WAD Lab Test 1 (1.5 hours) [20 marks]

General Instructions:

- You can refer to any offline resources already on your laptop, but you must disable all networking and Bluetooth connections during the test. You must not communicate with anyone via any means during the test.
- Just before the test, you will be given instructions by the invigilator as to how to obtain resource files required for the lab test and how to submit your solutions.
- No questions will be entertained during the test. If necessary, make your own assumptions.
- You are allowed to use only standard PHP classes and functions in your solutions – do not use any third-party libraries.
- Use meaningful names for classes, methods, functions and variables, as well as indent your code correctly. Use 4 spaces for indentation. Otherwise, you may attract penalty of up to **20%** of your score for the corresponding question.
- You **MUST** include your name as author in the comments of all your submitted source files. Failure to do so WILL attract a penalty of up to **20%** of your score for the corresponding question.

  For example, if your registered name is "TAN So Tong" and email ID is tan.sotong.2017, include the following comment at the beginning of each source file you write.

```
<!--
Name:  TAN So Tong
Email: tan.sotong.2017
-->
```

- You may wish to comment out the parts in your code which cause errors. But commented code will not be marked.

DO NOT TURN OVER UNTIL YOU ARE TOLD TO DO SO

Question 1 [Difficulty Level: *) [5 marks]

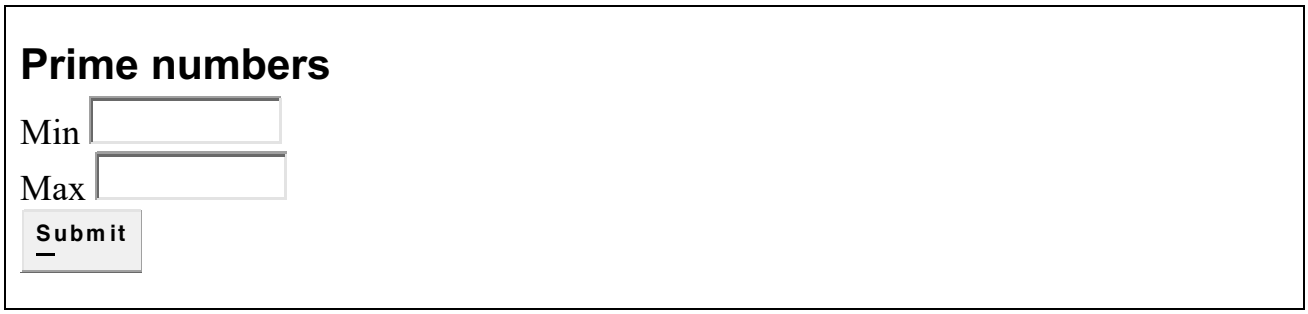
Given:

- `q1.html` (Edit this file. We will mark this file)
- `q1_test.php`
- `q1_result.php` (Edit this file. We will mark this file)

A Prime Number can be divided evenly **only** by 1, or itself. And it must be greater than 1. For example: 5 can only be divided evenly by 1 or 5, so it is a prime number. But 6 can be divided evenly by 1, 2, 3 and 6 so it is NOT a prime number (it is a composite number).

Tasks:

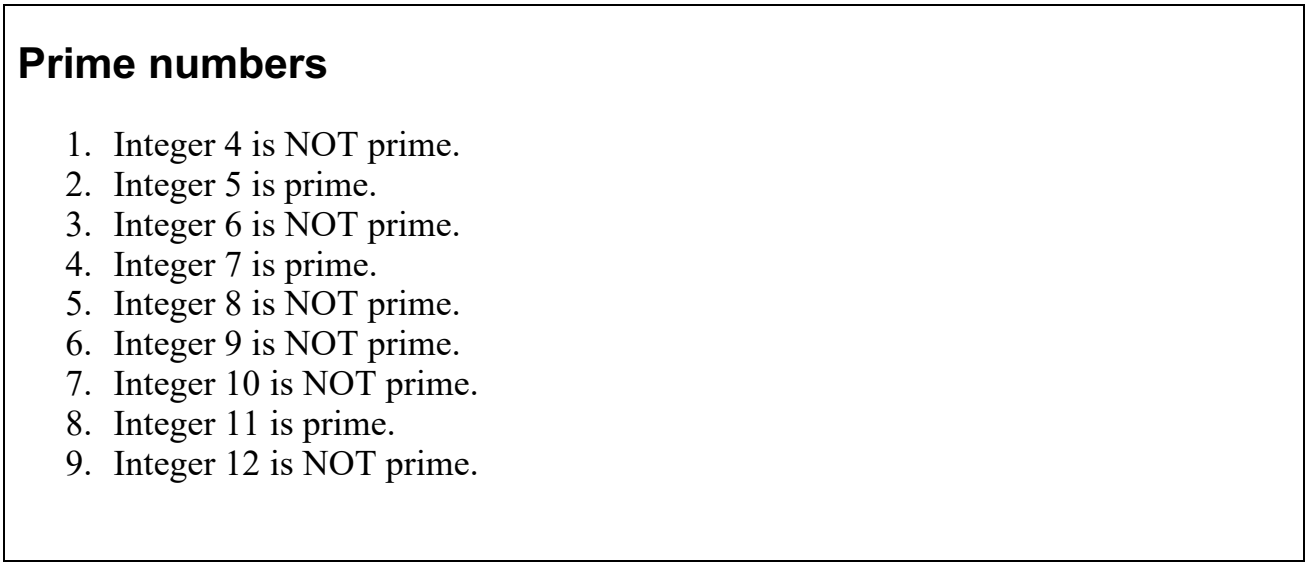
1. Update `q1.html` to have a form that
   a. Have two text fields “Min” and “Max”, and a “Submit” button.
   b. Upon clicking the button, submits to `q1_result.php` via HTTP POST.



2. Update `q1_result.php` to
   a. Implement a function called `is_prime()` that takes in one parameter `$num` which is a number greater than zero . The function returns `True` if `$num` is a prime number, `False` otherwise.

   b. Retrieve the submitted "min" and "max" values from `q1.html`. Assume that the user enters a valid value for "min" and "max".

   c. Print all integers from “min” to “max” inclusive in **an ordered list**, and indicate if the integer a prime number. For example, if user enters 4 for “min” and 12 for “max”, the expected output is as shown below.



Question 2 [Difficulty Level: *] **[5 marks]**

Given:

- `q2.html` (Edit this file. We will mark this file)
- `q2_result.php` (Edit this file. We will mark this file)

Tasks:

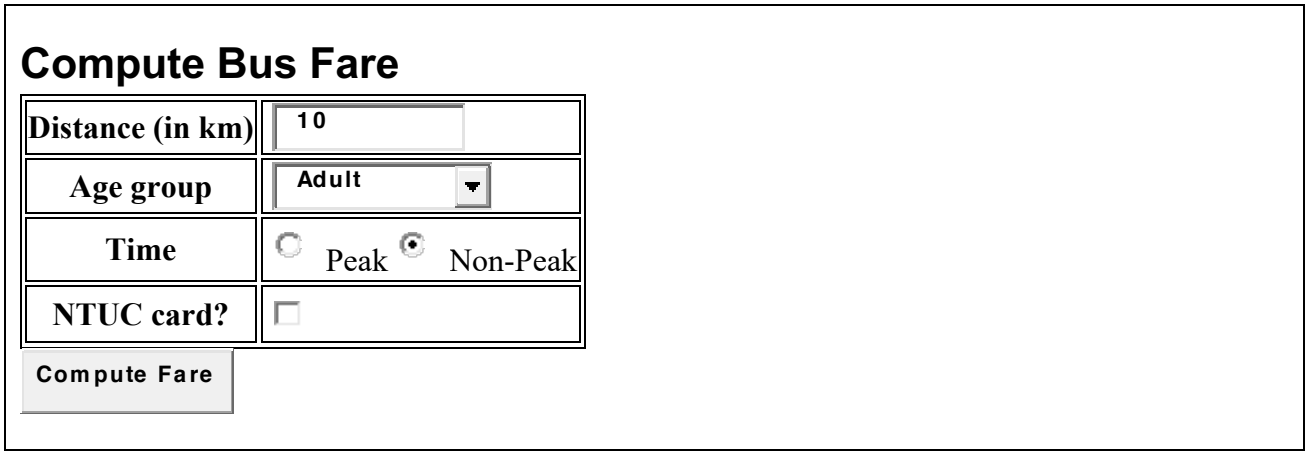
1. Update `q2.html` to have a form and HTML table with two columns and a border value of 1.
   a. First row is "Distance (in km)" in first cell and text field in second cell.

   b. Second row is "Age group" and drop down list with values "Children", "Adult" and "Senior".

   c. Third row is "Time" and radio buttons with the two values "Peak" and "Non-Peak". "Non-Peak" is ticked by default.

   d. Forth row is "NTUC card?" and a single checkbox. If the checkbox is ticked, it means the passenger has a NTUC card. It is unchecked by default.

   e. "Compute Fare" button below the table. Upon clicking the button, submits to `q1_result.php` via HTTP POST.



