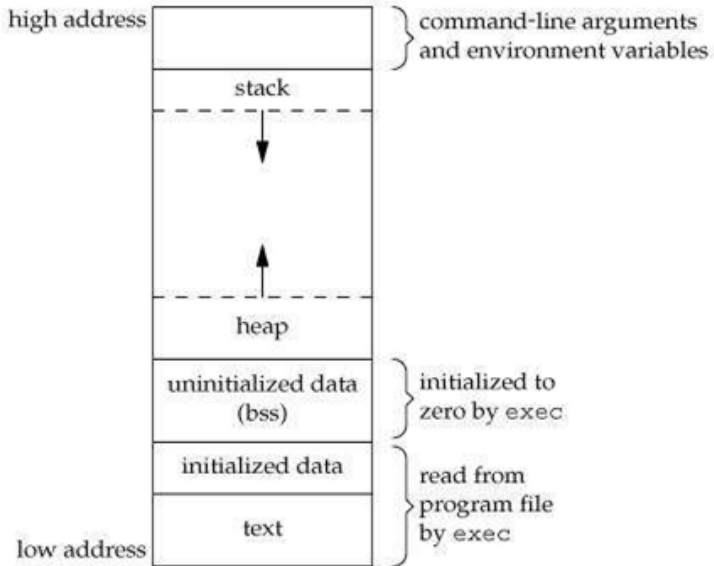


Concurrent Processing

Process Memory



Stack

- Stack Frames / Activation Records
 - Each function call allocates a stack frame for that function call
- Stack Pointer
- Stack Overflow

Heap

- Dynamic Allocation
- When is memory allocated in the heap?
- How is heap memory accessed?

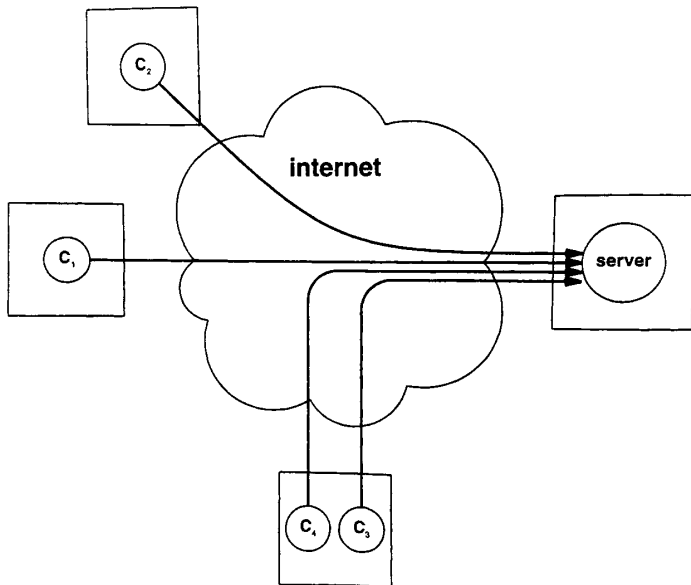
Terminology

- Multiprocessing
- Multithreading
- Distributed Computing
- Multicore Processor
- Pipelining

Concurrency versus Parallelism

- Concurrency is when two or more tasks can run in overlapping time periods.
- Parallelism is when tasks run at the same time.

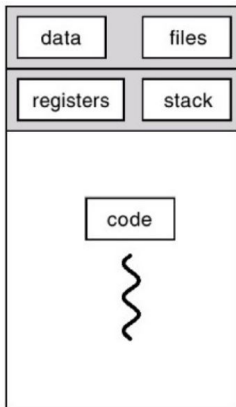
Concurrency in Client/Server



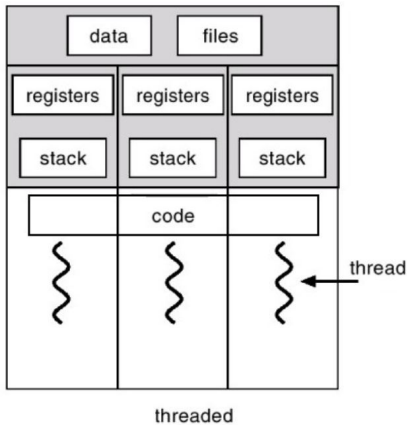
Terminology

- Program
- Process
- Thread
- Local versus Global Variables

Process



Thread



Processes versus Threads

Process	Thread
heavy weight operations	lighter weight operations
has own memory space	share memory within the same process
IPC can be slow	inter-thread communication can be fast
context switching is expensive	context switching is less expensive