# Programming Requirements:

I would like this program to be implemented using OOP. The program needs to be developed using Python, Tkinter, and MySQL. Please consider that it should be compatible with Raspberry Pi. If you have experience with Kivy, I would also consider using it instead of Tkinter, but I would like to know in advance.

The primary focus of this project is on the GUI. I want it to have an appealing appearance, ideally as good as or better than the examples provided below. While there are some backend requirements, they are limited. Most of the required programming will be done at a later stage, but I will need some placeholders.

The GUI interface will be displayed on a 10.1" touch screen with a resolution of 1280 x 800 pixels.

MySQL Requirements: A MySQL database needs to be created with the following table structure. The database should consist of two tables linked as shown below:
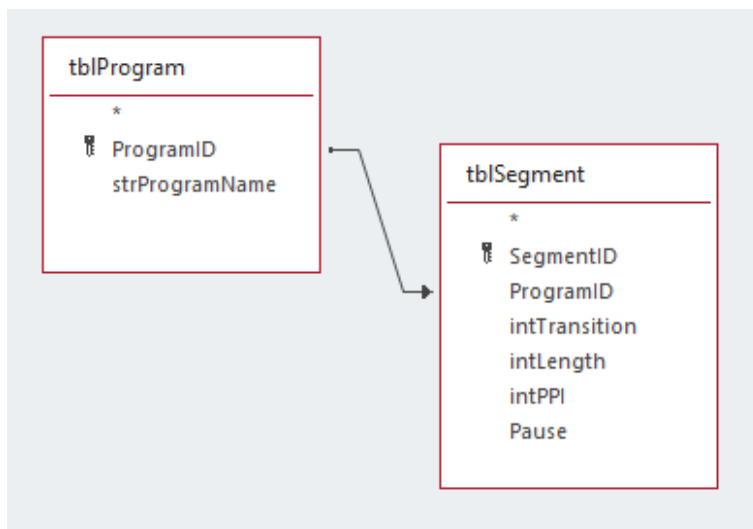

tblProgram: This table has the following fields:

- ProgramID (Key): A Long Integer value automatically generated as an auto number.
- strProgramName: A String value with a maximum length of 30 characters. It can contain alphanumeric characters and dashes only.

tblSegment: This table has the following fields:

- SegmentID (Key): A Long Integer value automatically generated as an auto number.
- ProgramID: This field is used to establish a parent-child relationship between the two tables. The line with an arrow indicates that in a query, ALL relevant records from 'tblProgram' should be displayed along with only those records from 'tblSegment' where the joined fields are equal.
- intTransition: An Integer value.
- intLength: An Integer value.
- intPPI: An Integer value.
- Pause: A Yes/No field.

Display Screen Requirements: The following display screens, labeled as A, B, C, and D, are illustrated below:

