

Department of Computer Science and Engineering

**FACULTY OF ENGINEERING AND TECHNOLOGY
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CS-501

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THREADS

Threads_{1/3}

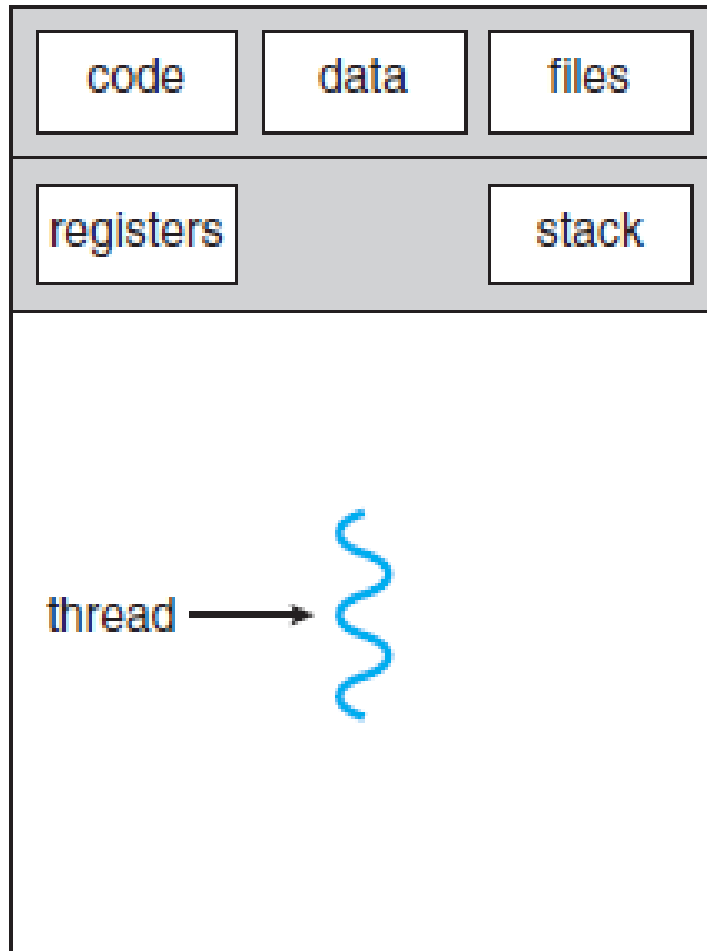
- Thread is a *lightweight* process.
- It is a *basic unit* of CPU utilization.
- It comprise:
 - A thread ID
 - A program counter
 - A register set
 - A stack

Threads_{2/3}

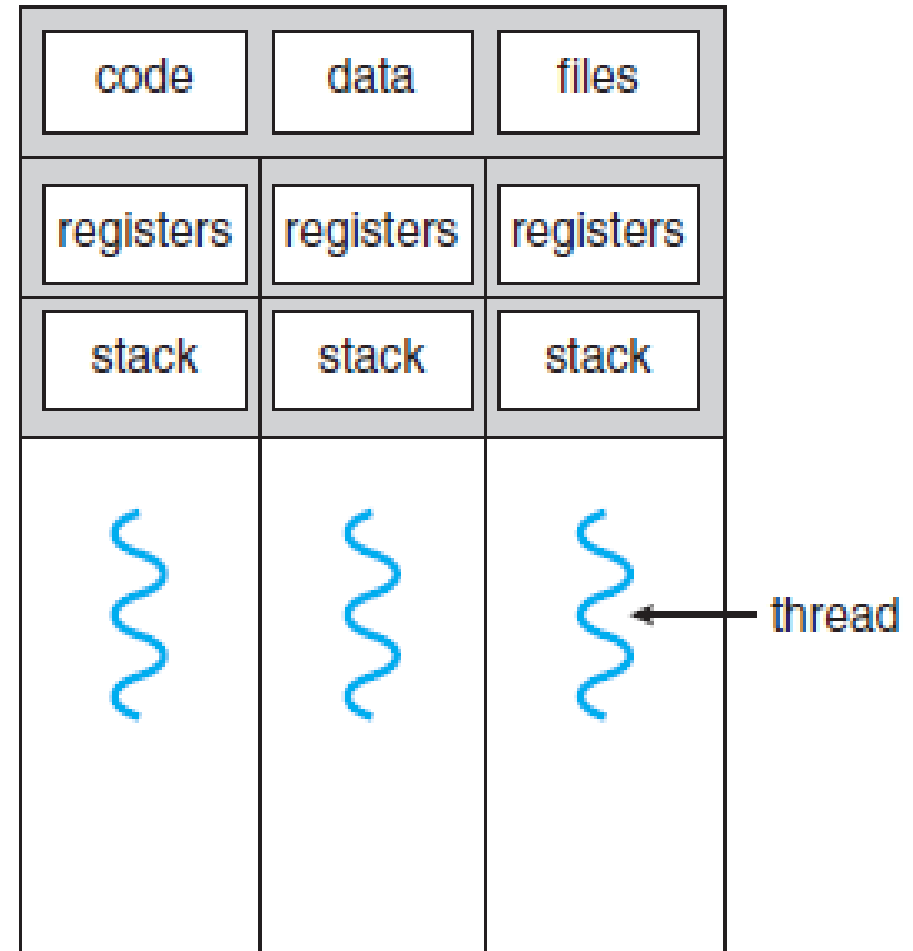
- It shares with other threads belonging to the *same process*:
 - Its code section,
 - Data section, and
 - Other operating-system resources, such as open files and signals.
- A traditional (or heavyweight) *process* has a *single thread of control*.
- *If a process has multiple threads of control, it can perform more than one task at a time.*

