Enhancement to eXpOS operating system and XFS file system

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What is eXpOS?

- Simpler version of OS
- Multiprogramming
- Familiarize students with the working of OS

Problem Definition

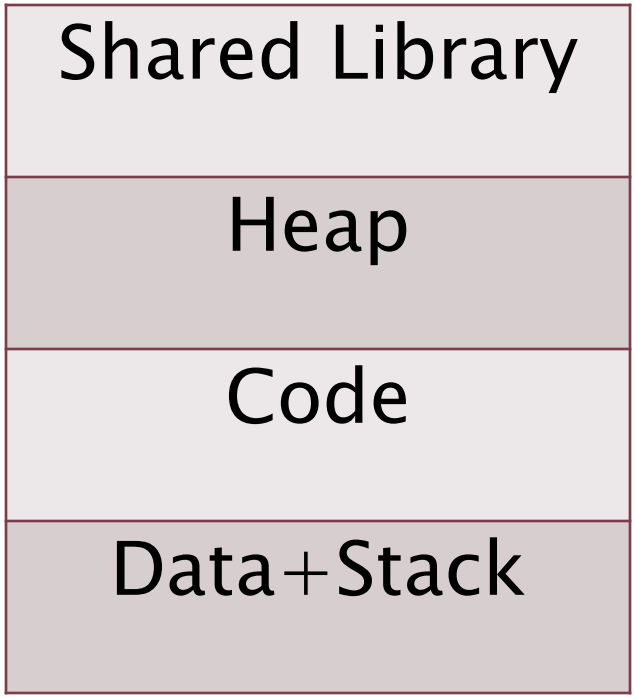
- Redesign the XFS system
- Include Inter process communication
- Redesign process model
- Introduce shared memory model
- System calls

Modifications to XFS

- Root file
- File locking – FLock and FunLock
- XEXE format

XMAGIC	Entry Point	Code Size	Heap Size	Stack Size	Library Bit	…

Modifications to process model



Inter process communication

- Semaphore
  - Semget
  - Semrelease
  - SemLock
  - SemunLock
- Wait and Signal
- FLock and FunLock

Shared Memory

- Sharing of data between Parent and Child
- Involves heap
- Semaphore for exclusive access

Additional features

- Buffer Cache
- Pre-emptive Scheduling
- Asynchronous Disk operations

Data structures added

- Buffer Table

Block Number	Dirty Bit	Locking PID

- Semaphore table

Locking PID	Process Count

- Disk status table

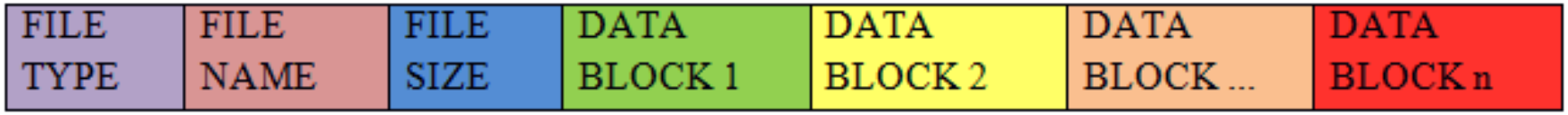
Load/Store Bit	Page Number	Block number	PID

