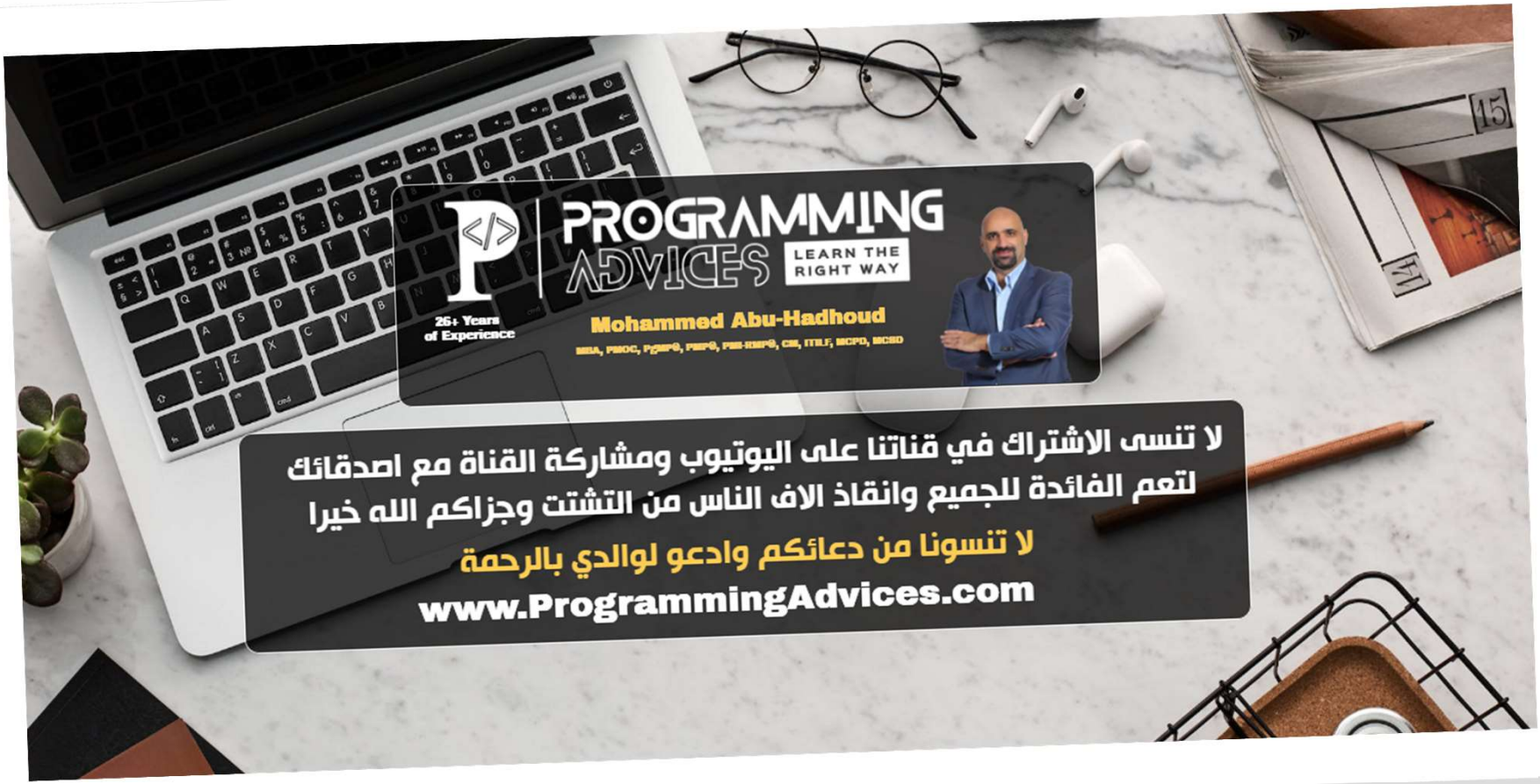
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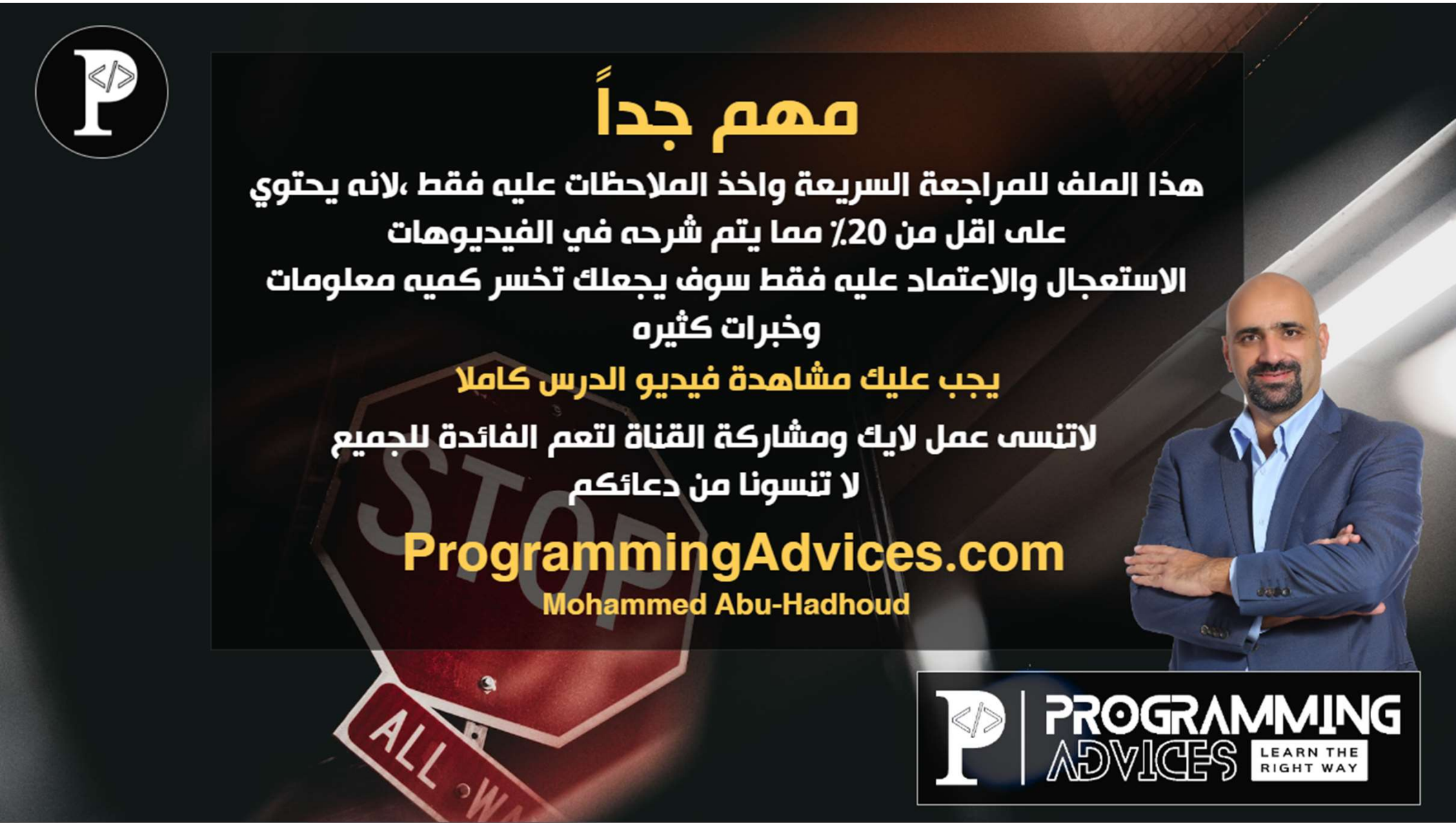
