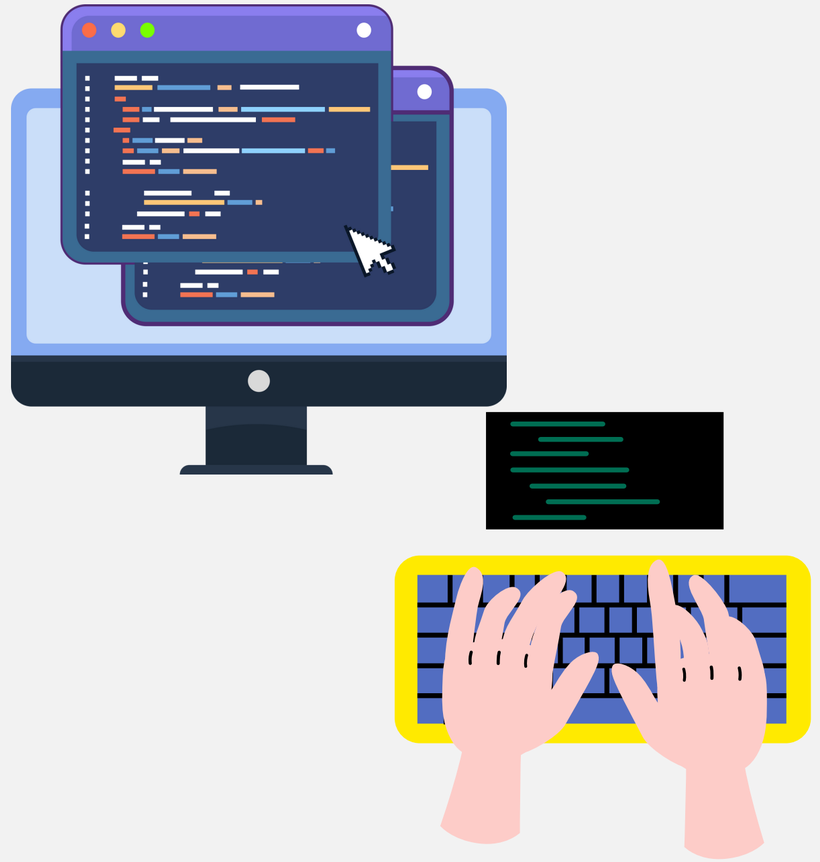
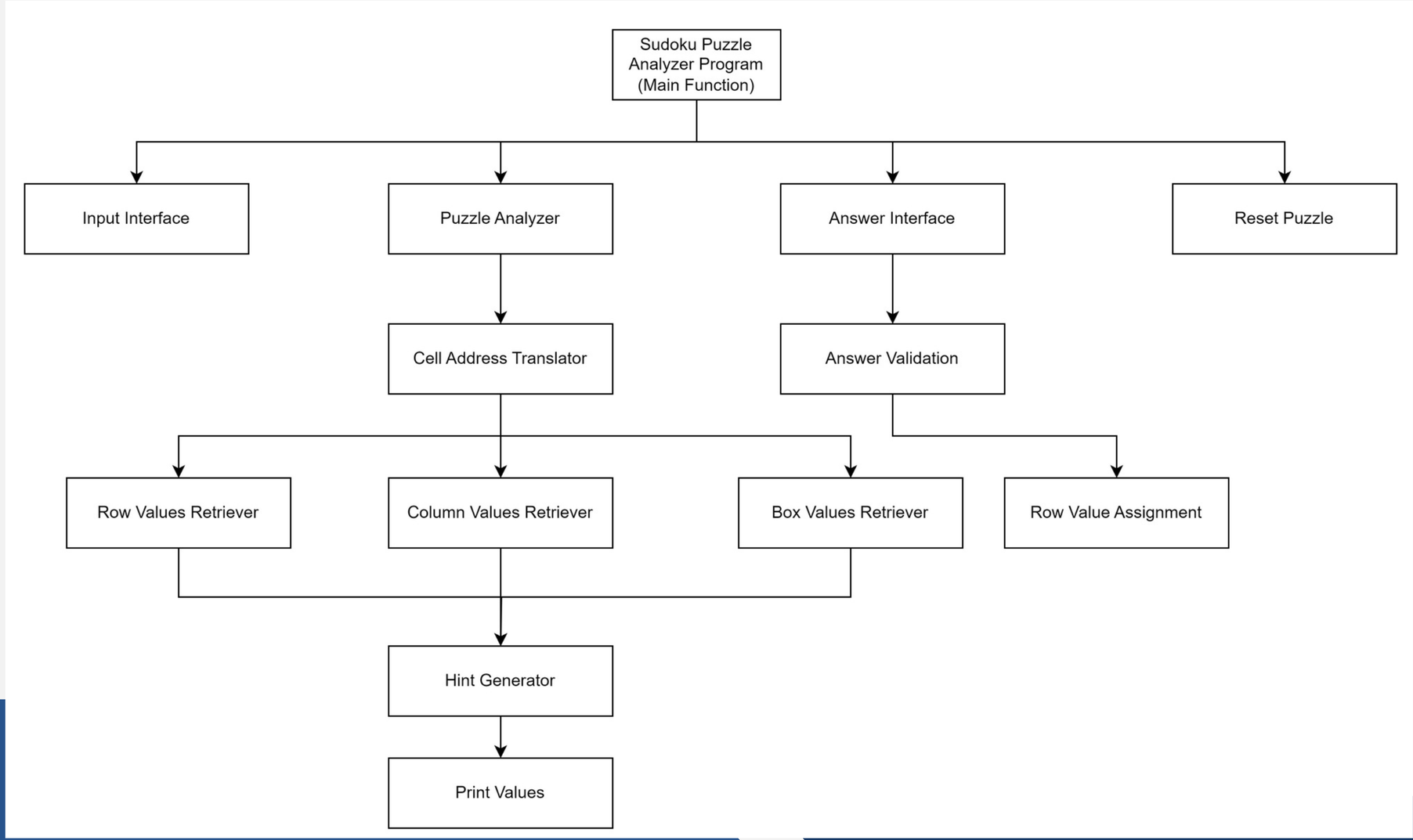
LABORATORY ACTIVITY # 01

