Please provide solutions for the following problems, your solutions will be evaluated based on their readability/clarity and efficiency. Feel free to provide your solutions in a separate sheet or in a GitHub repository.

1. JavaScript Chapter

Exercise 1

ISBN-10 identifiers are ten digits long. The first nine characters are digits `0-9`. The last digit can be `0-9` or `X`, to indicate a value of 10.

An ISBN-10 number is valid if the sum of the digits multiplied by their position modulo 11 equals zero.

For example:

```
ISBN     : 1 1 1 2 2 2 3 3 3  9
position : 1 2 3 4 5 6 7 8 9 10
```

This is a valid ISBN, because:
(1*1 + 1*2 + 1*3 + 2*4 + 2*5 + 2*6 + 3*7 + 3*8 + 3*9 + 9*10) % 11 = 0

Examples

```
1112223339   -->  true
111222333    -->  false
1112223339X  -->  false
1234554321   -->  true
1234512345   -->  false
048665088X   -->  true
X123456788   -->  false
```

Your solution here:

```
function validISBN10(isbn) {

    // TODO: return true if (and only if) isbn is a valid 10-digit ISBN.

}
```

Exercise 2

Complete the function that takes a non-negative integer, and returns a list of non-negative integer pairs whose values - when squared - sum to the given integer.

For example, given the parameter `25`, the function should return the two pairs `[0, 5]` and `[3, 4]` because `0^2 + 5^2 = 25` and `3^2 + 4^2 = 25`.

Return the pairs in ascending order, so e.g. `[[0, 5], [3, 4]]` **not** `[[5, 0], [3, 4]]` or `[[3, 4], [0, 5]]`, etc.

If the given value cannot be expressed as the sum of two squares, return an empty array.

Note: The upper bound of the parameter value will be `2,147,483,647`

Examples

```
  0  -->  [ [0, 0] ]
  1  -->  [ [0, 1] ]
  2  -->  [ [1, 1] ]
  3  -->  []
  4  -->  [ [0, 2] ]
  5  -->  [ [1, 2] ]
 25  -->  [ [0, 5], [3, 4] ]
325  -->  [ [1, 18], [6, 17], [10, 15] ]
```

Your solution here:

```
function allSquaredPairs(num) {

  // max(num) === 2147483647


  // Return every unique pair of numbers [a,b] where (a * a) + (b * b) =
num;

  // return value will be a two-dimensional array [[]]

}
```

2. PHP Chapter

a. What's the difference between the `include()` and `require()` functions?

b. How can we get the IP address of the client?

c. What is the output of the following code:

```
$a = '1';
$b = &$a;
$b = "2$b";
echo $a.", ".$b;
```

d. What are the main error types in PHP and how do they differ?

Exercise 1

Write a brief sample code that connects to a mySQL DB and functions that do the following:

a. Add new record (with SQL statement)

b. Update existing record (with SQL statement)

c. delete specific record (with SQL statement)

Exercise 2

Write a brief sample code that iterates through a database table called users, and fetches all records (use the following field names: *client_id*, *client_name*, *client_email*).

Exercise 3

Assume you have this associative array:
`array("Peter"=>"35", "Ben"=>"37", "Joe"=>"43");`

Write a brief sample code that loops through it and prints the *name*, *and age*.

3. React.js Chapter

a. What is the difference between state and props?

b. What are synthetic events in React? (Provide an example)

c. What are portals in React?

e. What will happen if you use setState in constructor?

Exercise

Use the following test API :
https://jsonplaceholder.typicode.com/todos

a. Create a simple app in React that fetches data from the above API and displays UI elements in a list.

b. Each object should include the following key properties of each object (*id*, *title*).

c. Furthermore, using the *"completed"* key property, display each UI element in different backgroundColor according to its value (*false/true*).