



Information Systems and Databases
Project Assignment (part III)
<http://web.ist.utl.pt/ist180856/Part3/>

Maria Casimiro, ist178755
Mariana Martins, ist180856
Pedro Carmo, ist190989
Group 46

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1 Global Structure

Firstly, the user lands on index.php, figure 1 (section 5), where it is presented with 3 options to interact with the database, Patient, Study or Region related. For all of these, the access to the database is done through the file db.php (section 5). The inputs are passed through POST method since its safer than GET, except when this last method is necessary.

SIBD Project

SIBD's Medical Center

Search Patient

Patient name:

Create New Study

Add New Region

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Figure 1: index.php

2 Patient

2.1 Search for a patient

After searching for the patient in the home page, one of two things can happen: either the patient is already listed or he isn't. In the latter, figure 2, it is possible to insert a new patient.

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Insert a new patient:

* required field

Patient name: *

Birth date: *

Address: *

There is no patient named Maria

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Figure 2: Patient not listed

In the former case, figure 3, it is possible to choose the patient we were looking for and check all the devices he has used in the past and the ones he is using now, which are the ones highlighted, figure 4.

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Patients with 'Pedro':

Pedro Vasco - no. 162

Not listed? Insert new patient

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Figure 3: Patient already in the DB

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Devices used or in use by the patient:

A10U7F Proteus

A23OE5 Proteus

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Figure 4: Devices used and in use by the patient

2.2 Change patient's device

In order to change the device(s) a patient is using, it is necessary to have devices available for replacement. This can be checked after clicking the option "REPLACE" in the page that presents the devices currently worn. This leads us to a new page, showing all the devices available for replacement, figure 5.

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Possible replacement devices:

[A23OE5](#) Proteus

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Figure 5: Devices available for replacement

Now, if we intend to replace the device for one of the available ones, we only need to press "REPLACE", and we will be led to a page that informs us of the success of the replacement, figure 6.

This replacement had to be carefully programmed, since all the updates of the tables and all of the inserts had to be done in one transaction, to guarantee that if something went wrong inserting the new data, the database would rollback to a previous and consistent state. Moreover, we had to check if there was more than one row entry of the Wears table that referenced the same row of the Period table, because in that case, instead of an update, there would be an insert of a new period in the table.

To solve the problem of updating both tables at once, the Period table and the Wears table, we modified the database, so that the table Wears would be updated on cascade.

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Device successfully updated!

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Figure 6: Successful replacement of devices

3 Study

When creating a study, the user also has to create a series associated to it. If any loading to the database (whether from the study or the series) fails, the process is rolled back, because its a single transaction (figure 7) (section 7.1).

SIBD Project

SIBD's Medical Center

Create a new study:

* required field

Request Number: *

Description: *

Date: *

Doctor ID: *

Manufacturer: *

Serial Number: *

Create a new serie:

* required field

Name: *

Description: *

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Figure 7: Create a new study and series

According to the request number, the doctor ID dropdown content adapts (section 7.1.1). This also happens for Manufacturer/Serial Number (section 7.1.2). The date calendar only allows dates posterior to today. When the input is loaded to the database the user lands on a page that echos the success

or the failure (figure 8) (section 7.2).

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A new study was created!

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Figure 8: Study and series submitted with success

4 Region

By selecting the "Add New Region" option on index.php page, the user will be presented with a table with all Studies of the database, along with their respective information, as we can see in figure 9 (section 8.1).

SIBD Project					
<u>SIBD's Medical Center</u>					
Studies List					
Request Number	Description	Date	Doctor ID	Serial Number	Manufacturer
1	X-ray left knee	2016-08-23	202	S57BT2	Medtronic
2	dwfw	2017-11-30	203	A10U7F	Proteus
2	X-ray both hands	2016-09-16	203	S76BT3	Medtronic
3	ECG	2016-09-02	204	S89RE4	Medtronic
4	ECG	2016-10-01	205	S35G7U	Medtronic
5	pregnancy echography	2016-09-12	202	S64OI1	Medtronic
6	X-ray right arm	2016-10-07	201	S57BT2	Medtronic
7	X-ray left knee	2016-10-27	204	S76BT3	Medtronic
8	ECG	2016-09-15	205	S89RE4	Medtronic
9	ECG	2016-10-16	202	S35G7U	Medtronic
10	echography left knee	2016-11-07	203	S64OI1	Medtronic
11	X-ray right hand	2017-04-02	202	S57BT2	Medtronic
12	X-ray both knees	2017-05-20	204	S76BT3	Medtronic
13	echography right knee	2017-06-12	201	S64OI1	Medtronic
14	ECG	2017-09-20	205	S89RE4	Medtronic

