University of Southeastern Philippines
Institute of Computing

NETWORK MANAGEMENT

The SNMP Protocol
Network Management Software

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THE SNMP PROTOCOL

Network Management

A major role of a system administrator or a network engineer is to collect and gather accurate information from within a network infrastructure.

There are a number of tools and options for gathering and processing this information and most of them are built upon the **Simple Network Management Protocol (SNMP)**.

Network Management

SNMP is a protocol within the application layer of the networking stack (TCP/IP).

The protocol was created to gather information from different systems in a consistent manner. Through such protocol, hosts can share information about their current state (real-time information). This protocol can also channel through which an administrator can modify pre-defined values.

Network Management

Through SNMP, the method of querying information and the paths to the relevant information are standardized.

Network Management

Some Networking Utility Commands every IT should know:

1. **ping**
2. **nslookup**
3. **ipconfig**
4. **netstat**
5. **nbtstat**
6. **arp**
7. **tracert**

Network Management

The SNMP Components:

1. **SNMP Agent**
2. **SNMP Manager**
3. **Management Information Base (MIB)**

Network Management

In general, a network being profiled with SNMP will main consist of devices containing **SNMP agents**.

An agent is a program that can gather information about a piece of hardware, organize it into predefined entries, and respond to queries using the SNMP protocol.

The component that queries agents for information is called an **SNMP manager**. These machines generally have data about all of the SNMP-enabled devices in their network and can issue requests to gather information and set certain properties.

Network Management

An **SNMP manager** is a computer that is configured to poll SNMP agent for information.

The manager can be any machine that can send query requests to SNMP agents with the correct credentials.

Almost all of the commands defined by SNMP are designed to be sent by a manager component.

GetRequest, GetNextRequest, GetBulkRequest, SetRequest, InformRequest, Response

Network Management

An **SNMP manager** is also designed to respond to **trap** and **response** messages.

Network Management

An **SNMP agent** is responsible for gathering information about the local system and storing them in a format that can be queried, updating a database called **Management Information Base (MIB)**.

The MIB is hierarchical, pre-defined structure that stores information that can be queried or set. This is available to well-informed SNMP requests originating from a host that has authenticated with the correct credentials (an SNMP manager).

Network Management

SNMP agents **respond** to most commands defined by the protocol.

GetRequest, GetBulkRequest, SetRequest, InformRequest

An agent is also designed to send **trap** messages.

Network Management

Management Information Base (MIB)

The MIB is a database that follows a standard that the manager and agents adhere to.

The MIB structure is best understood as a top-down hierarchical tree. Each branch that forks off is labeled with both identifying number (starting with 1) and an identifying string that are unique for that level of hierarchy.

THE SNMP PROTOCOL COMMANDS

Get

A Get message is sent by a manager to an agent to request the value of a specific OID.

This request is answered with a Response message that is sent back to the manager with the data.

GetNext

A GetNext message allows a manager to request the next sequential object in the MIB.

This is a way that you can traverse the structure of the MIB without worrying about what OIDs to query.

Set

A Set message is sent by the manager to an agent in order to change the value held by a variable on the agent.

This can be used to control configuration information or otherwise modify the state of remote hosts.

This is the only write operation defined by the protocol.

GetBulk

This manager to agent request function as if multiple GetNext requests are made.

The reply back to the manager will contain as much data as possible (within the constraints set by the request) as the packet allows.

Response

This message, send by an agent, is used to send any requested information back to the manager. It serves as both a transport for the data requested, as well as an acknowledgement of receipt of request.

If the requested data cannot be returned, the response contains error fields that can be sent with further information. A response message must be returned for any of the above requests, as wee as Inform messages.

Trap

A Trap message is generally sent by an agent to a manager. Traps are synchronous notifications in that they are unsolicited by the manager receiving them.

