Characteristics/Feature of Operating System

- User Friendly
- Multitasking
- Multi-user Support
- Fast and Efficient
- Reliable

- Secure
- Portability
- Automatic Resource allocation
- Error Handling Capability

The Features of Operating Systems

An operating system is a **software** that manages a computer system. The operating system is loaded when a computer starts. One of its primary functions is to **manage resources**.

Providing user interface

- Allows copying/ deleting/ moving/ sorting/ searching of file or folders.
- Allows access to system settings such as hardware.
- Provides a Command Line Interface (CLI).
- Allows users to have more than one window open.
- Provides a Graphical User Interface (GUI) (windows, icons, menus, pointers).
- Provides user with error/help messages.
- Allows customisation of interface, e.g. change desktop background/ layout.
- Allows user to switch between tasks (programs/ windows).

Spooling

- Data is stored on a hard disk/ in memory/ stored in a queue.
- Document is printed when printer is free/ in correct order.
- Benefit of spooling – user can carry on working/log off when waiting for job to print.

Managing RAM

- Ensures that programs/data do not corrupt each other.
- Ensures that all programs and data, including itself, are stored in correct memory locations.

Managing processes

- Ensures that different processes can utilise the CPU and do not interfere with each other or crash.
- Ensures that all tasks appear to run simultaneously on a multi-tasking operating system.

Disk defragmentation

- Files are stored on computer systems that can, over time, become fragmented. This means they are split and stored on different parts of the disk.
- Defragmentation is the process where files are physically re-arranged on a disk so the parts of each file are stored together.

Managing security

- Allows creation and deletion of user accounts.
- Allows users to log on and change passwords.

File compression

- Compression is the process of making a file size smaller.
- This may be advantageous as it allows more data to be stored on the disk, and files may also be transferred more quickly.
- The disadvantage of this is that it slows down the process of reading and writing to disk.

Managing backing store

- Ensures data is stored and can be retrieved correctly from any disk drive.
- Creates and maintains filing system.
- Organises files in a hierarchical directory structure.

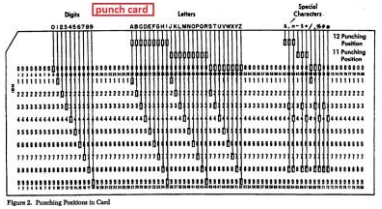
Types of Operating System (OS)

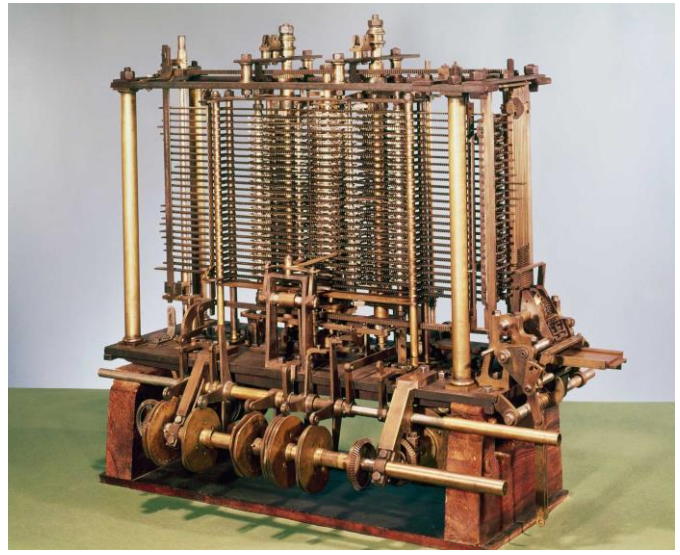
1. Batch OS
2. Multi-Programming OS
3. Multi-Tasking OS / Time Sharing OS
4. Real Time OS – (i) Hard (ii) Soft)
5. Distributed OS
6. Embedded OS
7. Network OS
8. Multi proessing OS