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Figure 9: Presenting the table of all studies

From this page, we can go deeper on each study by selecting the desired request number. This will lead us to the listing of all the series assigned to the study with the information about its ID, name, description and number of elements, as presented in figure 10(section 8.2).

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Series List

Series ID	Name	Description	Elements
5	S0505	pregnancy echography	2

[Return Studies List](#)

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Figure 10: Presenting the table of all series assigned to a study

By following the same principle, the user can click on the number of the element, resulting on the listing of all elements of that series, with its number of assigned regions, figure 11 (section 8.3).

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Elements List

Element Index	description	No of Regions
1	pregnancy echography	2
2	pregnancy echography	1

[Return Series List](#)

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Figure 11: Presenting the table of elements assigned to a series that belongs to a study

Then again, a table with the region's coordinates will be presented, as it can be seen in figure 12 (section 8.4), but now there is the possibility of adding a region to this

element by simply filling out the fields and submitting the form.

SIBD Project

SIBD's Medical Center

Regions List for Series S0505 - Element 1

x1	y1	x2	y2
0.10	0.40	0.20	0.60
0.50	0.40	0.60	0.60

Add New Region

Series ID: 5 | Element Index: 1

x1: y1:

x2: y2:

[Return Elements List](#)

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Figure 12: Presenting the table of all regions in a chosen element

Following the submission, the user is presented with an ending result page that returns positive – if the region does not overlap with any other region of that element, figure 13(section 8.5)– or negative – if the region overlaps with some other region of that element, figure 13 (section 8.5). In every iteration along the tables, the user has the possibility of returning to the previous table.

SIBD Project

SIBD's Medical Center

There is new clinical evidence on:

Patient Name: Smith
Patient Number: 159
Element index: 1
Series Name: S0101 (ID 1)
Study Request Number: 1
requested by: Doctor 202

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Figure 13: Success result page when adding a region

SIBD Project

SIBD's Medical Center

ERROR REGION OVERLAP - Could not add the new clinical evidence on:

Patient Name: Smith
Patient Number: 159
Element Index: 1
Series Name: S0101 (ID 1)
Study Request Number: 1
requested by: Doctor 202

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Figure 14: Error result page when adding a region

5 Code - Global Structure

```
1 <!-- index.php -->
2 <html lang="en">
3 <head>
4     <meta charset="utf-8">
5     <title>SIBD Project</title>
6     <link rel="stylesheet" type="text/css" href="css/style.css">
7 </head>
8 <body>
9     <h1>SIBD Project</h1>
10    <h2><a style='color:#484848;' href=' '><span style='color↵
        :#484848'>SIBD's Medical Center</span></a></h2>
11    <ul>
12        <li>
13            <h3>Search Patient</h3>
14            <form action="patient/look_for_patient.php" method="post"↵
                ">
15                <p>Patient name: <input value="" type="text" name="↵
                    patient_name" required/> <input value="Submit" type↵
                    ="submit" value="Submit"/></p>
16            </form>
17        </li>
18        <li>
19            <a href = "study/create_study.php"><h3>Create New Study↵
                </h3>
20            </a>
21        </li>
22        <li>
23            <a href = "region/studies.php"><h3>Add New Region<h3>
24            </a>
25        </li>
26    </ul>
27 <?php include 'footer.php';?>
28 </body>
29 </html>
```

```
1 <!-- db.php -->
2 <?php
3     $host = "db.ist.utl.pt";
4     $user = "ist180856";
5     $pass = "tkeh0706";
6     $dsn = "mysql:host=$host; dbname=$user";
7     try {
8         $connection = new PDO($dsn, $user, $pass);
9     }
```

```
10     catch (PDOException $exception) {
11         echo("<p>Error: ");
12         echo($exception->getMessage());
13         echo("</p>");
14         exit();
15     }
16 ?>
```

