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# Elementalist: Master of Atoms (MoA)

## Problem Statement

- The periodic table is a fundamental tool in chemistry, but it can be challenging for students and professionals alike to quickly retrieve detailed information about the atomic structure of elements, particularly the number of subatomic particles and quantum numbers. According to a study published in the Journal of Chemical Education, students often struggle to understand the relationship between atomic structure and periodic trends. This project aims to address this issue by developing a program that takes the name of an element as input and outputs its amount of subatomic particles and four different quantum numbers.

## Problem Objectives:

- Test a student's knowledge about Chemistry.
- See how elements, atoms, and everything are related to each other.

## Planned Features:

- To design and develop a program that accurately retrieves and displays the number of subatomic particles (protons, neutrons, electrons) for a given element.
- To calculate and display the four quantum numbers ( $n$ ,  $l$ ,  $m_l$ ,  $m_s$ ) for each element.
- To provide a user friendly interface for inputting element names and displaying results.

## Planned Inputs and Outputs:

Inputs	Outputs
An element's name	The element's number of subatomic particles (Protons, Neutrons, Electrons)
	The element's four quantum numbers ( $n$ , $l$ , $m_l$ , $m_s$ )

## Logic Plan:

The program will follow these steps:

- Initialize a database or data structure (2D Array) with element information.
- Prompt the user to input an element name or symbol.

3. Validate the input and retrieve the corresponding element data.
4. Calculate the number of subatomic particles and quantum numbers.
5. Display the results in a clear and readable format.

```
INPUT element_name
VALIDATE element_name
IF valid THEN
    RETRIEVE element_data
    CALCULATE subatomic_particles AND quantum_numbers
    DISPLAY results
ELSE
    DISPLAY error_message
END IF
```