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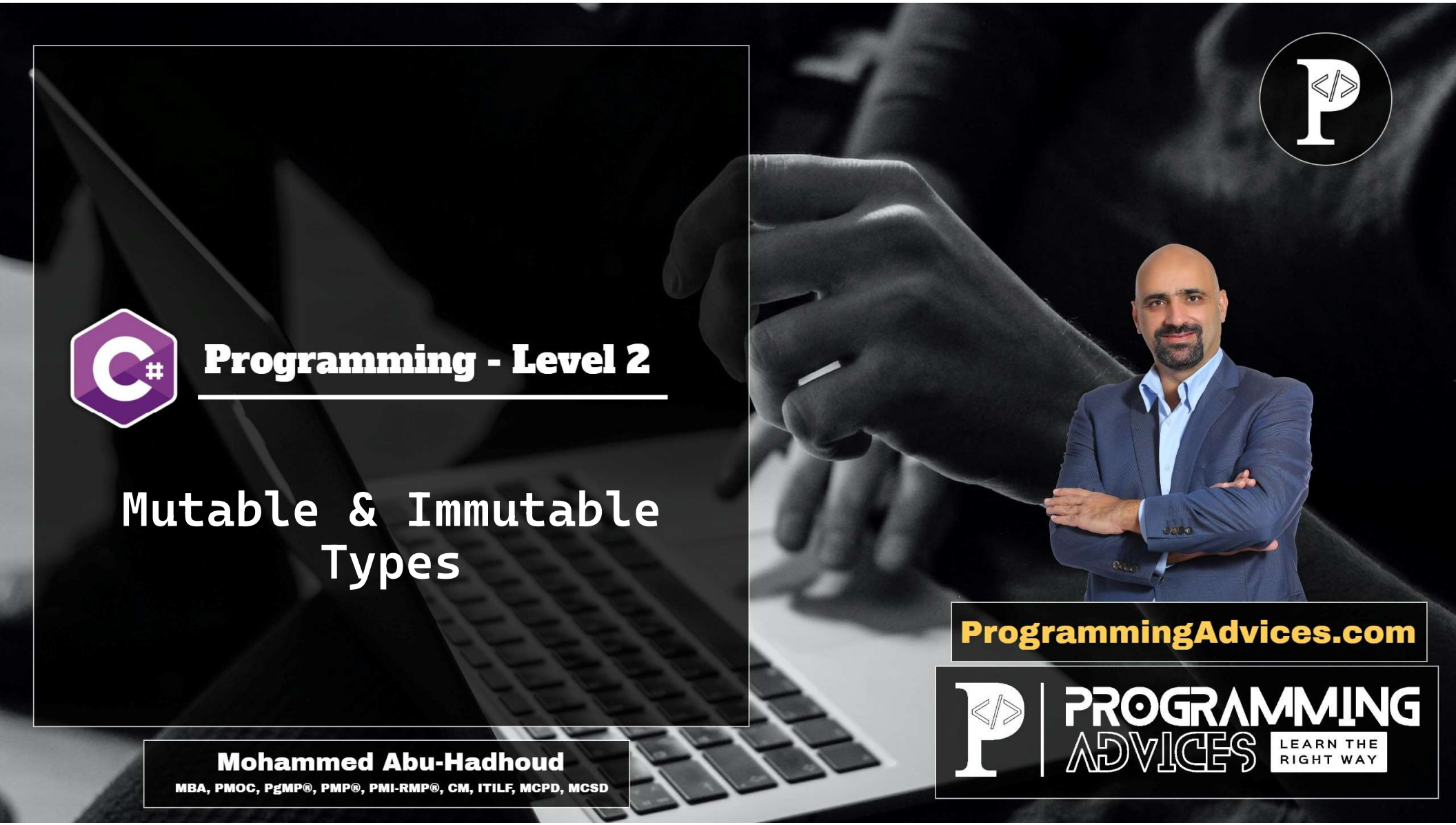
Programming - Level 2
Mutable & Immutable Types
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Mutable and Immutable Types