6 Code - Patient

6.1 Look-up patient

```
1 <html>
2   <head>
3     <meta charset="utf-8">
4     <title>SIBD Project</title>
5     <link rel="stylesheet" type="text/css" href="../css/↵
      style.css">
6     <script src="https://ajax.googleapis.com/ajax/libs/↵
      jquery/3.2.1/jquery.min.js"></script>
7     <script src="https://code.jquery.com/jquery-1.12.4.js"↵
      ></script>
8     <script src="https://code.jquery.com/ui/1.12.1/jquery-ui↵
      .js"></script>
9   </head>
10  <body>
11    <?php include '../header.php';?>
12    <?php include '../database/db.php';?>
13    <div id="insert_patient">
14      <form action="insert_patient.php" method = "post">
15        <h3>Insert a new patient:</h3>
16        <span class="error">* required field</span>
17        <p>Patient name: <input type="text" name="↵
          patient_name" required/>
18          <span class="error">* </span>
19        </p>
20        <?php
21          $year = date("Y");
22          $month = date("m");
23          $day = date("d");
24          echo("
25            <script>
26              $( function() {
27                $('#birthdate').datepicker({
28                  maxDate: new Date($year, $month ↵
                    - 1, $day),
29                  dateFormat: 'yy-mm-dd'
30                });
31              } );
32            </script>
33          ");
34        <?>
35        <p>Birth date: <input id="birthdate" type = "text" ↵
          name="birthdate" required/>
36          <span class="error">* </span>
37        </p>
```

```

38         <p>Address: <input type="text" name="address" ↵
           required/>
39         <span class="error">* </span>
40     </p>
41     <p><input type="submit" value="Submit"/></p>
42 </form>
43 </div>
44 <script>
45     $('#birthdate').keydown(function(e) {
46         e.preventDefault();
47         return false;
48     });
49     $('#insert_patient').hide();
50     function show_insert_patient() {
51         $('#insert_patient').show();
52         $('#listed').hide();
53     }
54 </script>
55 <?php
56     $patient_name = $_REQUEST['patient_name'];
57     $sql = "SELECT name, p_number
58           FROM Patient
59           WHERE name like '%$patient_name%'";
60     $result = $connection->query($sql);
61     $nrows = $result->rowCount();
62
63     if($nrows == 0){
64         echo("<script>$('#insert_patient').show()</script>
65             <h3 style='color:red'>There is no patient named ↵
66                 $patient_name</h3>
67             ");
68     }
69     else {
70         echo("<div id='listed'>");
71         echo("<h3>Patients with '$patient_name':</h3>");
72         echo("<ul>");
73         foreach ($result as $row) {
74             $p_name = $row['name'];
75             $p_number = $row['p_number'];
76             echo("<li><h3><a href='patient.php?number=$p_number↵
77                 '>$p_name - no. $p_number</a></h3></li>");
78         }
79         echo("</ul>");
80         echo("<button type='button' onclick='show_insert_patient↵
81             ()'>Not listed? Insert new patient</button>");
82     }
83     $connection = null;
84     ?>

```

```

83 <?php include '../footer.php';?>
84     </body>
85 </html>

```

6.2 Insert new patient in the database

```

1 <html>
2     <head>
3         <meta charset="utf-8">
4         <title>SIBD Project</title>
5         <script src="https://ajax.googleapis.com/ajax/libs/↵
        jquery/3.2.1/jquery.min.js"></script>
6         <link rel="stylesheet" type="text/css" href="..↵
        style.css">
7     </head>
8     <body>
9 <?php include '../header.php';?>
10 <?php include '../database/db.php';?>
11 <?php
12     $patient_name = $_POST['patient_name'];
13     $birthdate = $_POST['birthdate'];
14     $address = $_POST['address'];
15
16     $sql = "SELECT p_number FROM Patient
17             ORDER BY p_number desc";
18
19     $result = $connection->query($sql);
20     if ($result == FALSE) {
21         $info = $connection->errorInfo();
22         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
23         exit(0);
24     }
25
26     foreach ($result as $row) {
27         $p_number[0] = $row['p_number'];
28         break;
29     }
30     $patient_number = $p_number[0] + 1;
31
32     $stmt = $connection->prepare("INSERT INTO Patient VALUES(:↵
        p_number, :name, :birthday, :address)");
33     $stmt->bindParam(':p_number', $patient_number);
34     $stmt->bindParam(':name', $patient_name);
35     $stmt->bindParam(':birthday', $birthdate);
36     $stmt->bindParam(':address', $address);
37

