

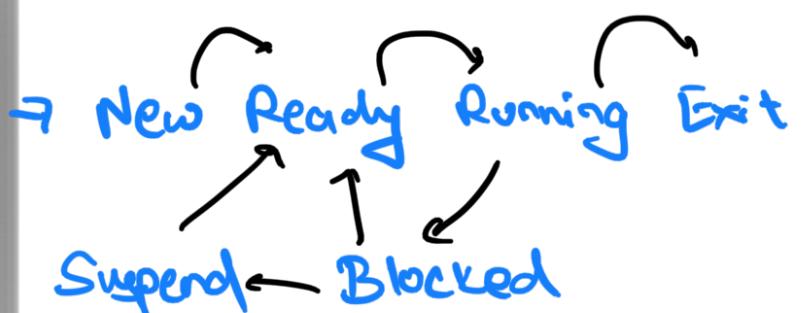
Suspended Processes

→ It may happen that processor is idle; all processes are waiting

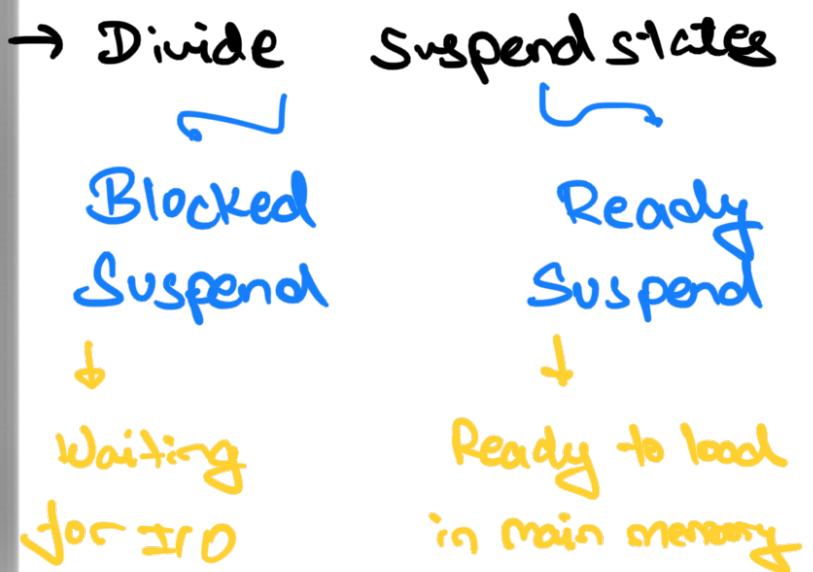
Solution

→ Swap from main to secondary memory
↳ Suspended Processes

6 State Process Model



7 State Process Model



Possible but not necessary transitions

→ Blocked Suspend to Ready Suspend: The event has occurred

- Blocked Suspend and Ready Suspend: On secondary memory
- If no free main memory: New to Ready Suspend (& not Ready)
- Can move to exit from any state (various reasons)
 - ① Less Memory
 - ② Parent Terminated
 - ③ Fatal error in 1 process; all connected are terminated

Why Block/Suspend to Blocked?

- If event is going to happen very soon or it is of high priority

Characteristics of Suspended Process

- Not available immediately
- Blocked & Suspend are independent; Blocked Suspend to Ready not

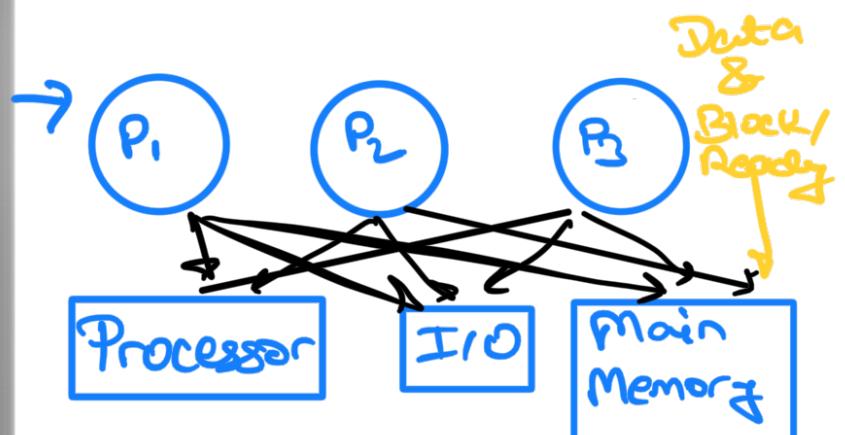
possible

- In Suspend by agent
- ↳ Accounting Example
- Not removed until explicitly ordered

Reasons to Suspend

- Swapping (Memory)
- OS Reason
- User (Debugging)
- Timing (Accounting)
- Parent

Process and Resources Relationship



- Extension of Main on Secondary \rightarrow Virtual memory

OS Control Structure

- Everything about all has to be known
- ↳ Need to be omniscient

Memory Tables

- Track main and secondary memory
- ↳ Also virtual memory
- Protection in shared memory

I/O Tables

- Availability and assignment of I/O devices
- Location in main memory used as source/destination

File Tables

- Readable? Available? Existence?
- ↳ Usually now done by file management systems
- ↳ Primitively was done by OS
- NTFS, FAT32, ext4

Process Tables

- Location & attributes

Physical Manifestation



What is it on
your system?

Stack



- * One or more LIFO
store param & call
address for proc
& system calls

Process Location



Where is it on
your system?

→ Memory, I/O & files
are defined on behalf
of processes

→ Process needs sufficient
memory to hold data
& program

→ Stack: Track of
calls & parameter
passing

→ Collection of data,
program, stack and
attributes → PCB

Process
Image

→ Depends on memory
manager

→ PCB on main, Image
on secondary memory

→ Need to be loaded

on main/virtual to
create

→ OS needs to know
everything in either

Single Block?

→ Not necessary

→ Paging system - Can
be scattered as
diff pages

↳ Logically
contiguous block
in secondary mem

↳ not necessary in
main

* **Process Attributes
of PCB**

→ Identification

↳ Own ID

↳ Parent ID

↳ User ID (whose?)

→ State Information

↳ User Visible (8-32)

↳ Control & Status

Add & subtract Counter

Arithmetic → Condition codes
Interrupt → Status Info
→ Stack Pointers
→ Stack only needs top pointer (LIFO)
→ Return & call proc and System calls

→ Control Information
↳ Control and coordinate
↳ Schedule & State
↳ Data Structs
↳ Inter Process Comm
↳ Privileges & Permissions

IPC

→ Using flags, signals, messages

Role of PCB

→ Omniscience of process
→ Not the program data
→ Need to protect PCB

Summary: Suspended processes - 6 state model - 7 state model - characteristics of suspended models - Reasons to suspend - Process resource relationship - OS knows all - Diff tables - Memory, I/O, File, Process Tables - Physical Manifestation (What) - Process Location (Where) - Process attributes - ID, State, Control-Role & protect PCB - General structure has PCB + User Stack & Main & Secondary mem