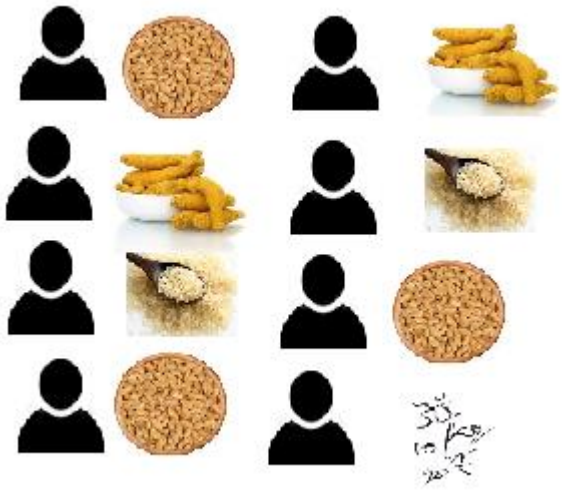
1. Batch Operating System

1st Gen
1940 - 1956

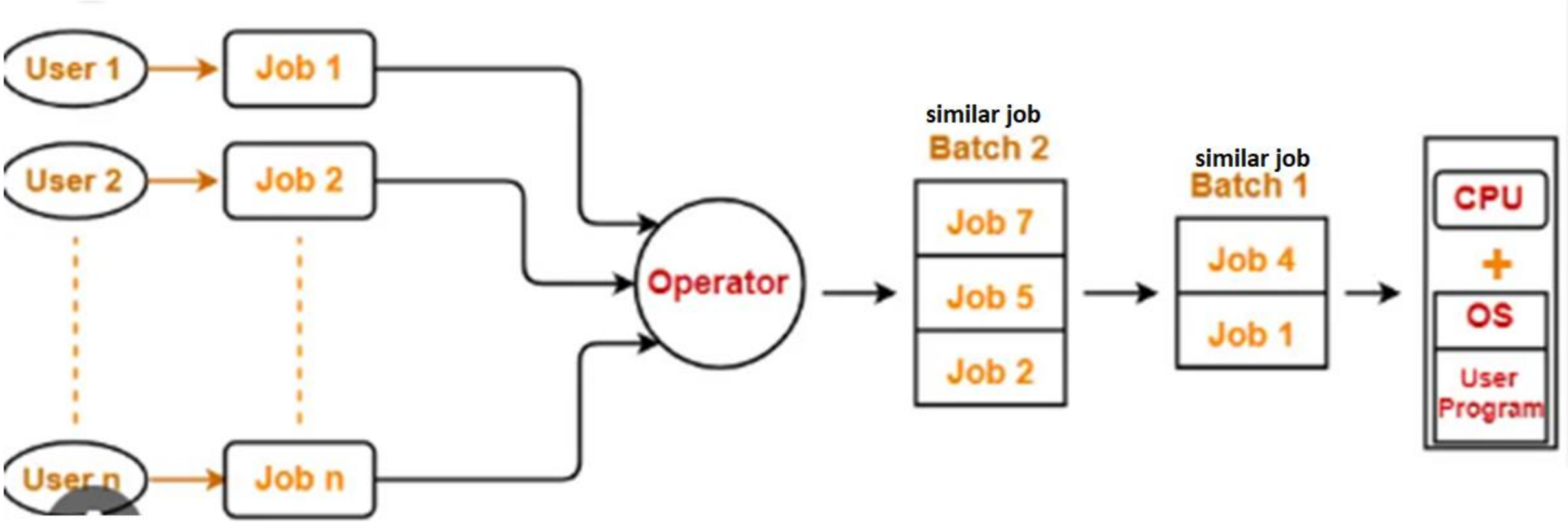
$$\frac{a \times a + a}{a} = 10, \; a = ?$$