2. Update `q2_result.php` to retrieve the submitted form values from `q2.html`.
   a. If the submitted value "distance" is non-numeric (i.e. not a valid floating point number), display the following error message.

      Distance is not numeric!

   a. If the submitted value "distance" is numeric and is zero or less, display the following error message.

      Distance must be more than zero!

   b. Otherwise, print out the submitted values in a similar two-column table format.
      a. Display "Yes" or "No" for availability of NTUC card.
      b. In addition, the table has three more rows "Cost per km", "Discount" and "Bus fare".

   c. "Cost per km is based on age group; $0.15 for adults, $0.05 for children, and $0.1 for seniors.

   d. For "Discount", there are two types.
      a. If the time is non-peak hours, 25% discount.
      b. If there is NTUC card, 5% discount.

      Non-peak plus NTUC card means a total of 30% discount.

e. The formula for "Bus fare" is as follows:

```
Bus fare = distance X cost per km X (100% – discount)
```

Display the decimal places as it is.

Sample output 1:

Distance (in km)	12.8
Age group	Children
Time	Non-Peak
NTUC card?	No
Cost per km	$0.05
Discount	25%
Bus fare	$0.48

Sample output 2:

Distance (in km)	10.8
Age group	Adult
Time	Peak
NTUC card?	No
Cost per km	$0.15
Discount	0%
Bus fare	$1.62

Sample output 3:

Distance (in km)	10
Age group	Adult
Time	Non-Peak
NTUC card?	Yes
Cost per km	$0.15
Discount	30%
Bus fare	$1.05

Sample output 4:

Distance (in km)	10
Age group	Senior
Time	Peak
NTUC card?	Yes
Cost per km	$0.1
Discount	5%
Bus fare	$0.95

Question 3 [7 marks]

Given:

- `ClubReport.php`
- `common.php`
- `q3.php` (Only edit this file. We will only mark this file)

Task A [3 marks, Difficulty Level: **]

1. Complete `q3.php` such that the club dropdown list will display the distinct names of clubs that are retrieved from `ClubReport`. Display the clubs' names in the order as returned by `ClubReport`.

2. When a name is selected and the "Submit" button is clicked, the form is submitted back to `q3.php` which does the following:
   a. Get the breakdown on student-composition for the club using the `ClubReport`. The `ClubReport` returns a three level associative array.
      i. First level's key is school,
      ii. Second level's key is cohort,
      iii. Third level's key is ethnicity, and value is the number of students of that ethnicity, cohort and school.

      Below is an example of the array returned.

```
[
    "SOA" => [
        2017 => [ "Malay" => 5, "Indian" => 4 ],
        2016 => [ "Chinese" => 2 ]
    ],
    "SOSS" => [
        2017 => [ "Korean" => 1 ]
    ]
];
```

   b. Display the breakdown on student-composition in a table where columns are school, cohort, ethnicity, and number of students.
      i. Each school cell displays the school name.
      ii. Each cohort cell displays the cohort year.
      iii. Each ethnicity cell displays the ethnicity and the number of students for that school, cohort and ethnicity.

   c. Example of a student-composition table

School	Cohort	Ethnicity
SOA	2017	Malay (5)
SOA	2017	Indian (4)
SOA	2016	Chinese (2)
SOSS	2017	Korean (1)

      There are 11 SOA students which comprise of (a) 5 Malays and 4 Indians make up a total of 9 from cohort 2017, and (b) 2 Chinese from cohort 2016.
      i. The cell for SOA spans across three rows.
      ii. The cell for 2017 cohort spans across two rows.

      There is 1 SOSS student who is from cohort 2016 and is an Indian.

   d. Display in the same order is as returned by `ClubReport`.

3. When the page first loads, the report displayed will be the first club in the dropdown list.

Example 1: On first load, the value shown in the the dropdown list is `Ellipsis`.

