Top-Down Approach:

* **Description:** This approach involves breaking down a system into its compositional sub-systems, starting with an overview and specifying high-level subsystems. Each subsystem is then refined in greater detail until the entire system is understood.
* **Example:** In software development, this could mean designing the overall architecture before diving into specific module details.

Bottom-Up Approach:

* **Description:** This approach involves piecing together individual elements to form more complex systems, making the original systems sub-systems of the emergent system. It often starts with small, detailed elements that are progressively linked.
* **Example:** In software development, coding and testing may begin as soon as the first module is specified, gradually building up the complexity of the system.

**De Morgan's Theorems:**

* **NOT(A OR B):**

**This expression is equivalent to (NOT A) AND (NOT B).**

* **NOT(A AND B):**

**This expression is equivalent to (NOT A) OR (NOT B).**

* **Theorem:** De Morgan's Laws describe the relationship between logical conjunctions (AND) and disjunctions (OR) concerning their negations.

**Logic Gates and Truth Tables:**

AND Gate:

* **Truth Table:**

| **A** | **B** | **Output** |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

OR Gate:

* **Truth Table:**

| **A** | **B** | **Output** |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

NOT Gate:

* **Truth Table:**

| **A** | **Output** |
| --- | --- |
| 0 | 1 |
| 1 | 0 |

A black background with a black square

Description automatically generated with medium confidence

# References

16-007 Logical Problem Solving and Error Detection Techniques

https://byjus.com/jee/basic-logic-gates/