Data structures redesigned

- Process Table

- File Table

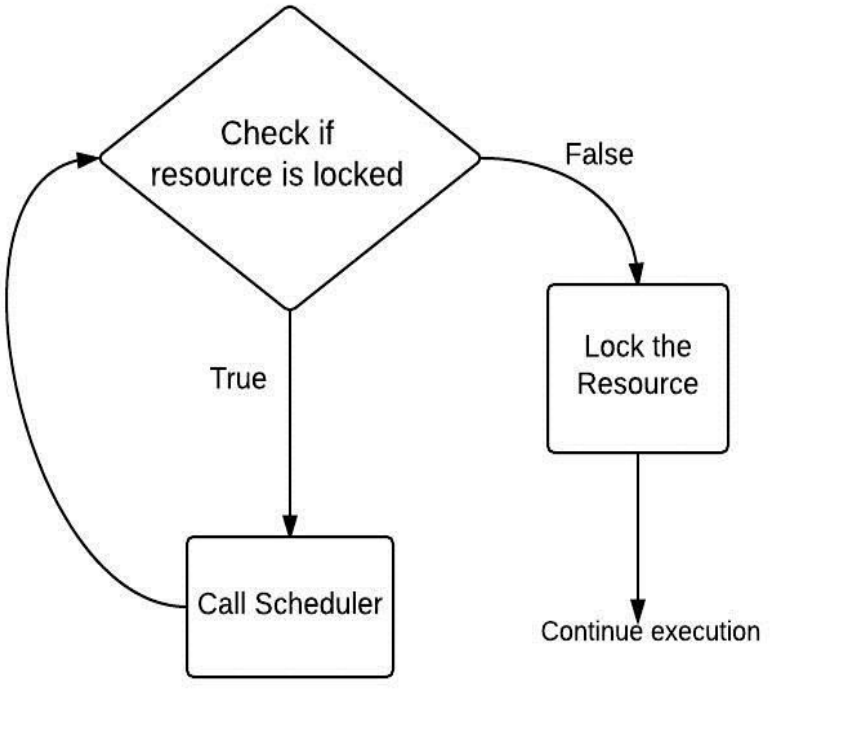
- Inode Table

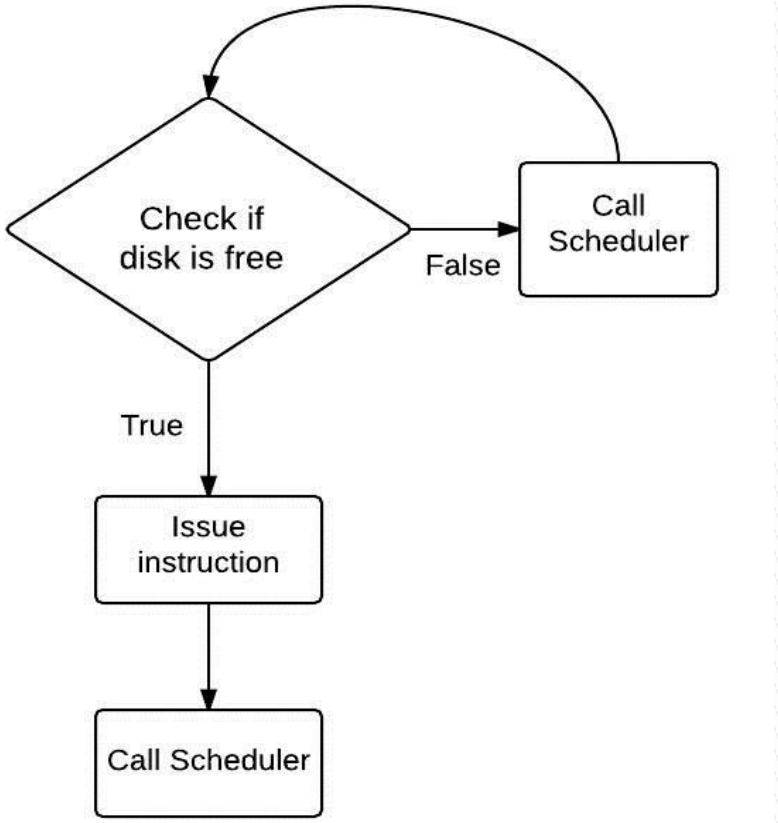


System calls Added

- FLock
- FunLock
- Semget
- Semrelease
- SemLock
- SemunLock

System calls redesigned

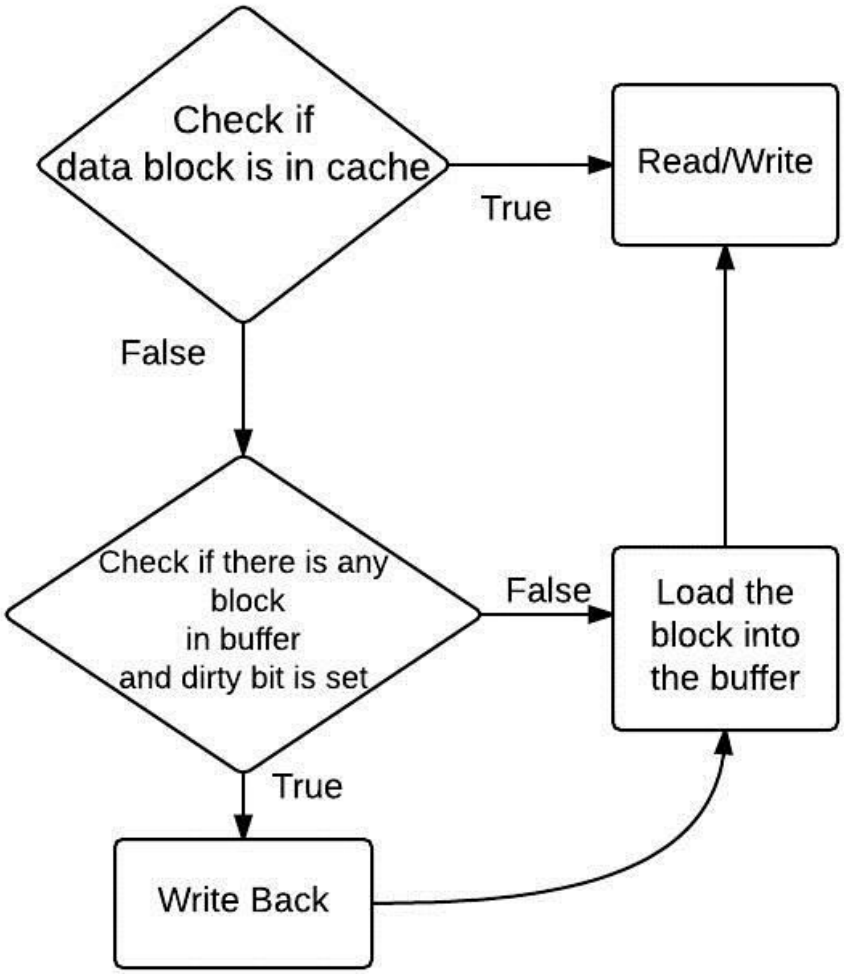




Pre-emptive Scheduling

Asynchronous disk operations

Buffer Cache



Future Work

- Implementation
- Testing
- Roadmap

Conclusion

- More efficient
- More similar to commercial OS
- Students can gain better insight

References

- http://xosnitc.github.io
- The Design of Unix Operating System, By Maurice J. Bach

Thank You