(CREATING SUDOKU PUZZLE ANALYZER)



FUNCTIONAL DECOMPOSITION DIAGRAM



INPUT INTERFACE

Problem

- A String Value is entered with a minimum length of 9 digits.
- Only values from 0 to 9 is ALLOWED.
- Each Entry is equivalent to One (1) Row in the 9x9 Grid.

Needs

- Input Validation
- String splicing (Getting each digit from the string 1 by 1)
- String to integer conversion

```
Sudoku Puzzle Program
Please provide the Sudoku Puzzle Program with the Sudoku Problem,
Please enter the values for each row in the following format (Example: 000100200):
Please enter value for Row # 1: 000040900
```

PUZZLE ANALYZER: CELL ADDRESS TRANSLATOR

Problem

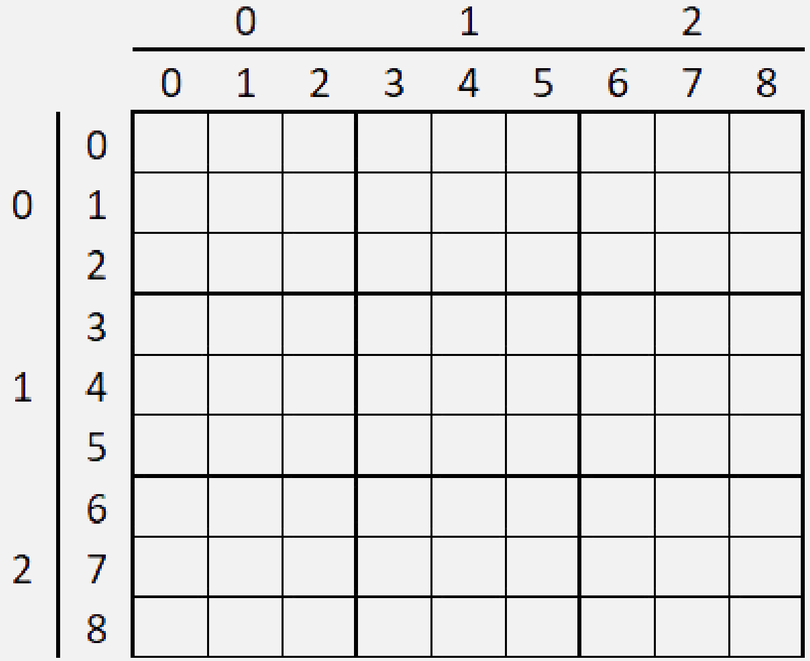
- A String value shall be entered with a minimum length of 2.
- First character should be from A - I ONLY. Second character should be from 1 - 9 ONLY.