```

```

38     if($stmt->execute()){
39         echo("<h3>New patient inserted in the database</h3>");
40         echo "<ul>
41             <li>Patient name: $patient_name</li>
42             <br>
43             <li>Patient number: $patient_number</li>
44             <br>
45             <li>Birthdate: $birthdate</li>
46             <br>
47             <li>Address: $address</li>
48         </ul>";
49     }else {
50         echo "<h2>ERROR: inserting new patient</h2>";
51     }
52
53     $connection = null;
54 ?>
55 <?php include '../footer.php';?>
56 </body>
57 </html>

```

6.3 Patient's devices

```

1 <html>
2 <head>
3     <meta charset="utf-8">
4     <title>SIBD Project</title>
5     <script src="https://ajax.googleapis.com/ajax/libs/↵
        jquery/3.2.1/jquery.min.js"></script>
6     <link rel="stylesheet" type="text/css" href="../css/↵
        style.css">
7 </head>
8 <body>
9 <?php include '../header.php';?>
10 <?php include '../database/db.php';?>
11 <?php
12
13     $patient = $_GET['number'];
14
15     $sql = "SELECT Wears.p_start, Wears.p_end, Wears.snum, Wears↵
        .manuf
16         FROM Wears, Device
17         WHERE Wears.snum = Device.serialnum
18         AND Wears.manuf = Device.manufacturer
19         AND Wears.patient = $patient
20         ORDER BY Wears.p_end desc";

```

```

21
22     $result = $connection->query($sql);
23     if ($result == FALSE) {
24         $info = $connection->errorInfo();
25         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
26         exit(0);
27     }
28
29     $nrows = $result->rowCount();
30     if ($nrows == 0) {
31         echo "<h3>No devices</h3>";
32     }
33     else {
34         echo "<h3>Devices used or in use by the patient:</h3>";
35         echo "<ul>";
36         $today = date("Y-m-d");
37         foreach ($result as $row) {
38             $start = $row['p_start'];
39             $end = $row['p_end'];
40             $snum = $row['snum'];
41             $manuf = $row['manuf'];
42             if($today < $end){
43                 echo "<li><mark>$snum &nbsp; &nbsp; $manuf</mark> ↵
44                     &nbsp; &nbsp; ";
45                 echo("<a href='replace_device.php?snum=$snum&↵
46                     manuf=$manuf
47                     &patient=$patient&start=$start&end=$end'><button↵
48                     >REPLACE</button></a></li></br>");
49             }
50             else{
51                 echo "<li>$snum &nbsp; &nbsp; $manuf</li></br>";
52             }
53         }
54         echo "</ul>";
55     }
56
57     $connection = null;
58     ?>
59 </body>
60 <?php include '../footer.php';?>
61 </html>

