**Context Switch**

- Process A Control Block
  - Threads: A1, A2, A3

- Process B Control Block
  - Threads: B1

- Core
  - Hardware Registers: R0, R1, ..., RN, SP

- A3 Stack

- B1 Stack
**Context Switch**

Process A
Control Block

Threads
- A1
- A2
- A3

Core
- R0
- R1
- RN
- SP

Hardware Registers

Saved
Registers
(all but SP)

A3 Stack

Process B
Control Block

Threads
- B1

B1 Stack
Context Switch

Process A
Control Block

Threads
A1
A2
A3

SP

Core

Hardware
Registers

R0
R1
RN
SP

A3 Stack

Process B
Control Block

Threads
B1

SP

B1 Stack

A1 Stack

A2 Stack
Context Switch

Process A
Control Block

Threads
A1
A2
A3

Threads
SP

SP

Core

Hardware
Registers

R0
R1
RN
SP

A3 Stack

B1 Stack

Process B
Control Block

Threads
B1
Context Switch

Process A

Control Block

Threads

A1
A2
A3

SP

A3 Stack

Core

Hardware Registers

R0
R1
RN
SP

Process B

Control Block

Threads

B1

B1 Stack

Threads, Processes, and Dispatching
Linux Fork/Exec Example

```c
int pid = fork();
if (pid == 0) {
    execvp("ls", argv);
} else {
    waitpid(pid, &status, options);
};
```
Windows Process Creation

```c
BOOL CreateProcess(
    LPCTSTR lpApplicationName,
    LPTSTR lpCommandLine,
    LPSECURITY_ATTRIBUTES lpProcessAttributes,
    LPSECURITY_ATTRIBUTES lpThreadAttributes,
    BOOL bInheritHandles,
    DWORD dwCreationFlags,
    LPVOID lpEnvironment,
    LPCTSTR lpCurrentDirectory,
    LPSTARTUPINFO lpStartupInfo,
    LPPROCESS_INFORMATION lpProcessInformation
);

WaitForSingleObject(lpProcessInformation->hProcess, INFINITE);
```