Threads^{3/3}

- Single-threaded process vs Multi-threaded process



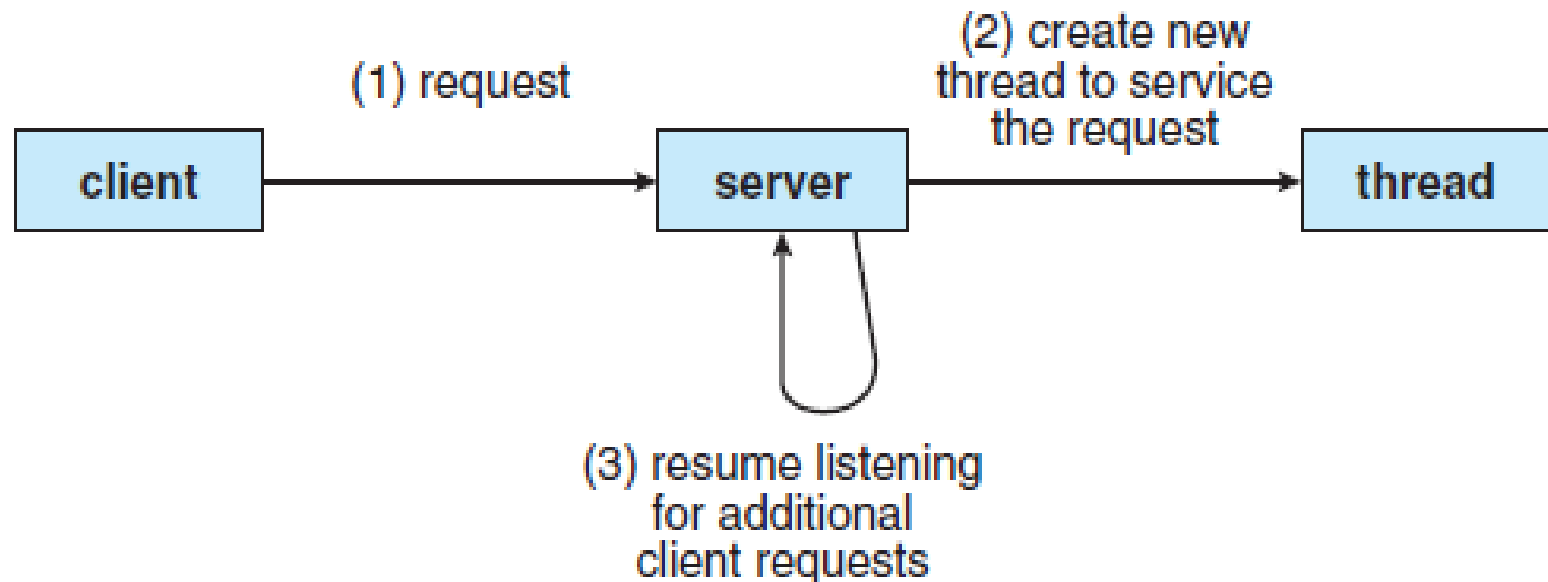
single-threaded process



multithreaded process

Multithreaded Server Architecture

- In multithreaded server architecture, the server will create a separate **thread** that listens for client requests.
- When a request is made, rather than creating another process, the server creates a new thread to service the request and resume **listening** for additional requests.



Benefits of Multithreaded Programming

- Responsiveness
- Resource sharing
- Economy
- Scalability

References

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley.
2. William Stallings, “Operating Systems: Internals and Design Principles”, 6th Edition, Pearson Education.
3. D M Dhamdhere, “Operating Systems: A Concept based Approach”, 2nd Edition, TMH.

Thank You.