1. Batch Operating System



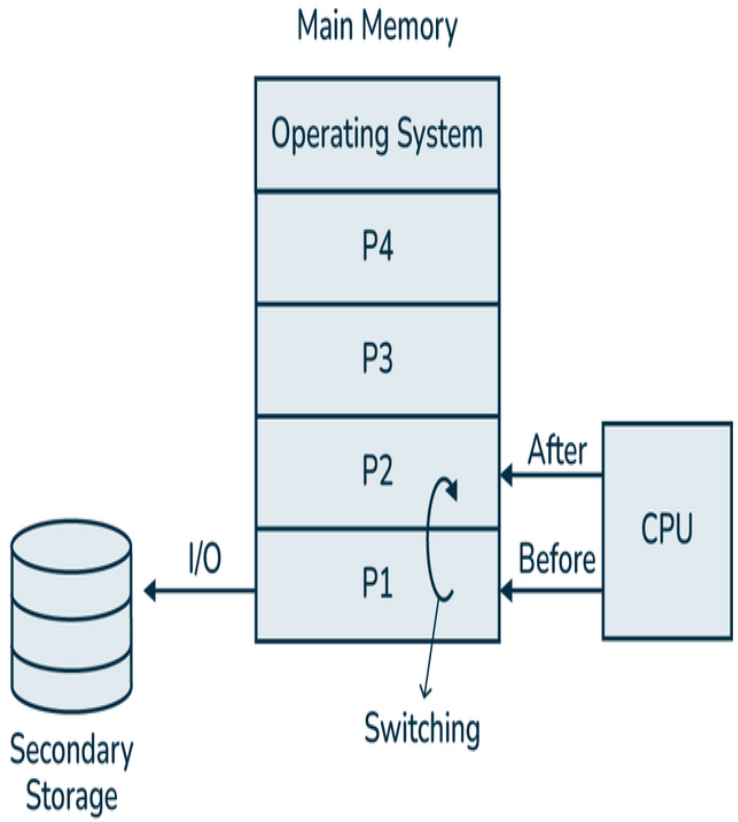
Real-life Example

- Salaries Calculate process in bank/company
- Result public

2. Multiprogramming Operating System

2. Multiprogramming Operating System

Application Software



Real-life Example

- Unix, Windows Server, Linux, IBM OS/360

3. Multitasking Operating System
Timesharing OS

Real-life Example

- Windows 11/10/7, Mac OS, Linux (Ubuntu, Fedora), Android, IOS

4. Real Time Operating System

Real-time systems are used when there are time requirements that are very strict like missile systems, air traffic control systems, robots, etc

Two Types

i. Hard Real time OS

ii.Soft Real time OS

Real-life Example

- Airplane Control Systems
- Medical devices
- Industrial Robots
- Traffic light Control system
- Automobile system
- Missile/spacecraft guidance


