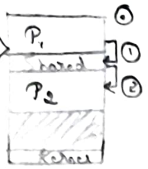
*) 

⊙ Shared Memory : * region of Memory is Shared by Communicating Process, into which the info is written & read
* useful for Sending large block of data
* System Call is used only to Create Shared Memory
* Message is Sent fast (∵ No System Calls).

__/__/____

* fork() → Create Child Process of Parent Process.
* Chown() → Change ownership
* Chmod() → Change Mode. (Read / write)
* Shmget() → to get Shared memory.

* Pipe()

*

1Q) What happens when you turn On your Computer?

* Bootprocess → Turning 'ON' Computer.

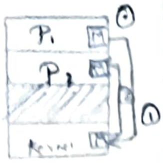
Ans →

i) Power ON (PC ON).
↓
Power Supply to Motherboard, Hardware, Storage. (Harddisk),

ii) CPU initializes itself and looks for firmware Programs (BIOS). Stored in BIOS Chip [Basic input-Output System Chip is a (Non-volatile) ROM Chip found on Motherboard that allows to access & Setup Computer System at most basic level].
↓
"In Modern Computer, CPU Loads UEFI [unified Extensible firmware interface].
(updated BIOS)
↓
"It is a firmware Specification for a Software Program that Connects a Computer's firmware to its OS".

iii) CPU runs the BIOS which tests & initialize System hardware (RAM + ROM). BIOS loads Configuration Settings. from (memory area) → Backed by CMOS battery
↓
* If Something is not appropriate (Missing RAM) → error is thrown and boot Process is Stopped.
↓
" This is Called POST {Power On Self Test} Process.

⊙ UEFI → Can do lot more than initialize hardware; its really a tiny O.S. for Ex→ Intel CPUs have 'Intel Management Engine'.
↓
It Provides Variety of features.



Message Passing : * Message Exchange is done among the Processes by using objects.

* useful for Sending Small data
* System Call is used during every read & write operation —/—/—
* Message is Communicated Slowly

iv) BIOS will handoff responsibility for booting your PC to your OS's bootloader.

↓

Boot device
↓
<disk (SSD)/CD/USB>

* BIOS looked at the MBR (Master Boot Record), a Special boot Sector at the beginning (0th index) of a disk. The MBR Contains Code that loads the rest of the O.S known as a "bootloader".

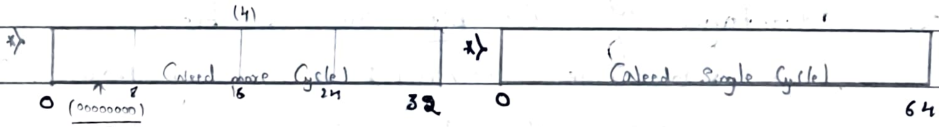
↓

" BIOS Executes the bootloader → which take it from there and begins booting the actual O.S (Windows, Linux or mac).

v) Bootloader (BL) → Small Program that has large task of booting the rest of O.S { Both kernel & user Space }.

- ⊙ Windows → BL → Boot Manager (Bootmgr.Exe)
- ⊙ Linux → BL → GRUB (GNU Grand Unified Bootloader)
- ⊙ MacOS → BL → Boot.efi

2) 32 bit V/S 64 bit O.S :-

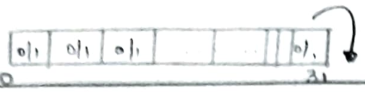


* 32 bit O.S has 32 bit registers and it Can Access 2^{32} unique memory address → 4 GB of Physical memory
* 64 bit O.S has 64 bit registers and it Can access 2^{64} unique memory address.

→ 32 bit

i) Registers → 32 bit register, meaning each register Can Store a value that is 32 bits long (4 byte).

{1 byte = 8 bits}



ii) Address Memory : O.S uses this memory address.
O.S (It) Can access 2^{32} unique memory (Register to store the) address.

iii) Memory Size : 2^{32} address = 4,294,967,296 address. each address Points to 1 byte of memory. ∴ It Can access a Max of 4GB of memory.

→ 64 bit OS :-

i) Register :- has 64-bit registers & Can hold a Value that is 64 bits long (8 byte)

ii) Address Memory :- Manipulate 2^{64} unique memory address

iii) 2^{64} = 18,446,744,073,709,551,616 memory address. each address Points to 1 byte of memory. (18 Exabytes of memory) [17.18 billion GB].

32 ↓ "Process 32 bit of data and Information"

64 ↓ "Process 64 bit of data and Information"

→ Advantages of 64-bit over 32-bit :.

i) Adressable memory : 2^{32} memory address / 2^{64} M.A.

ii) Resource usage : installing more RAM on 32-bit → No impact But Same on 64-bit → has a differce in Performance

iii) Performance : having large register (where all math Calculation occurs) allow to Perform large Calculation at the Same time (in 1 instruction Cycle)

iv) Compatibity :- 64 Can run both 64 & 32 but 32 Can run only 32.

v) Better Graphics Performance.

○ 32-bit Processor Execute 4 bytes of data in 1 Cycle, while 64-bit Processor Execute 8 bytes of data in 1 instruction Cycle.

__/__/____

3Q) What are the different Memory Present in Computer System?

(CPU) → (Store digital bit 0's & 1's) {data / Instruction}.

- Register
- Cache
- Main Memory

} → (Very Close to CPU) 1° Memory

- Electronic Disk
- Magnetic Disk
- Optical Disk
- Magnetic Tapes

} 2° Memory.

○ Register →

* Smallest unit of Storage (Part of CPU itself).
* A register may hold a instruction, Storage address, or any other data (bit Sequence / individual Characters).
* Registers are a type of Computer memory used to quickly accept, Store & transfer data and instructions that are being used immediatly by CPU.

○ Cache →

* Additional Memory System that temporarily Stores frequenty used instructions and data for quicker Processing by CPU.

○ Main Memory →

* RAM → Random Access memory → volatile (temporary)

○ 2° Memory →

* Storage media where Computer Can store data & Programs.

→ **Comparision :**

i) **Cost :**

- i) 1° Storage is Costly (filled with Transistors).
- ii) Registers are most Expensive due to Expensive Semiconductor & labour.
- iii) 2° is Cheaper than 1°.

ii) **Access Speed :**

- i) 1° has highest access Speed than 2° Memory
- ii) register has highest access Speed > Cache > main memory

iii) **Storage Size :**

- i) 2° has more Space.

iv) **Volatility :**

(Saved data).

- i) 1° → volatile (data flushed)
- ii) 2° → Non-volatile. (data not flushed out)