Screen-A: Main control screen
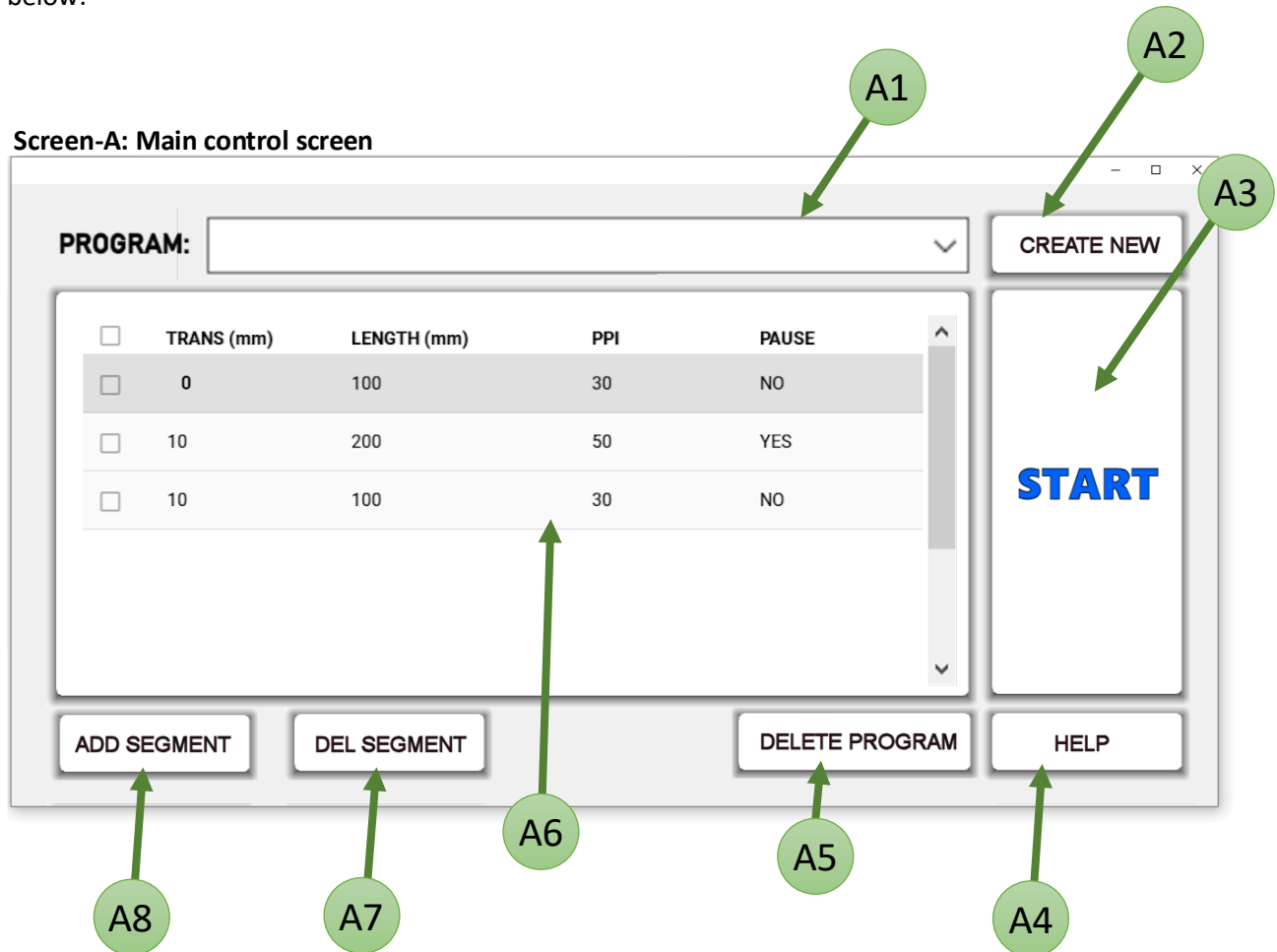
Screen-A: Main control screen. Has the following features and requirements:

A1: Program name combo box: This allows the user to select a program from the MySQL database.

A2: CREATE NEW button: When clicked, it will open Screen-B (New Program screen).

A3: START button: This button will have an event reserved, which will be programmed later.

A4: HELP button: When clicked, it will open Screen-D.

A5: DELETE PROGRAM button: This button deletes the currently selected program, displayed in the program name combo box (A1). It also deletes associated records from the segment table (A6).

- The "DELETE PROGRAM" button (A5) should only be active when an active program is selected in the combo box A1. If no program is selected, the DELETE PROGRAM button should be greyed out to indicate that it is inactive.
- When a program is deleted, its record is removed from the MySQL database (tblProgram). Additionally, records from the MySQL database (tblSegment) that are associated with the deleted program should also be deleted. A6 should be cleared of data, and the combo box A1 should be updated to show that no program is selected.

- Before deleting a program, a warning message should be displayed to ask if the user really wants to proceed with the deletion or cancel the operation.

A6: Table that contains data stored with the selected program. The table fields are:

- Checkbox: Allows the user to select a segment from the list for later deletion. It doesn't necessarily need to be tied to a table, but it can be if it simplifies programming the table.
- TRANS (mm): An integer value.
- LENGTH (mm): An integer value.
- PPI: An integer value.
- PAUSE: A combo box with two possible choices (YES, NO).
- If the data in the table extends beyond the viewing area, a scroll bar should be present.
- If the user clicks on a row anywhere other than the checkbox, Screen-C (New/Modify segment screen) should pop-up.

A7: DEL SEGMENT button: When clicked, any selected segment (A6 row) should be deleted after displaying a warning message to allow the user to cancel or proceed with the deletion. After a segment is deleted, the table view should refresh to display the updated data.

- If there are no segments selected for deletion, the DEL SEGMENT button (A7) should be greyed out to indicate that it is inactive.
- Please note that in table A6, the first row and only the first row must contain a zero in the "TRANS" field. Also, if there are multiple segment entries (rows) and the first row is deleted, the second row becomes the new first row. This means that any value in the "TRANS" field must be deleted and replaced with zero.

A8: ADD SEGMENT button: When clicked, it will open Screen-C (New/Modify segment screen).

Screen-B: New Program Screen is used to enter a new project to the list of projects already added to mySql. This screen pops-up over Screen-A (Control Screen) when the CREATE NEW (A2) button is pressed from Screen-A.

Screen-B: New Program Screen

Screen-B: New Program Screen. Has the following features and requirements:

B1: Program name: When the user clicks on this field, a keyboard widget must pop-up allowing the user to enter a program name. This is needed because the user does not have access to a physical keyboard.