304°
AIRSPEED
ENGINE #1
ENGINE #2
FUEL
AOA
FLAPS
TRIM
ALTITUDE
VS
92%
92%
50%
0°
9°
0%
29.92 IN
TAS 54KT
M. 0.08
+ 1.0


Controls
Settings
LIGHTS
21.5
21.0

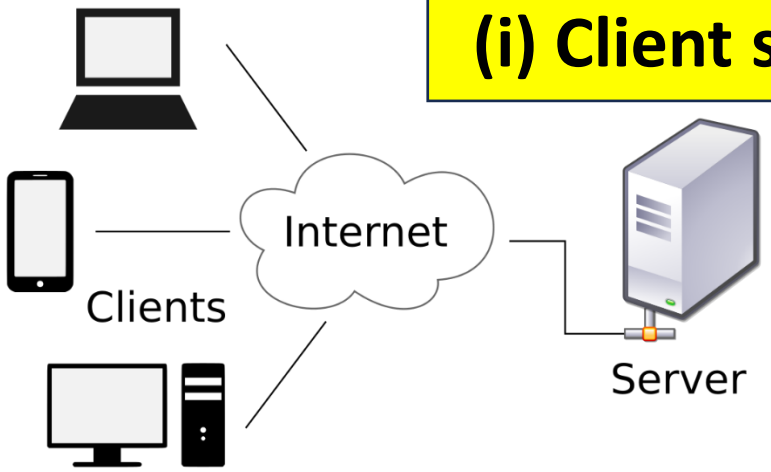
5. Distributed Operating System

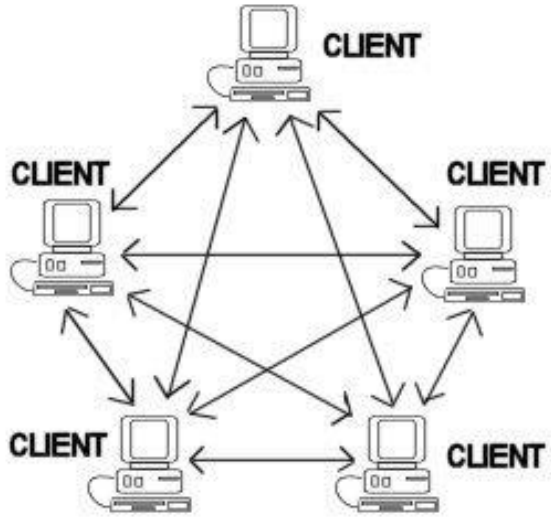
Distributed OS manage multiple networked computer and presents them as a single system to the user.

(ऐसा OS जो कई independent computer(node) आपस में network से जुड़े होते हैं, और user को एक ही कंप्यूटर जैसा अनुभव होता हैं)