```

6.4 Devices for replacement

```

1 <html>
2     <head>

```

```

3      <meta charset="utf-8">
4      <title>SIBD Project</title>
5      <script src="https://ajax.googleapis.com/ajax/libs/↵
        jquery/3.2.1/jquery.min.js"></script>
6      <link rel="stylesheet" type="text/css" href="../css/↵
        style.css">
7  </head>
8  <body>
9  <?php include '../header.php';?>
10 <?php include '../database/db.php';?>
11 <?php
12
13     $patient = $_GET['patient'];
14     $start = $_GET['start'];
15     $end = $_GET['end'];
16     $curr_snum = $_GET['snum'];
17     $curr_manuf = $_GET['manuf'];
18     $today = date("Y-m-d");
19
20     $sql = "SELECT distinct Device.serialnum, Device.↵
        manufacturer
21         FROM Device, Wears
22         WHERE Wears.snum = Device.serialnum
23             AND Wears.manuf = Device.manufacturer
24             AND Device.serialnum != '$curr_snum'
25             AND Device.manufacturer = '$curr_manuf'
26             AND Device.serialnum NOT IN
27             (SELECT distinct Device.serialnum
28              FROM Device, Wears
29              WHERE Wears.snum = Device.serialnum
30                  AND Wears.manuf = Device.manufacturer
31                  AND Device.serialnum != '$curr_snum'
32                  AND Device.manufacturer = '$curr_manuf'
33                  AND Wears.p_end > '$today')";
34
35     $result = $connection->query($sql);
36     if ($result == FALSE) {
37         $info = $connection->errorInfo();
38         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
39         exit(0);
40     }
41     $nrows = $result->rowCount();
42
43     if ($nrows == 0) {
44         echo "<h3>No devices available for replacement</h3>";
45     }else {
46         echo("<h3>Possible replacement devices:</h3>");
47         echo("<ul>");
48         foreach ($result as $row) {

```

```

49         $snum = $row['serialnum'];
50         $manuf = $row['manufacturer'];
51         echo("<li><a href='update_device.php?new_snum=$snum
52         &manuf=$manuf&patient=$patient&start=$start&end=$end←
53             '>$snum</a>");
54         echo "&nbsp; &nbsp; $manuf</li></br>";
55     }
56     echo("</ul>");
57 }
58 $connection = null;
59 ?>
60 </body>
61 <?php include '../footer.php';?>
62 </html>

```

6.5 Update database entries upon device replacement

```

1 <html>
2 <head>
3 <meta charset="utf-8">
4 <title>SIBD Project</title>
5 <script src="https://ajax.googleapis.com/ajax/libs/←
6     jquery/3.2.1/jquery.min.js"></script>
7 <link rel="stylesheet" type="text/css" href="../css/←
8     style.css">
9 </head>
10 <body>
11 <?php include '../header.php';?>
12 <?php include '../database/db.php';?>
13 <?php
14     $patient = $_GET['patient'];
15     $start = $_GET['start'];
16     $end = $_GET['end'];
17     $new_snum = $_GET['new_snum'];
18     $manuf = $_GET['manuf'];
19
20     $today = date("Y-m-d");
21
22     $connection->beginTransaction();
23
24     /* check how many entries in table Wears have the same ←
25         period */
26     $sql = "SELECT COUNT(patient)
27             FROM Wears

```

```

26         WHERE    p_start = '$start' AND p_end = '$end';
27
28     $result = $connection->query($sql);
29     $period_count = $result->fetchColumn(0);
30
31     if ($period_count > 1) {
32         $sql = "INSERT INTO Period values('$start', '$today')";
33         $result = $connection->exec($sql);
34         if (!$result){
35             $info = $connection->errorInfo();
36             echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p><←
37                 ");
38             exit(0);
39         }
40
41         $sql = "UPDATE Wears
42                 SET    p_end = '$today'
43                 WHERE  p_start = '$start'
44                 AND    (p_end = '2500-01-01' OR p_end = '$end')
45                 AND    patient = $patient";
46         $result = $connection->exec($sql);
47         if (!$result){
48             $info = $connection->errorInfo();
49             echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p><←
50                 ");
51             exit(0);
52         }
53     }
54     else{
55         $sql = "UPDATE Period
56                 SET    p_end = '$today'
57                 WHERE  p_start = '$start'
58                 AND    (p_end = '2500-01-01' OR p_end = '$end')<←
59                 ";
60
61         $result = $connection->exec($sql);
62         if (!$result){
63             $info = $connection->errorInfo();
64             echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p><←
65                 ");
66             exit(0);
67         }
68     }
69
70     $sql = "INSERT INTO Period VALUES('$today', '2500-01-01')";
71
72     $result_period = $connection->exec($sql);

