SECTION C

QUESTION 3: PROBLEM-SOLVING PROGRAMMING

SCENARIO

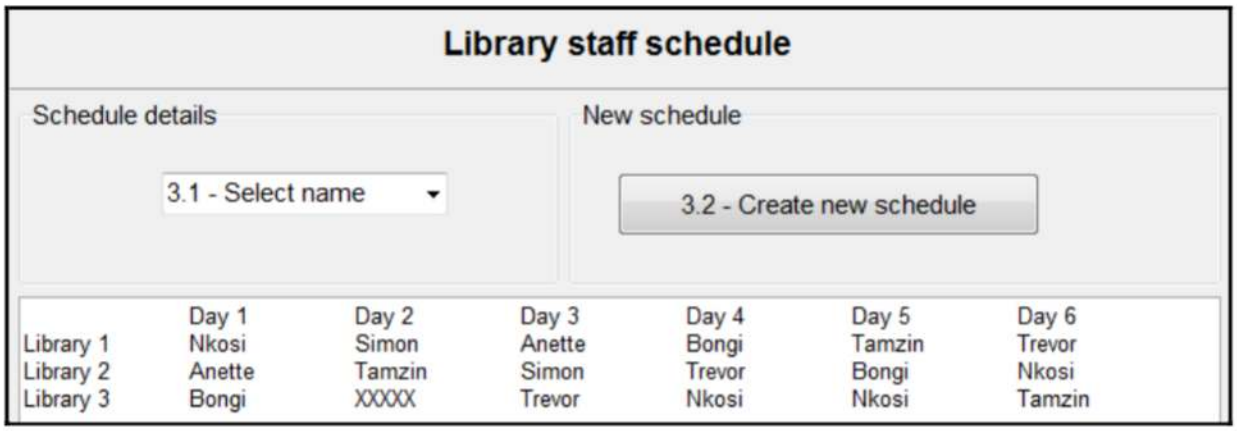
The university has three libraries. The first two libraries are open for six days of the week and the third library is open for five days of the week. There are six staff members who will be on duty in the libraries on the days the libraries are open. The manager of the library requires a program to create and maintain a placement schedule for staff members.

Do the following:

- Compile and execute the program in the **Question3** folder. Currently the program has no functionality.
- Complete the code for each section of the question as described in QUESTION 3.1 to QUESTION 3.3.

Supplied GUI:

The GUI below represents an interface used by the manager of the library to allocate duties shifts to staff members.



The following code has been provided:

- An array called **arrStaff** which contains the names of the six staff members.

```
arrStaff: array [1 .. 6] of String =
 ('Trevor','Nkosi','Tamzin','Anette','Bongi','Simon');
```

- The declaration of a two-dimensional array called **arrPlacements** that will be used to store the names of staff members according to the days they will be on duty (columns 1 to 6) in each library (rows 1 to 3):

```
arrPlacements: array [1 .. 3, 1 .. 6] of String =
  (('Nkosi', 'Simon','Anette', 'Bongi', 'Tamzin', 'Trevor'),
   ('Anette', 'Tamzin','Simon', 'Trevor', 'Bongi', 'Nkosi'),
   ('Bongi', 'XXXXX', 'Trevor','Nkosi', 'Nkosi', 'Tamzin'));
```

- A completed **Display** procedure that will display the schedule of staff placements (content of **arrPlacements**).

  Example of the output of a schedule that will be displayed when the display procedure is called to display the content of **arrPlacements**. Library 3 can be closed on any day, as decided by the manager. For this schedule, the manager has decided to close Library 3 on Day 2, which is represented by 'XXXXX' in array **arrPlacements**.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Nkosi	Simon	Anette	Bongi	Tamzin	Trevor
Library 2	Anette	Tamzin	Simon	Trevor	Bongi	Nkosi
Library 3	Bongi	XXXXX	Trevor	Nkosi	Nkosi	Tamzin

  The row and column headings are not part of the content of the two-dimensional array provided.

NOTE:

- You are NOT allowed to modify supplied data manually. Code must be written to manipulate the supplied data according to the requirements.
- The use of good programming techniques and modular design must be applied in the design and coding of your solution.
- NO marks will be awarded for the use of hardcoding to populate array **arrPlacements**.

3.1 Combo box [3.1 - Select name]

A staff member may request a schedule of his/her duties.

When a name is selected from the combo box **cmbStaff**, the following information must be displayed in the output component provided:

- A heading with the name of the staff member
- The work schedule details of the selected staff member

The format of the work schedule details is as follows:

```
Day <day number>-Library#<library number>
```

Example of output if staff member Tamzin was selected from **cmbStaff**:

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Nkosi	Simon	Anette	Bongi	Tamzin	Trevor
Library 2	Anette	Tamzin	Simon	Trevor	Bongi	Nkosi
Library 3	Bongi	XXXXX	Trevor	Nkosi	Nkosi	Tamzin

Tamzin's schedule
Day 2-Library#2
Day 5-Library#1
Day 6-Library#3

Example of output if staff member Nkosi was selected from **cmbStaff**:

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Nkosi	Simon	Anette	Bongi	Tamzin	Trevor
Library 2	Anette	Tamzin	Simon	Trevor	Bongi	Nkosi
Library 3	Bongi	XXXXX	Trevor	Nkosi	Nkosi	Tamzin

Nkosi's schedule
Day 1-Library#1
Day 4-Library#3
Day 5-Library#3
Day 6-Library#2

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3.2 **Button [3.2 - Create new schedule]**

A one-dimensional array called **arrStaff** is provided and must be used to create a new schedule for staff members. The new schedule must be saved in the two-dimensional array **arrPlacements**.

Write code to compile a new placement schedule for staff members by populating the **arrPlacements** array with the names of staff members as follows:

Library 1: Each staff member will be placed on duty according to the order of the appearance of their names in the array **arrStaff**. The first staff member in the array will be assigned to Day 1, the second staff member to Day 2 and so on.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Trevor	Nkosi	Tamzin	Anette	Bongi	Simon

Library 2: Each staff member will be placed on duty in the reverse order of the contents of the array **arrStaff**. The first staff member in the array will be assigned to Day 6, the second staff member to Day 5 and so on:

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Trevor	Nkosi	Tamzin	Anette	Bongi	Simon
Library 2	Simon	Bongi	Anette	Tamzin	Nkosi	Trevor

Library 3: Write code to use an input box to prompt the manager to enter a day number (1 to 6) on which Library 3 will be closed. Array **arrPlacements** must show 'XXXXX' for the day the library is closed. The staff will be allocated randomly for the remainder of the days to this library. A test must be done to ensure that the staff member randomly selected for Library 3 is not already allocated to Library 1 or Library 2 for that day.

Example of output if the manager entered Day 3 for Library 3 to be closed:

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Library 1	Trevor	Nkosi	Tamzin	Anette	Bongi	Simon
Library 2	Simon	Bongi	Anette	Tamzin	Nkosi	Trevor
Library 3	Anette	Anette	XXXXX	Nkosi	Simon	Tamzin

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- Ensure that your examination number has been entered as a comment in the first line of the program file.
- Save your program.
- Print the code if required.

TOTAL SECTION C: 30
GRAND TOTAL: 150

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