Valid data for B1 is a string value, 30 characters max. It can contain alpha-numeric characters as well as dashes. If the user tries to enter any other character, they must be notified they cannot do that. To simplify, if the keyboard widget only has valid entries, mistakes would be avoided.

B2: Save button: Allows user to save the entry to mySql and exit to return to Screen-A. When the user returns to Screen-A the newly created program name should show up in Screen-A (A1 field). Sense it is a new program no segment entries in table A6 would be present.

If no name was entered, including a name that contains only spaces, the save button should show inactive.

B3: Cancel button: If pressed, there are no updates to mySql or Screen-A. It just simply closes this screen as if it was never opened in the first place.

Screen-C: New/Modify segment screen

This screen can be opened in one of two modes:

1. Edit mode: Opened by clicking a row from the table view shown on Screen-A, specifically table-view A6. In edit mode, the information from the selected row automatically populates the fields and is ready to be modified.
2. New Segment mode: Opened by clicking button A8 on Screen-A. In the new segment mode, all fields are blank and ready to accept a new entry.

C1, C2, C3, and C4 should only accept integer values. When the user touches an active field, a widget must pop up to allow the user to enter only integer values. The widget should contain keys 0 through 9.

C5: SAVE button - When pressed, this button will verify that the entered data is valid before adding or updating the mySql record. There are only a few rules to follow:

- No blank entries are allowed.
- All values must be integer values.
- If this is the only entry that exists for the program, it must also be the first row of the segment table (A6). Therefore, anything other than a zero in field C1 would be invalid because a transition from a previous segment is not possible if a previous segment doesn't exist.

C6: CANCEL button - If the user chooses to cancel, no data is saved, and the window simply closes as if it was never opened in the first place.

Screen-D: Help window screen
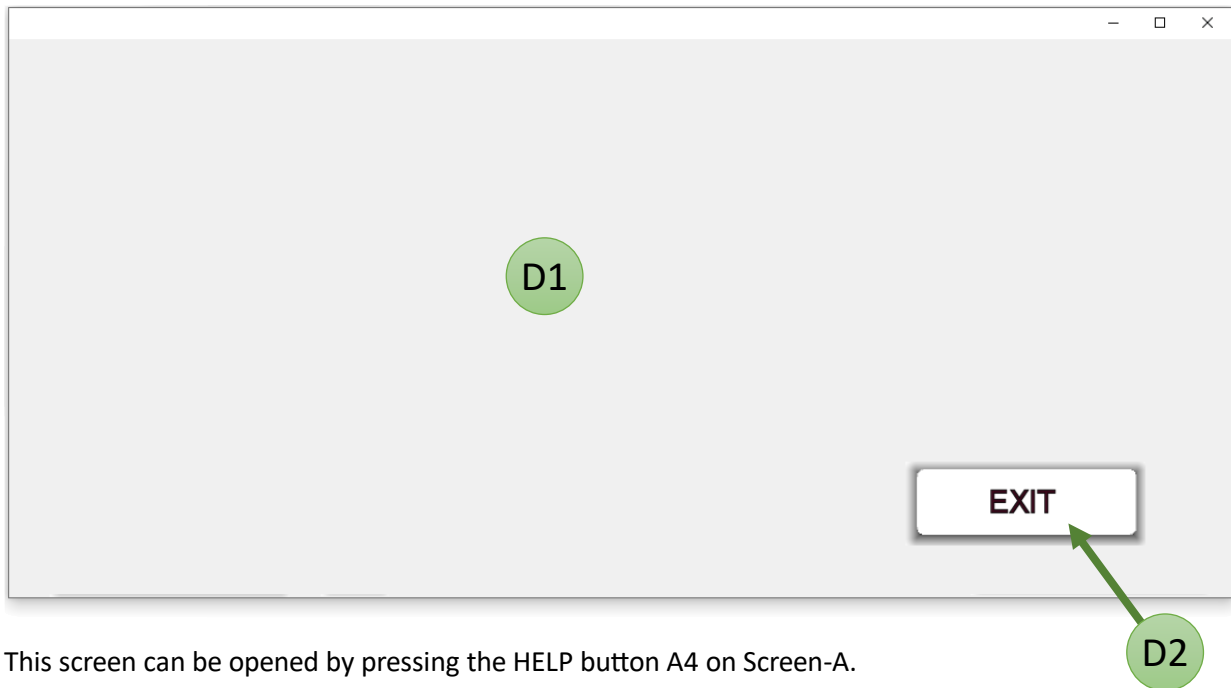
This screen can be opened by pressing the HELP button A4 on Screen-A.

D1: Label area - This is a reserved spot with a label that will be programmed at a later time.

D2: Exit - Closes the window and returns back to Screen-A.

*Other Notes:

When any button is pressed, it should emit a clicking noise and visually depress, giving the impression of a physical button.