```



```
70     $sql = "INSERT INTO Wears values('$today', '2500-01-01', ↵
        $patient, '$new_snum', '$manuf')";
71
72     $result_wears = $connection->exec($sql);
73
74     echo "<h3> Device successfully updated!</h3>";
75
76     if ($result_period && $result_wears) {
77         $connection->commit();
78     }
79     else{
80         $connection->rollback();
81     }
82
83     $connection = null;
84
85     ?>
86     </body>
87     <?php include '../footer.php';?>
88     </html>
```

7 Code - Study

7.1 Create Study

```
1 <html lang="en">
2   <head>
3     <meta charset="utf-8">
4     <title>SIBD Project</title>
5     <link rel="stylesheet" type="text/css" href="../css/↵
      style.css">
6     <script src="https://ajax.googleapis.com/ajax/libs/↵
      jquery/3.2.1/jquery.min.js"></script>
7     <script src="https://code.jquery.com/jquery-1.12.4.js"↵
      ></script>
8     <script src="https://code.jquery.com/ui/1.12.1/jquery-ui↵
      .js"></script>
9     <script type="text/javascript">
10       $(document).ready(function(){
11
12         $("#manufacturer").change(function(){
13           var manufacturer=$("#manufacturer").val();
14           $.ajax({
15             type:"post",
16             url:"dropdowns/get_snum.php",
17             data:"manufacturer="+manufacturer,
18             success:function(result){
19               $("#snum").html(result);
20             }
21           });
22         });
23         $("#request_number").change(function(){
24           var request_number=$("#request_number").val↵
             ();
25           $.ajax({
26             type:"post",
27             url:"dropdowns/get_doctor_id.php",
28             data:"request_number="+request_number,
29             success:function(result){
30               $("#doctor_id").html(result);
31             }
32           });
33         });
34
35         $('#date').keydown(function(e) {
36           e.preventDefault();
37           return false;
38         });
39
```

```

40         });
41     </script>
42 </head>
43 <body>
44 <?php include '../header.php';?>
45 <?php include '../database/db.php';?>
46     <form action="submit_study.php" method = "post">
47         <h3>Create a new study:</h3>
48         <span class="error">* required field</span>
49         <p>Request Number:
50             <select id="request_number" name="request_number"
51                 " required>
52                 <option></option>
53 <!-- Get all request numbers-->
54 <?php
55     $sql = "SELECT distinct r_number FROM Request ORDER BY ↵
56             r_number";
57     $result = $connection->query($sql);
58     if ($result == FALSE) {
59         $info = $connection->errorInfo();
60         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
61         exit(0);
62     }
63     foreach($result as $row) {
64         $r_number = $row['r_number'];
65         echo("<option value=\"\$r_number\">$r_number</option>");
66     }
67 </select>
68     <span class="error">* </span>
69 </p>
70 <p>Description: <input type="text" name="description" ↵
71     " required/>
72     <span class="error">* </span>
73 </p>
74 <?php
75     $year = date("Y");
76     $month = date("m");
77     $day = date("d");
78     echo("
79         <script>
80             $( function() {
81                 $('#date').datepicker({
82                     minDate: new Date($year, $month ↵
83                         - 1, $day),
84                     dateFormat: 'yy-mm-dd'
85                 });
86             } );
87         </script>

```

```

85         ");
86     ?>
87     <p>Date: <input id="date" type="text" name="date" ↵
        required/>
88         <span class="error">* </span>
89     </p>
90     <p>Doctor ID:
91         <select id="doctor_id" name="doctor_id" required↵
            >
92             <option></option>
93 <!-- Get all availables doctors given a certain request number↵
    -->
94         </select>
95         <span class="error">* </span>
96     </p>
97     <p>Manufacturer:
98         <select id="manufacturer" name="manufacturer" ↵
            required>
99             <option></option>
100 <!-- Get all manufacturers -->
101 <?php
102     $sql = "SELECT distinct manufacturer FROM Device ORDER BY ↵
        manufacturer";
103     $result = $connection->query($sql);
104     if ($result == FALSE) {
105         $info = $connection->errorInfo();
106         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
107         exit(0);
108     }
109     foreach($result as $row) {
110         $manufacturer = $row['manufacturer'];
111         echo("<option value=\"{$manufacturer}\">{$manufacturer}</↵
            option>");
112     }
113 ?>
114         </select>
115         <span class="error">* </span>
116     </p>
117     <p>Serial Number:
118         <select id="snum" name="serial_number" required>
119             <option></option>
120 <!-- Get all serial numbers of a certain manufacturer -->
121         </select>
122         <span class="error">* </span>
123     </p>
124     <h3>Create a new serie:</h3>
125     <span class="error">* required field</span>
126     <p>Name: <input type="text" name="series_name" ↵
        required/>

