



School: Campus:

Academic Year: Subject Name: Subject Code:

Semester: Program: Branch: Specialization:

Date:

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiment : SHA-256 in Action – Cryptographic Hashing

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

- Enter any desired text or message in the input box.
- The tool automatically generates the corresponding SHA-256 hash.
- View the resulting 256-bit (64-character) hexadecimal hash output.
- Slightly modify the input and observe the drastic change in the hash (avalanche effect).
- Recognize that the hash is unique to the input and cannot be reversed.

* Software used

1. Web Browser – Brave
2. Online Tool – SHA-256 Hash Generator : <https://emn178.github.io/online-tools/sha256.html>

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* Implementation Phase: Final Output (no error)

- **Input Data:** Type or paste your string into the **Input** box.
- **Configure Settings:**
 - **Input Encoding:** Keep it as **UTF-8** unless you know your data is in a different format.
 - **Output Encoding:** Select **Hex (Lower Case)** or **Hex (Upper Case)**.
- **View Output:** The **SHA256 hash** will appear automatically in the **Output** box.

The screenshot shows two separate instances of the SHA256 online tool. Both instances have the following settings:

- Input:** item
- Output Encoding:** Hex (Lower Case)
- Input Encoding:** UTF-8
- Settings:** Hash, Auto Update, Remember Input
- Output:** The output hash is displayed in both instances.

The top instance's output is: 5055f1a0cff34bdc74c1f554a596bde12aef01a224ac5f30cf6ccaa1de870

The bottom instance's output is: 06B1328C72112B1123FD3B0062711E7D58F7EA91567424427A908E104E92A457

* Implementation Phase: Final Output (no error)

The image displays two side-by-side screenshots of a web-based SHA256 hashing tool. Both screenshots show the same interface with identical input and settings.

Top Screenshot:

- Input:** The input field contains the string "HGGG".
- Settings:**
 - Hash tab is selected.
 - Auto Update: On
 - Remember Input: On
 - Input Encoding: UTF-8
 - Output Encoding: Hex (Upper Case)
 - Enable HMAC: On
 - HMAC Encoding: UTF-8
 - Key: (empty)
- Output:** The output field shows the hex digest: 2DE394F1C00AD442245E7E52A9006654A9A9AC3C93C37C8C9B1B4E212442E477

Bottom Screenshot:

- Input:** The input field contains the string "HGGG".
- Settings:**
 - Hash tab is selected.
 - Auto Update: On
 - Remember Input: On
 - Input Encoding: UTF-8
 - Output Encoding: Hex (Upper Case)
 - Enable HMAC: On
 - HMAC Encoding: UTF-8
 - Key: (empty)
- Output:** The output field shows the hex digest: 2DE394F1C00AD442245E7E52A9006654A9A9AC3C93C37C8C9B1B4E212442E477

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***Observations:**

- Each input consistently produced a unique, fixed-length SHA-256 hash.
- Minor input changes caused significant differences in the hash (avalanche effect).
- The tool supports various input/output encodings and allows HMAC for additional security.

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	50		

Signature of the Student:***Name :******Signature of the Faculty:******Regn. No. :********