- In C#, types are classified as either mutable or immutable based on whether their instances can be modified after they are created.

- Understanding the difference between mutable and immutable types is crucial for designing robust and maintainable code.

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Mutable Types:

- Mutable types are types whose instances can be modified after they are created.
  - Characteristics: Properties or fields of a mutable type can be changed.
  - Changes to an instance affect the state of that instance.
  - Examples include classes, arrays, and custom objects where properties can be modified.

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Immutable Types:

- Immutable types are types whose instances cannot be modified after they are created.
  - Characteristics: Properties or fields of an immutable type cannot be changed after the instance is created.
  - Any operation that appears to modify the instance actually returns a new instance with the desired changes.
  - Examples include strings, tuples, and some built-in value types.
  - Another Example a Person Class that has everything as ready only.

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Pros and Cons:

Mutable Types:

- Pros:
  - More flexible for certain scenarios.
  - Can be more memory-efficient if state changes frequently.
- Cons:
  - Prone to unintended side effects.
  - May require additional effort to maintain consistency.

Immutable Types:

- Pros:
  - Safer and less error-prone since instances cannot be modified.
  - Easier to reason about and maintain.
- Cons:
  - Creating a new instance for each modification
  - Can be less memory-efficient for certain scenarios.

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Guidelines:

- Favor Immutability: Whenever possible, prefer using immutable types to reduce bugs related to unintended state changes.

- Use Mutability When Necessary: There are scenarios where mutability is more appropriate, such as when frequent state changes are expected or when performance is a critical concern.

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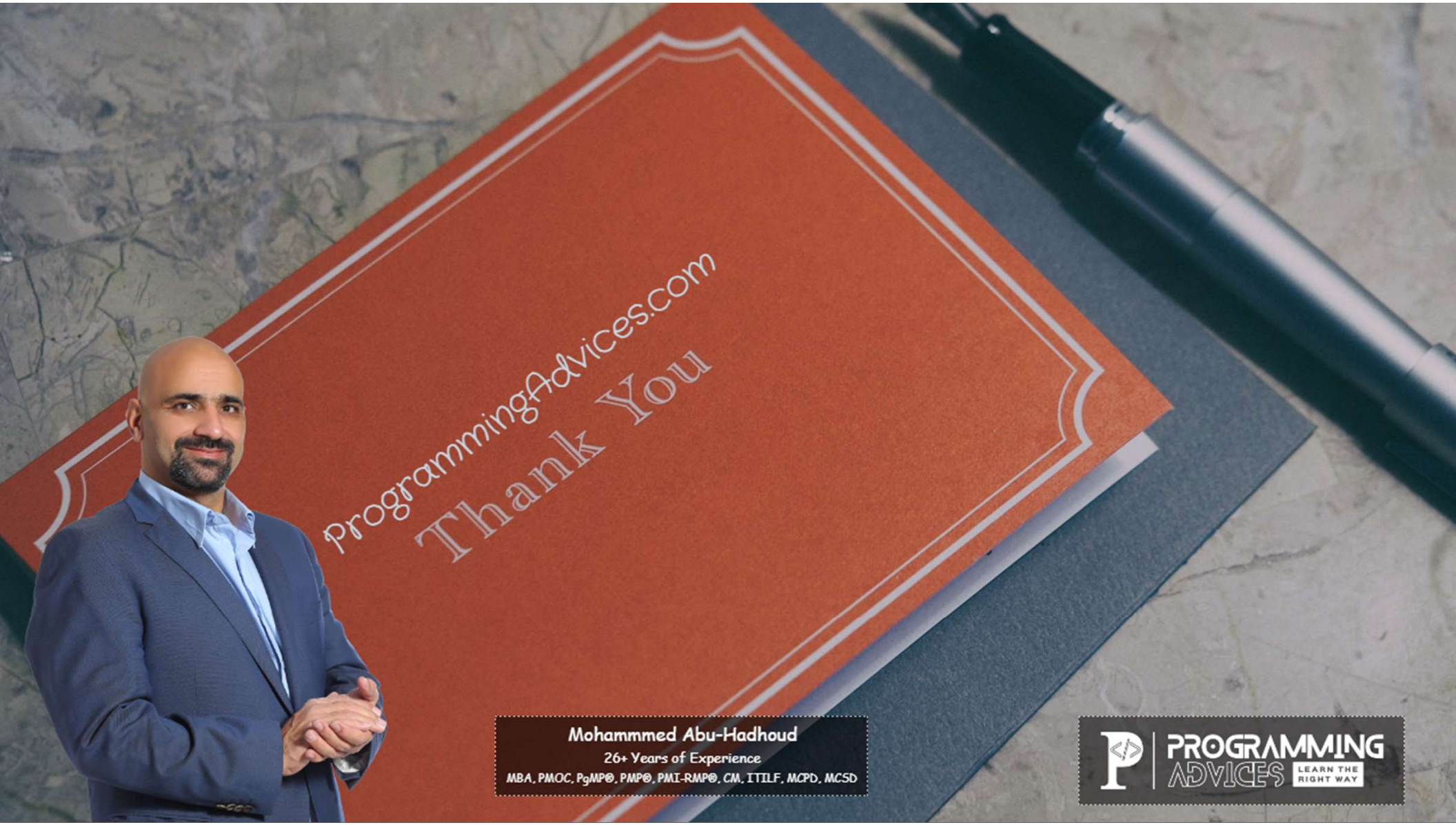
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