```

```

127         <span class="error">* </span>
128     </p>
129     <p>Description: <input type="text" name="↵
        series_description" required/>
130     <span class="error">* </span>
131 </p>
132     <p><input type="submit" value="Submit"/></p>
133 </form>
134 <?php include '../footer.php';?>
135 </body>
136 </html>

```

7.1.1 Dropdown - Get doctor_id

```

1 <!-- get_doctor_id.php -->
2 <?php include '../../database/db.php';?>
3 <?php
4     $request_number = $_POST["request_number"];
5
6     $sql = "SELECT distinct doctor_id FROM Doctor
7           WHERE doctor_id NOT
8           IN (SELECT doctor_id FROM Request
9             WHERE r_number = $request_number)
10          ORDER BY doctor_id";
11     $result = $connection->query($sql);
12     if ($result == FALSE) {
13         exit(0);
14     }
15     echo("<option></option>");
16     foreach($result as $row) {
17         $doctor_id = $row['doctor_id'];
18         echo("<option value=\"\$doctor_id\">$doctor_id</option>")↵
        ;
19     }
20
21 ?>

```

7.1.2 Dropdown - Get serial number

```

1 <!-- get_snum.php -->
2 <?php include '../../database/db.php';?>
3 <?php
4     $manufacturer = $_POST["manufacturer"];
5

```

```

6     $sql = "SELECT distinct serialnum FROM Device
7             WHERE manufacturer='$manufacturer'
8             ORDER BY serialnum";
9     $result = $connection->query($sql);
10    if ($result == FALSE) {
11        exit(0);
12    }
13    echo("<option></option>");
14    foreach($result as $row) {
15        $serial_number = $row['serialnum'];
16        echo("<option value=\"\$serial_number\">$serial_number</↵
            option>");
17    }
18
19 ?>

```

7.2 Submit Study

```

1 <html>
2     <head>
3         <meta charset="utf-8">
4         <title>SIBD Project</title>
5         <link rel="stylesheet" type="text/css" href="↵
            style.css">
6     </head>
7     <body>
8 <?php include '../header.php';?>
9 <?php include '../database/db.php';?>
10 <?php
11
12     $request_number = $_POST['request_number'];
13     $description = $_POST['description'];
14     $date = $_POST['date'];
15     $doctor_id = $_POST['doctor_id'];
16     $manufacturer = $_POST['manufacturer'];
17     $serial_number = $_POST['serial_number'];
18     $series_name = $_POST['series_name'];
19     $series_description = $_POST['series_description'];
20
21     /* If series already exists */
22     $sql = "SELECT series_id FROM Series
23             WHERE series_id >=
24             ALL(SELECT series_id FROM Series);";
25     $result = $connection->query($sql);
26     if ($result == FALSE) {
27         $info = $connection->errorInfo();

```

```

28         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
29         exit(0);
30     }
31     $nrows = $result->rowCount();
32     if($nrows == 0) {
33         $series_id = 1;
34     }
35     else {
36         $last_series_id = $result->fetchColumn(0);
37         $series_id = $last_series_id + 1;
38     }
39     $url = "https://web.ist.utl.pt/".$user."/series/".$series_id↵
40         ;
41     /* Try insert in database (to avoid SQL Injetion)*/
42     try {
43         $sql_study = "INSERT INTO Study values (:request_number,↵
44             :description, :s_date, :doctor_id, :serial_number, :↵
45             manufacturer);";
46         $result_study = $connection->prepare($sql_study);
47         $sql_series = "INSERT INTO Series values (:series_id, :↵
48             series_name, :base_url, :request_number, :↵
49             series_description);";
50         $result_series = $connection->prepare($sql_series);
51
52         $connection->beginTransaction();
53
54         $result_study->bindParam(':request_number',↵
55             $request_number);
56         $result_study->bindParam(':description',$description);
57         $result_study->bindParam(':s_date',$date);
58         $result_study->bindParam(':doctor_id',$doctor_id);
59         $result_study->bindParam(':serial_number',$serial_number↵
60             );
61         $result_study->bindParam(':manufacturer',$manufacturer);
62         $result_study->execute();
63
64         $result_series->bindParam(':series_id',$series_id);
65         $result_series->bindParam(':series_name', $series_name);
66         $result_series->bindParam(':base_url',$url);
67         $result_series->bindParam(':request_number',↵
68             $request_number);
69         $result_series->bindParam(':series_description',↵
70             $description);
71         $result_series->execute();
72
73         $connection->commit();
74     }
75     catch(PDOException $err) {