Distributed OS – 2 types

(i) Client server base (ii) Peer to Peer





Google

Search Google or type a URL

Client server Example

- Vacancy form fill (SSC, UPSC, railway,….)
- Railway ticket booking
- Online banking
- Aadhar
- College admission
- Online shoping
- Online result
- Youtube/Netflix/facebook/,…

Peer to Peer

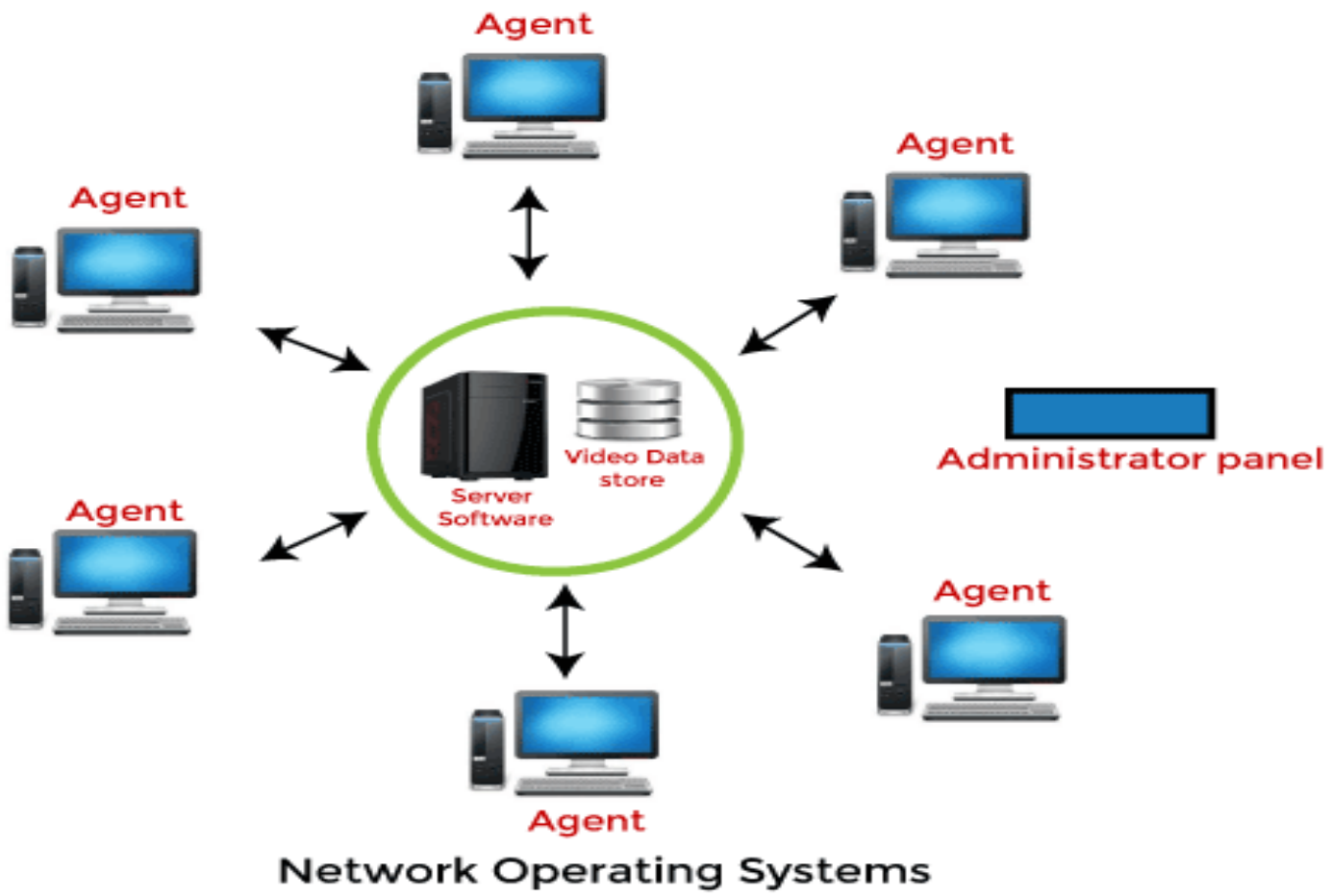
- Bluetooh file sharing
- File sharing in LAN


