

**SECTION C****QUESTION 3: PROBLEM-SOLVING PROGRAMMING****SCENARIO**

Information centres, referred to as 'terminals', have been set up at three different points along the routes in the park. The management requires a software program to provide information to visitors to locate the different activities and facilities at Aqua Wonderland and to be aware of maintenance activities in the park.

Do the following:

- Compile and execute the program in the **Question3** folder. Currently, the program has no functionality.
- Complete the code for each question as described in QUESTION 3.1 to QUESTION 3.4.

**Supplied GUI:**

The supplied GUI represents a self-help interface to assist visitors in reaching various activities and facilities within the park.

Select a terminal

Terminal 1

Terminal 2

Terminal 3

Select a direction

NORTH

SOUTH

EAST

WEST

3.1 - Activity/Facility codes for all terminals and directions

3.2 - Activities/Facilities from a selected terminal and direction

Choose an activity/a facility

Water park

3.3 - Access routes to selected activity/facility

3.4 - Maintenance at selected activity/facility

**Supplied data:**

You are provided with two parallel arrays and one two-dimensional array.

**arrActivities** is a one-dimensional array that contains the names of activities and facilities in the park. The data stored in this array are as follows:

Water park, Aquarium, Sea, Restaurants, Shopping, Diving, Help desk,  
Penguin park, Shark tank, Dolphin shows

A corresponding parallel array called **arrCodes** contains letters from the alphabet, each representing the corresponding activity/facility described in the **arrActivities** array.

The **arrCodes** array contains the following elements:

W, A, S, R, X, D, H, P, T, L

The first element (letter W) in the **arrCodes** array represents the first element ('Water park') in the **arrActivities** array, the second element (letter A) in the **arrCodes** array represents the second element ('Aquarium') in the **arrActivities** array, and so on.

**arrActCodes** is a two-dimensional array that contains a combination of codes that represent activities and facilities that are accessible from a specific terminal when the visitor departs in a specific direction. The codes contained in this array are as follows:

	North	South	East	West
Terminal 1	DXWAT	HRDST	STWLP	RDT
Terminal 2	SWA	SRXD	LWXH	SHA
Terminal 3	WLSR	AT	DATX	HW

**NOTE:** The row and column headings are not provided as part of the two-dimensional array.

Example:

The activity code that applies when a visitor walks from Terminal 1 in a northerly direction is DXWAT.

Using the content of the **arrCodes** and **arrActivities** arrays, it can be established that the activities and facilities that the code DXWAT refers to are Diving, Shopping, Water park, Aquarium and Shark tank.

**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.

**3.1 Button [3.1 – Activity/Facility codes for all terminals and directions]**

The program must display the content of the two-dimensional array **arrActCodes** neatly in rows and columns. Display the directions as column headings and the terminals as row labels.

Example of output:

	North	South	East	West
Terminal 1	DXWAT	HRDST	STWLP	RDT
Terminal 2	SWA	SRXD	LWXH	SHA
Terminal 3	WLSR	AT	DATX	HW

(9)

**3.2 Button [3.2 – Activities/Facilities from a selected terminal and direction]**

The buttons that contain images must be used to select a terminal and direction. Code is provided to assign the selected terminal and direction to variables. The program must then use the supplied arrays to identify all the activities and facilities available on the selected route. Display the selected terminal and direction as a heading and a list of activities and facilities on the route selected.

Example of output if Terminal 2 and South are selected:

Terminal 2, South
Sea
Restaurants
Shopping
Diving

(11)

**3.3 Button [3.3 – Access routes to selected activity/facility]**

Once the user selects a specific activity/facility from the combo box provided, the user must be able to view all access routes to that specific activity/facility. Display the terminal number and the direction for each access route for the visitor to be able to reach the activity/facility selected.

The total number of access routes leading to the activity selected must be determined and displayed.

Example of output if Aquarium was selected from the combo box:

Access routes to Aquarium
Terminal 1, North
Terminal 2, North
Terminal 2, West
Terminal 3, South
Terminal 3, East
Number of access routes: 5

(10)

### 3.4 Button [3.4 – Maintenance at selected activity/facility]

The area where activities take place or facilities are provided may sometimes be closed due to maintenance. The user must select an activity/facility where maintenance must take place from the combo box provided. The program must remove all references to the selected activity/facility from the two-dimensional array and display a suitable message in a dialog box indicating that the information has been updated. The updated content of the two-dimensional array must be displayed in the output area.

Example of output if Diving was selected from the combo box:



Example of output after removing the letter D from the two-dimensional array **arrActCodes** due to maintenance that must be done on the diving facility:

Updated information:				
	North	South	East	West
Terminal 1	XWAT	HRST	STWLP	RT
Terminal 2	SWA	SRX	LWXH	SHA
Terminal 3	WLSR	AT	ATX	HW

(8)

- Enter your examination number as a comment in the first line of the program file.
- Save your program.
- Make a printout of the code if required.

**TOTAL SECTION C: 38**  
**GRAND TOTAL: 150**