Needs

- Input Validation
- String splicing (Getting each character from the string)
- Convert Address to Cell and Box Coordinates

```
What cell would you like to analyze? G2
Cell Coordinates: (6, 1)
Box Coordinates: (2, 0)
```

PUZZLE ANALYZER: CELL ADDRESS TRANSLATOR



	0	1	2
0	(0, 0)	(1, 0)	(2, 0)
1	(0, 1)	(1, 1)	(2, 1)
2	(0, 2)	(1, 2)	(2, 2)

Analyze how Box Coordinates
will be derived from the Cell Coordinates

PUZZLE ANALYZER: ROW AND COLUMN VALUES RETRIEVER

Problem

- Based on provided Cell Coordinates, Retrieve values in current row and current column

Needs

- Array Traversal
  - Row (Consistent Column, Changing Rows)
  - Column (Consistent Row, Changing Columns)

```
Row Values: 8, 6, 7
Column Values: 9, 4, 5, 7, 8
```

PUZZLE ANALYZER: BOX VALUE RETRIEVER

Problem

- Based on calculated or derived, Box Coordinates, Compute for the Start Column and Start Row

Needs

- Compute for Start Row, End Row, Start Column and End Column
- Traversal through a 2D Array (Loop within a Loop)

```
Box Coordinates: (2, 0)
Box Values: 9, 4
```

PUZZLE ANALYZER:
HINT GENERATOR AND PRINT VALUES

Problem

- Based on retrieved values in row, column and box, eliminate possible values for each

Needs

- With an initial set of {1, 2, 3, 4, 5, 6, 7, 8, 9}
- Hint: Use (value - 1) as the index to change the value to zero (0)
- Only print non-zero values

```
Row Hints: 1, 2, 3, 4, 5, 6, 7, 8, 9
Column Hints: 1, 2, 3, 4, 6, 9
Box Hints: 1, 2, 3, 5, 6, 7, 8, 9
```

PUZZLE ANALYZER: UNIQUE HINT GENERATOR

Problem

- Based on computed possible answers for row, columns and within the box, identify the unique possible answers that are applicable to all.

Needs

- Comparison of Three (3) 1D Arrays
- Create a Boolean Expression to check if a particular value exists in all three (3) arrays of hints

```
Row Hints: 1, 2, 3, 4, 5, 6, 7, 8, 9
Column Hints: 1, 2, 3, 4, 6, 9
Box Hints: 1, 2, 3, 5, 6, 7, 8, 9
    Possible Answer: 1, 2, 3, 6, 9
```

ANSWER INTERFACE: VALIDATION AND ASSIGNMENT

Problem

- Only allow the user to enter answers based on the possible answer

Needs

- Input Validation

```
Please provide the answer for Cell (1, 8): 7
```

SUDOKU ANALYZER: MENU AND RESET PUZZLE

Problem

- Loop through all processes, based on actions the user desires
- Reset Functionality

Needs

- Input Validation and Menu
- Reset Functionality: Two (2) 9x9 Arrays. Copying Values from two (2) 2D Arrays

```
What action  do you like to perform?
1 - Provide an answer for this cell
2 - Check another cell
3 - Reset the Puzzle
4 - Exit the application
Please enter your choice: 1
```

QUESTIONS?

THANK YOU