Ascenty
data centers


IRCTC


FREE FIRE
PLAYERUNKNOWN'S
BATTLEGROUNDS
CARROM
Pool

6.Network Operating System



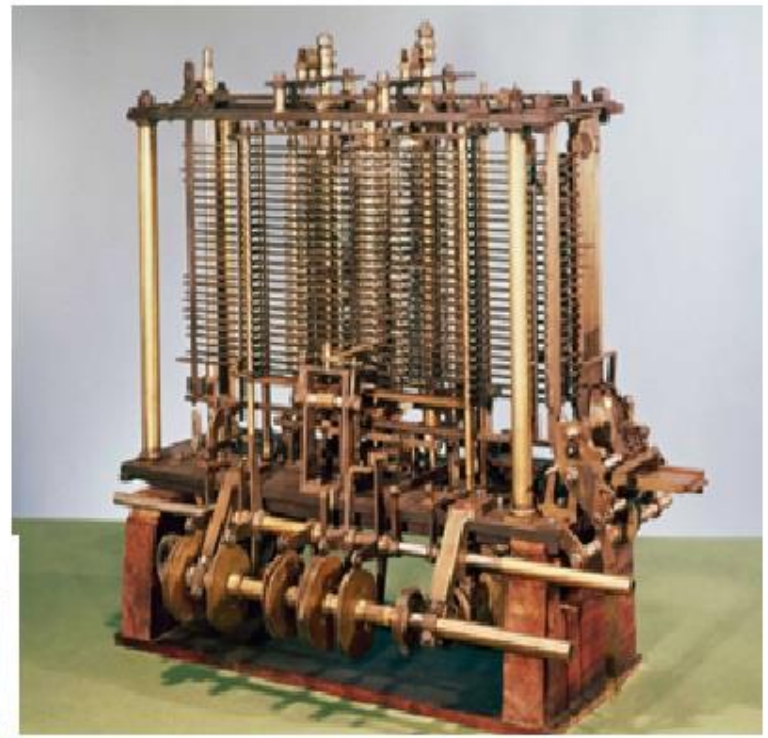
Real-life Example

- ❖ Linux server
- ❖ Windows Server

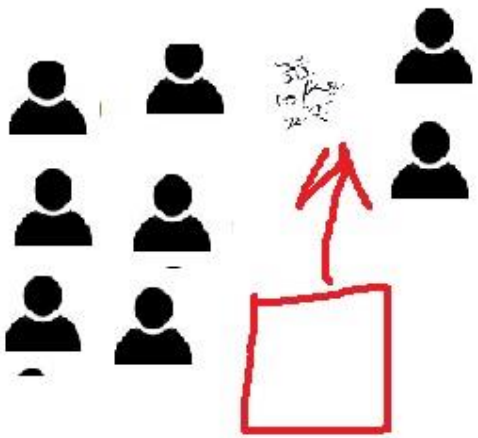
7.Embedded Operating System

