Assignment Project Exam Help Add WeChat powcoder

CS:3620 Operating Systems

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OS provides processabstraction

- When you run an exe file, the OS creates a process = a running program
- OS <u>timeshares</u> CPU across multiple processes. Virtualizes CPU
 - No. of running processes > https://www.pocesses
 - Programs are responsive to users, even when the CPU is busy with other tasks Add WeChat powcoder
- OS has a <u>CPU scheduler</u> that picks one of the many active processes to execute on a CPU
 - Policy: which process to run
 - Mechanism: how to "context switch" between processes

What comstitutes acouscies? Main Memory Instruction **CPU** Instruction A unique identifier (PID) **Program** Instruction Memory image
 Code & data (static)

Counter the station of the counter that the counter the counter that Counter Data • Stack and heap (dynamic) powcoder com Registers Data • CPU context: registers Add WeChat powcodeache Program counter Disk Current operands Stack pointer **D-Cache** Executable File descriptors Pointers to open files and devices • E.g., STDOUT, STDIN, STDERR

How does we content process?

 Allocates memory and creates memory Assignment Project Examcounter image

• Loads code, data from disktps://powcoder.comegisters

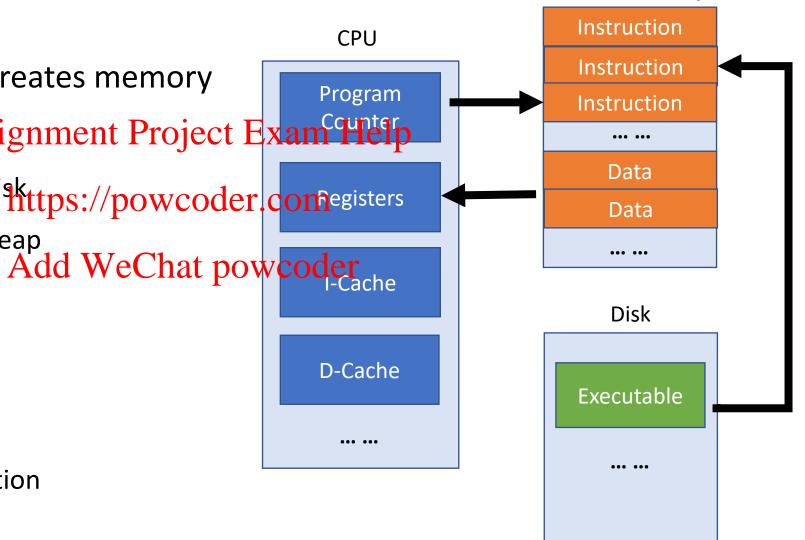
• Creates runtime stack, heap

Opens basic files

• STD IN, OUT, ERR

Initializes CPU registers

• PC points to first instruction



Main Memory

Processalm formation of the contraction of the cont

 In Linux, you can access a lot of information about a processes in: /proc/<pid>/

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maps: memory information

cwd: link to current workings directory der.com

exe: link to executable file

fd: links to open files Add WeChat powcoder

cmdline: command to run the executable

environ: environment variables

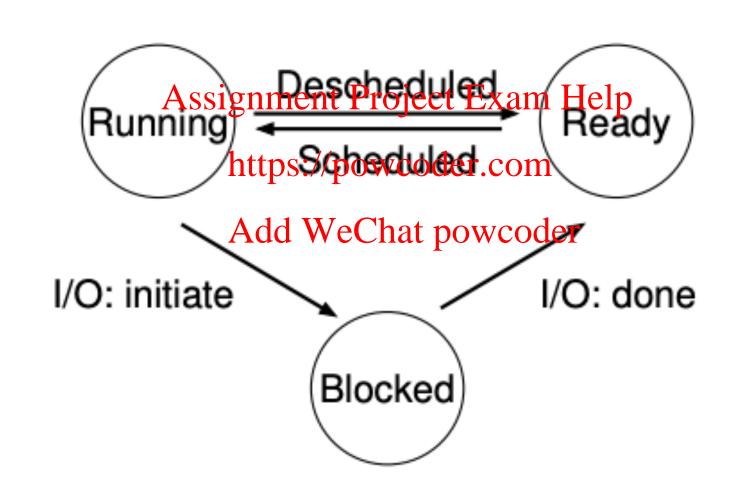
. . .

Tools like ps and htop, parse /proc

States and a volume of seconder

- Running: currently executing on CPU
- Ready: waiting to be scried ment Project Exam Help
- Blocked: suspended, not ready to the transition of the transitio
 - Why? Waiting for some execut executive or heatsposues alread from disk
 - When is it unblocked? Disk issues an interrupt when data is ready
- New: being created, yet to run
- Dead: terminated

Processastate Taransitions



Exampled Process State - CPU Only

Time	$\mathbf{Process}_0$	$\mathbf{Process}_1$	Notes
1	Running	meReadviec	t Exam Help
2	Running	Ready	
3	Runninght	tps://powcod	ler.com
4			Process ₀ now done owcoder
5	_ A	dd WeChat r	owcoder
6	_	Running	
7	_	Running	
8	_	Running	Process ₁ now done

Exampled Process State - CPU and I/O

Time	$\mathbf{Process}_0$	$\mathbf{Process}_1$	Notes
1	Running	Ready	Evam Heln
2	Running	ment Project Ready	Lxam Heip
3	Runninght	tps:R/powcod	eProcess ₀ initiates I/O
4	Blocked	Running	Process ₀ is blocked,
5	Blocked	ddr.WeChat p	owcod Process ₁ runs
6	Blocked	Running	
7	Ready	Running	I/O done
8	Ready	Running	Process ₁ now done
9	Running	_	
10	Running	_	Process ₀ now done

OS datast Wechatres coder

- OS maintains a data structure (e.g., list) of all active processes
- Information about each process is stored fix a process control block (PCB)
 - Process identifier https://powcoder.com
 - Process state
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 - Pointers to other related processes (parent)
 - CPU context of the process (saved when the process is suspended)
 - Pointers to memory locations
 - Pointers to open files

Assignment Project Exam Help Exercis@dd WeChat powcoder

• Exercise 1: Simulation of Process scheduler

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 These lecture slides are based on a slide set by Youjip Won (Hanyang University) and Mythili Vutukuru (IIT Bombay) Assignment Project Exam Help

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