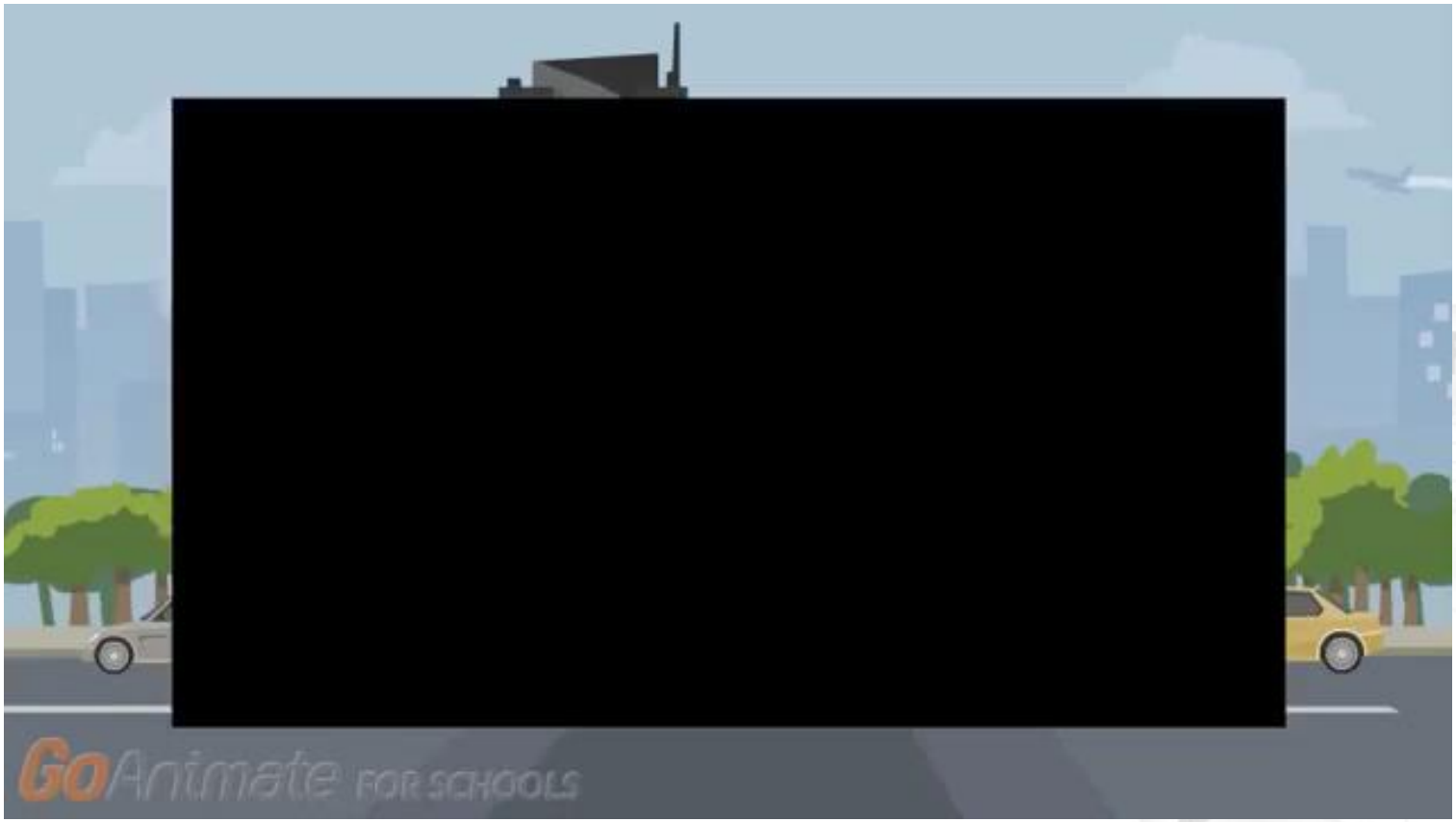
They are mainly used by agents to inform managers of events that are happening on their managed devices.

Inform

To conform to the received Trap message, a manager sends an Inform message back to the agent.

If the agent does not receive this message, it may continue to resend the trap message.

