.