Ellipsis Submit

School	Cohort	Ethnicity
SIS	2015	Chinese (2)
SIS	2015	Malay (2)
SIS	2016	Malay (1)
SIS	2016	Chinese (2)
SIS	2016	Indian (1)
SIS	2017	Korean (3)

Example 2: After the user selects `IndanCity` and clicks the "Submit" button.

IndanCity Submit

School	Cohort	Ethnicity
SIS	2016	Indian (2)
SIS	2017	Chinese (1)
SIS	2017	Korean (1)
SOA	2015	Malay (1)
SOA	2017	Korean (1)
SOSS	2016	Japan (3)

Example 3: After the user selects `Soccer` and clicks the "Submit" button.

Soccer Submit

School	Cohort	Ethnicity
SOA	2017	Malay (5)
SOA	2017	Indian (4)
SOA	2016	Chinese (2)
SOSS	2017	Korean (1)

Task B [4 marks, Difficulty Level: *] Attempt the next step if and only if you have completed Task A.**

Create a file `q3b.php` that displays the student-composition as follows:

a. Each school cell displays the school name and the number of students from that school. It spans across its cohort-rows.

b. Each cohort cell displays the cohort year and the number of students of that cohort-school. It should span across its ethnicity-rows.

c. Each ethnicity cell displays the ethnicity and the number of students of that ethnicity-cohort-school.

Example 4: On first load, the value shown in the the dropdown list is `Ellipsis`.

Ellipsis Submit

School	Cohort	Ethnicity
SIS (11)	2015 (4)	Chinese (2)
		Malay (2)
	2016 (4)	Malay (1)
		Chinese (2)
		Indian (1)
	2017 (3)	Korean (3)

Example 5: After the user selects `IndanCity` and clicks the "Submit" button.

IndanCity Submit

School	Cohort	Ethnicity
SIS (4)	2016 (2)	Indian (2)
	2017 (2)	Chinese (1)
		Korean (1)
SOA (2)	2015 (1)	Malay (1)
	2017 (1)	Korean (1)
SOSS (3)	2016 (3)	Japan (3)

Example 6: After the user selects `Soccer` and clicks the "Submit" button.

Soccer Submit

School	Cohort	Ethnicity
SOA (11)	2017 (9)	Malay (5)
		Indian (4)
	2016 (2)	Chinese (2)
SOSS (1)	2017 (1)	Korean (1)

Question 4 [Difficulty Level: *]** **[3 marks]**

Given:

- `common.php`
- `Line.php`
- `q4.php` `(Only edit this file. We will only mark this file)`
- `q4_test.php`

Tasks:

1. Update `q4.php` to complete the function `match($sequence, $board)`.
    a. `$sequence` is an array of non-repeating integers.
        i. It contains at least 1 element/integer.
    b. `$board` is a **rectangular** 2D array of non-repeating integers.
        i. It contains at least 1 element/integer.
        ii. **Height can be different from width**.

2. If all integers in the sequence form a line on the board, there is a match.
    a. A line is make up of **consecutive** cells in (a) a row, (b) a column or (c) diagonal.
    b. The order of the integers on the line may be different from the sequence.

3. If there is a match, the function returns a `Line` object as follows:
    a. Attributes `startRow` and `startCol` point to the coordinates of one end of the consecutive cells.
        i. The end with the smaller row number.
        ii. If the line is on a row, the end with the smaller column number.
    b. Attributes `endRow` and `endCol` point to the other end.

4. Otherwise, the function returns false.

Examples:

```
$board
[
    [ 3,  7, 11, 12],
    [ 8, 15,  1, 10],
    [14,  2 , 4,  5],
    [ 9, 13, 16,  6],
]
```

- **Row**
    - Sequence: [10, 1, 15, 8] Match from (1,0) to (1,3).
    - Sequence: [14, 2, 5] No match
- **Column**
    - Sequence: [13, 2, 15] Match from (1,1) to (3,1).
    - Sequence: [13, 2, 7] No match
- **Diagonal**
    - Sequence: [4, 3, 15] Match from (0,0) to (2,2).
    - Sequence: [9, 1, 12, 2] Match from (0,3) to (3,0).
    - Sequence: [9, 1, 12] No match
- **Others**
    - Sequence: [4] Match from (2,2) to (2,2).
    - Sequence: [13, 16, 6, 7] No match
    - Sequence: [9, 4, 1, 12] No match
    - Sequence: [1, 2, 3, 4, 5] No match

Use `q4_test.php` to check your code.