Network Management



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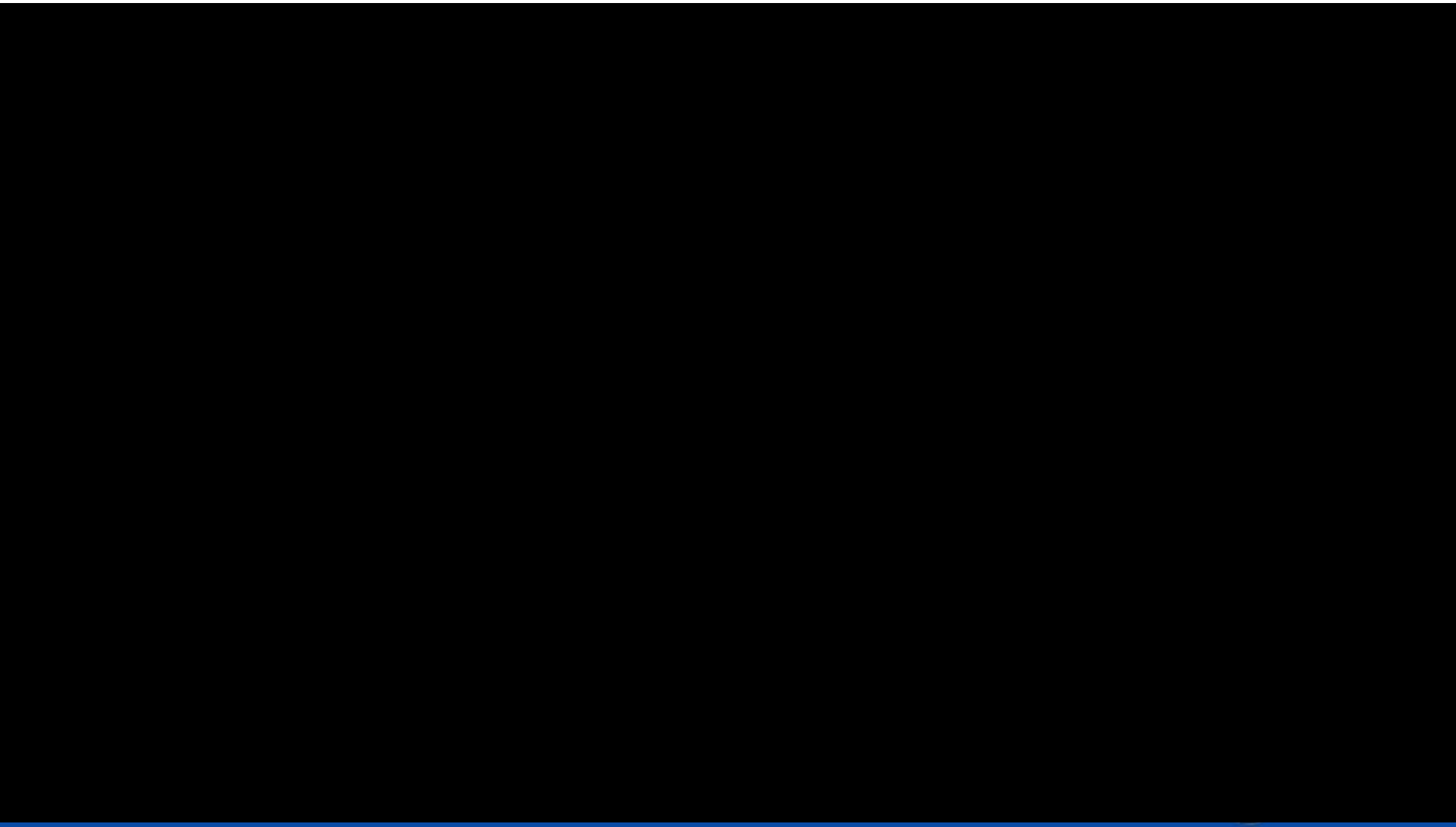