$$\frac{a \times a + a}{a} = 10,\ a = ?$$

batch 3

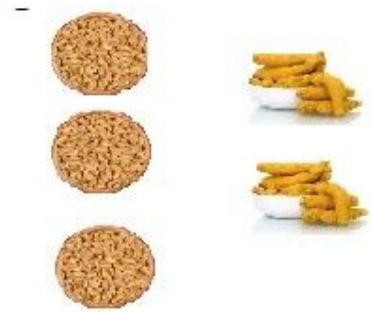


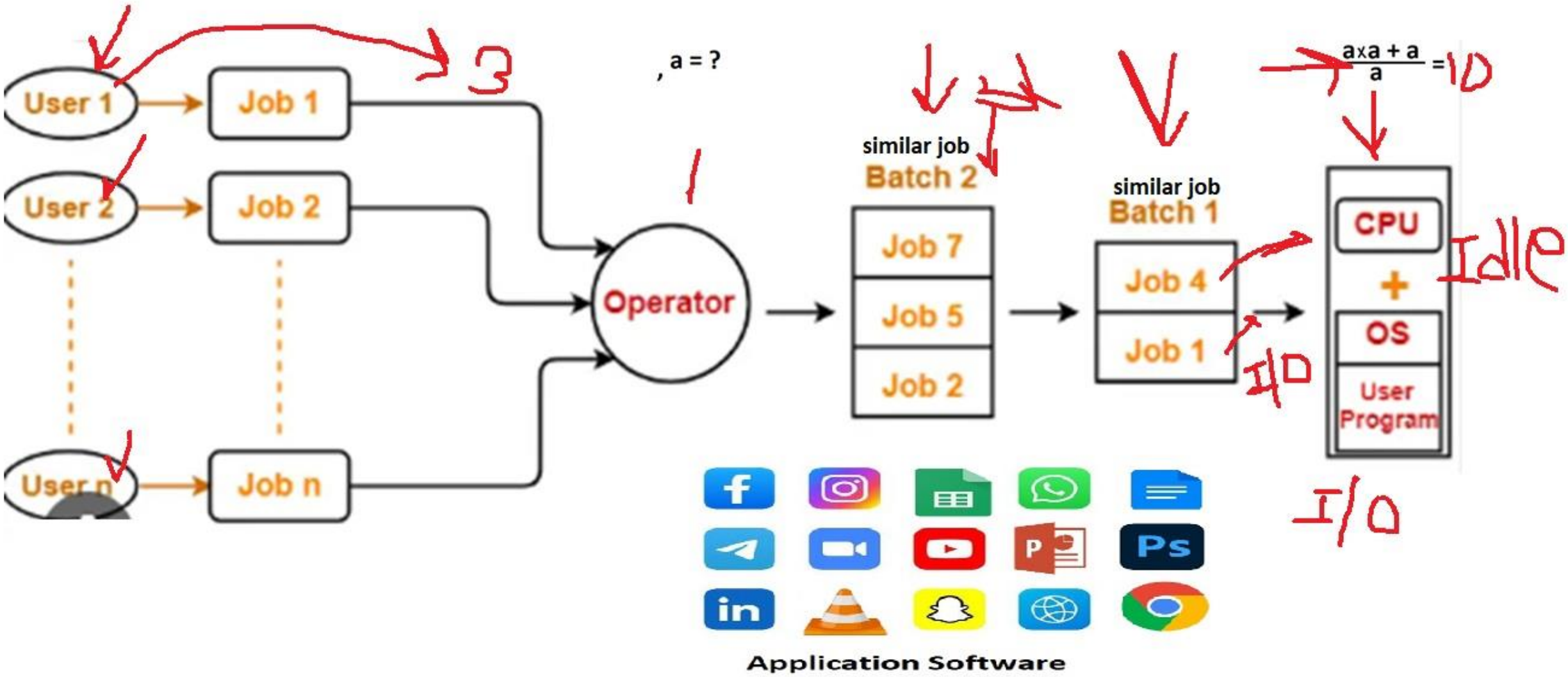
similar type job



batch1

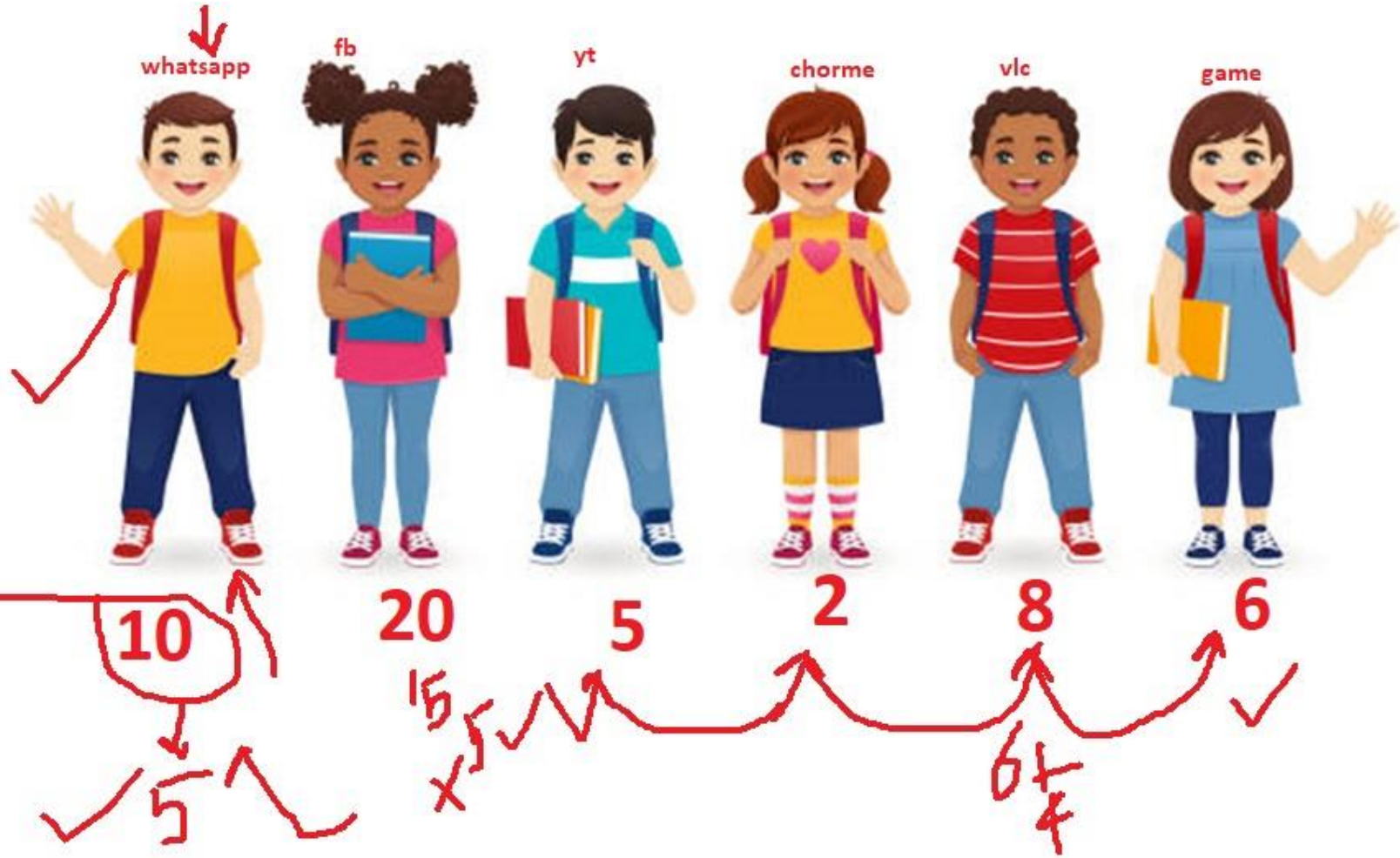
batch2



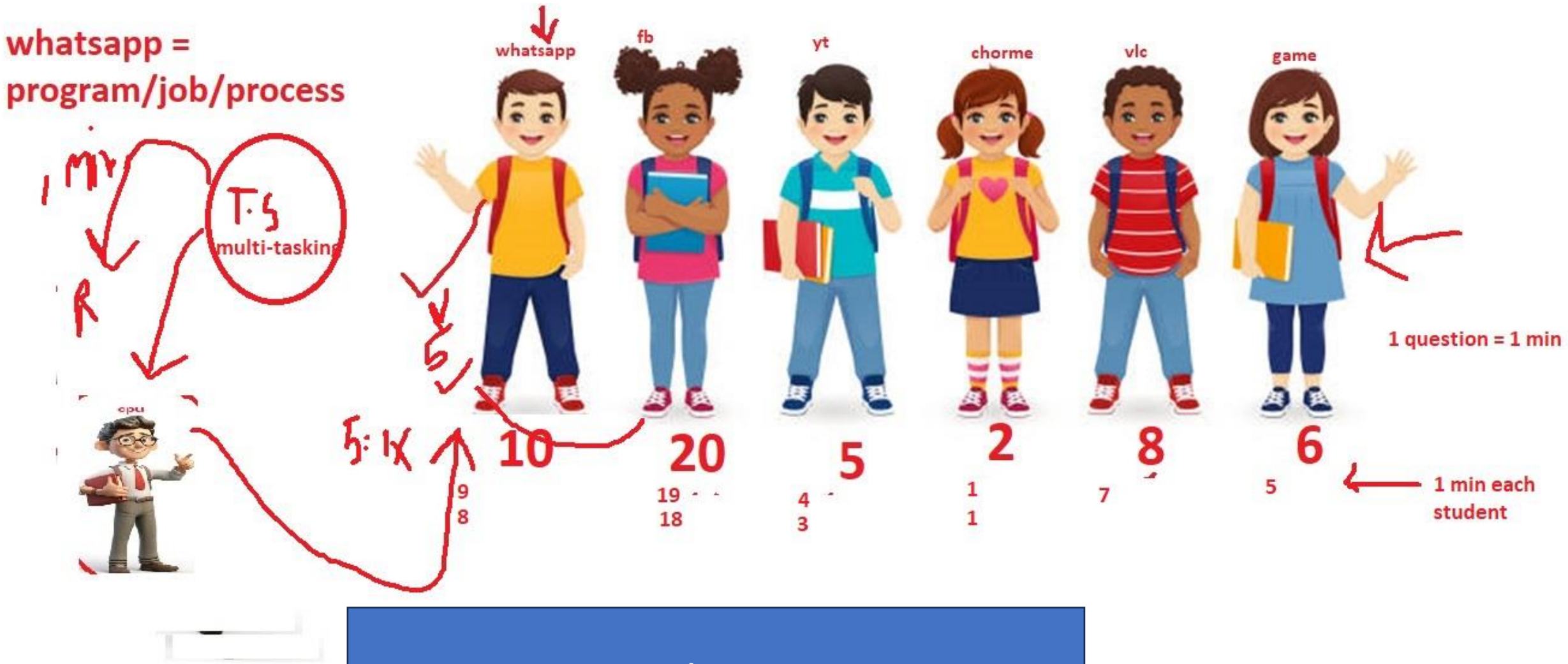

User 1
User 2
User n
Job 1
Job 2
Job n
Operator
, a = ?
similar job
Batch 2
Job 7
Job 5
Job 2
similar job
Batch 1
Job 4
Job 1
CPU
+
OS
User Program
Idle
I/O
I/O
Application Software

whatsapp =
program/job/process

multipro-
gramming



Multi -programming OS



Multi-tasking / Time sharing OS

Multiprocess OS