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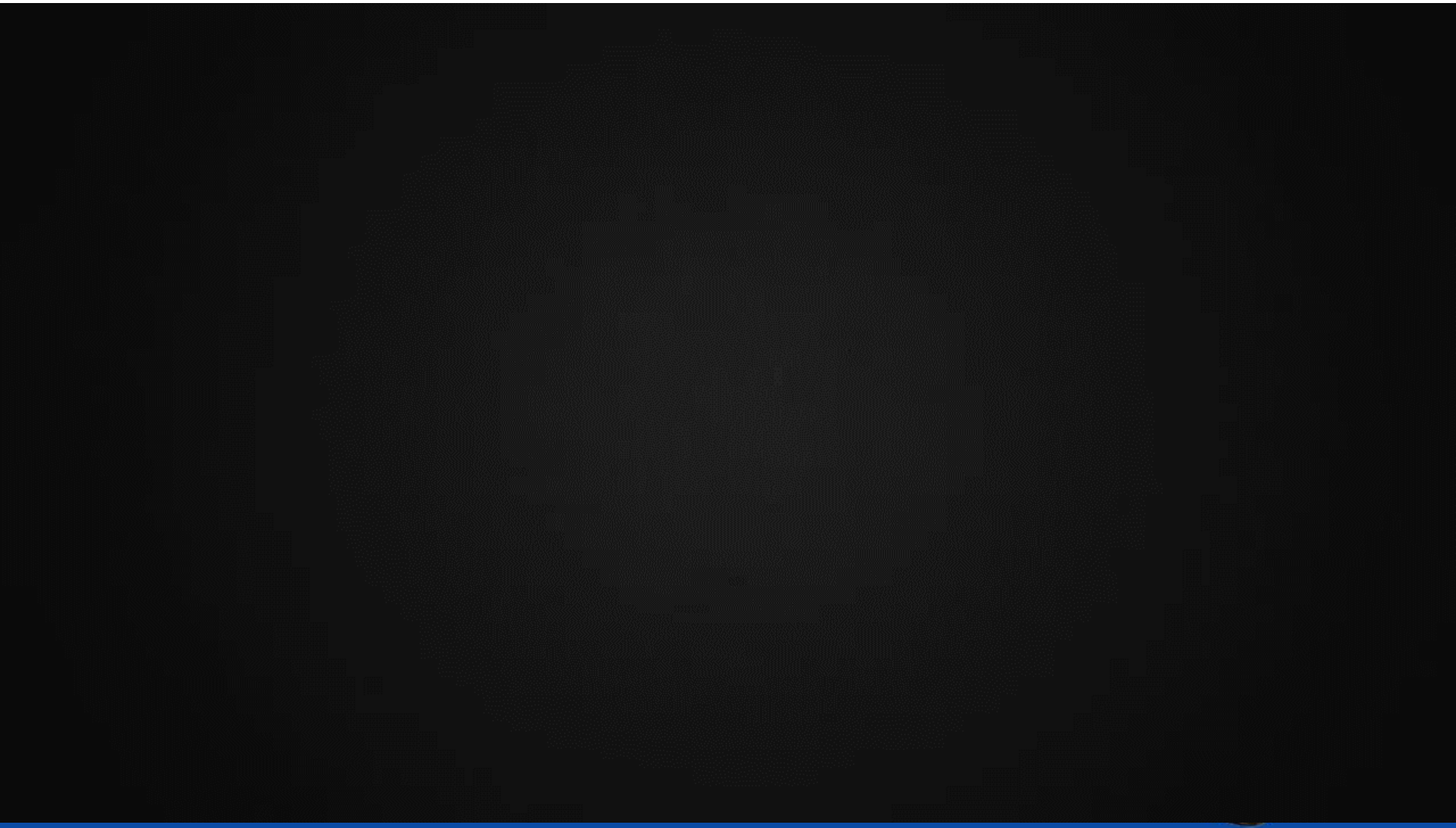
Network Management



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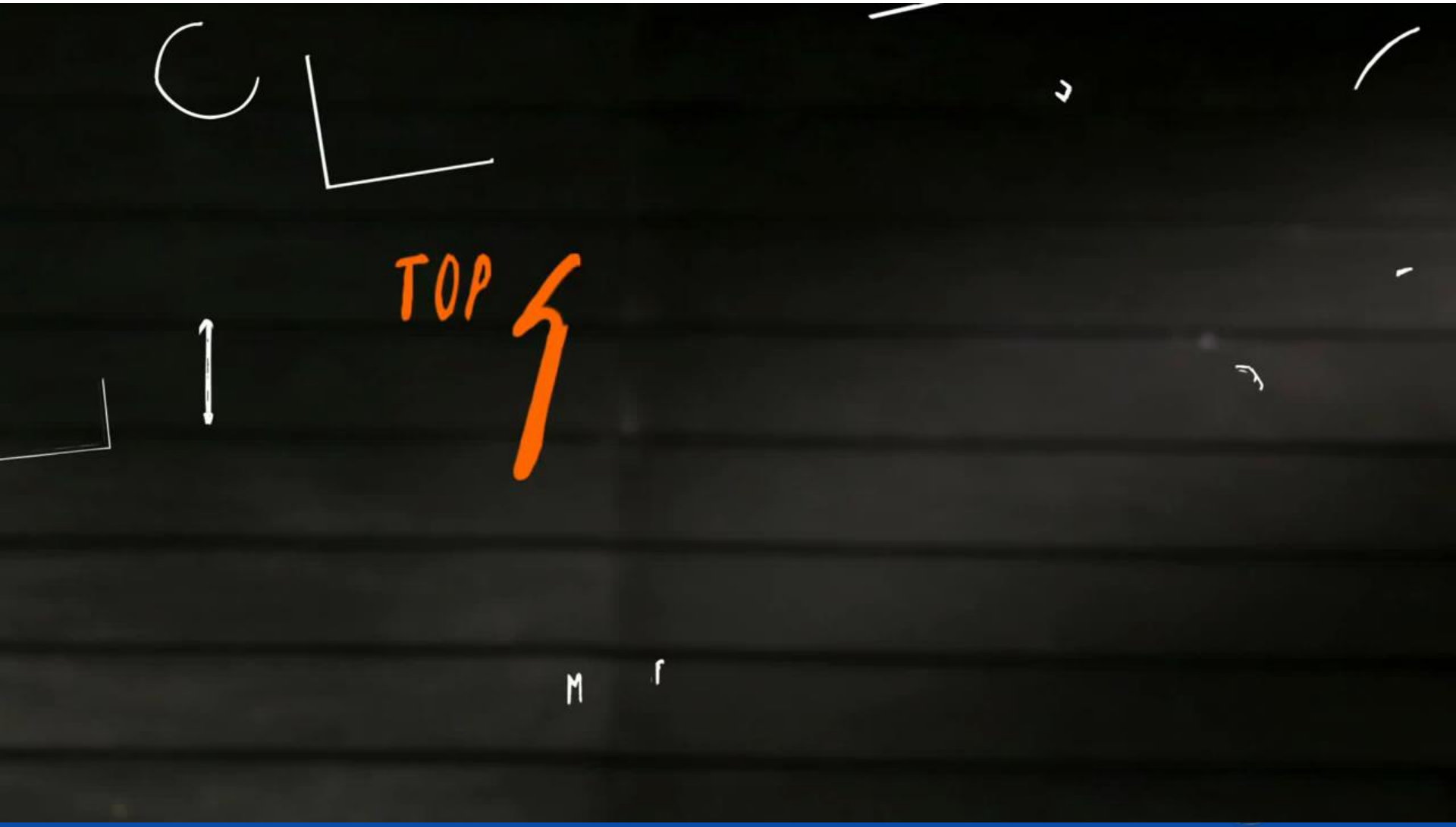


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