```

```

68     $connection->rollBack();
69     echo("<p> A new study was NOT created! ERROR: $err.</p>"↵
70     );
71     echo("<a href='create_study.php'>Go back</a>");
72     exit(0);
73 }
74 if ($result_study == FALSE || $result_series == FALSE) {
75     $connection->rollBack();
76     $info = $connection->errorInfo();
77     echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
78     exit(0);
79 }
80
81 echo("<p> A new study was created! </p>");
82 echo("<a href='create_study.php'>Go back</a>");
83
84 $connection = null;
85 ?>
86 <?php include '../footer.php';?>
87 </body>
88 </html>

```

8 Code - Region

8.1 Studies List

```
1 <html>
2   <head>
3     <meta charset="utf-8">
4     <title>SIBD Project</title>
5     <link rel="stylesheet" type="text/css" href="../css/↵
      style.css">
6     <link rel="stylesheet" type="text/css" href="../css/↵
      table_style.css">
7   </head>
8   <body>
9     <?php include '../header.php';?>
10    <?php include '../database/db.php';?>
11    <h3>Studies List</h3>
12    <?php
13      $sql = "SELECT * FROM Study";
14      $result = $connection->query($sql);
15      if ($result== FALSE) {
16        $info = $connection->errorInfo();
17        echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
18        exit(0);
19      }
20
21      echo("<table style=\"width:100%\">");
22      echo("
23        <tr>
24          <th>Request Number</th>
25          <th>Description</th>
26          <th>Date</th>
27          <th>Doctor ID</th>
28          <th>Serial Number</th>
29          <th>Manufacturer</th>
30        </tr>");
31
32      foreach($result as $row) {
33        $r_number = $row['request_number'];
34        $description = $row['description'];
35        $s_date = $row['s_date'];
36        $doctor_id = $row['doctor_id'];
37        $serial_number = $row['serial_number'];
38        $manufacturer = $row['manufacturer'];
39        echo("
40          <tr>
41            <td><a href= \"series.php?r_number=$r_number&↵
              description='$description'\"> $r_number</a></↵
```

```

42         <td>$description</td>
43         <td>$s_date</td>
44         <td>$doctor_id</td>
45         <td>$serial_number</td>
46         <td>$manufacturer</td>
47     </tr>");
48 }
49 echo("</table>");
50 ?>
51 <?php include '../footer.php';?>
52 </body>
53 </html>

```

8.2 Series List

```

1 <?php
2     session_start();
3 ?>
4 <html>
5     <head>
6         <meta charset="utf-8">
7         <title>SIBD Project</title>
8         <link rel="stylesheet" type="text/css" href="../css/↵
          style.css">
9         <link rel="stylesheet" type="text/css" href="../css/↵
          table_style.css">
10    </head>
11    <body>
12 <?php include '../header.php';?>
13 <?php include '../database/db.php';?>
14     <h3>Series List</h3>
15 <?php
16     $r_number = $_GET['r_number'];
17     $description = $_GET['description'];
18     $_SESSION['r_number'] = $r_number;
19     $_SESSION['description'] = $description;
20     $sql = "select s.series_id, s.name, s.description, count(e.↵
          elem_index) from Study as st NATURAL JOIN Series as s ↵
          LEFT OUTER JOIN Element as e on exists(select e2.↵
          elem_index from Series natural join Element as e2 where ↵
          Series.description = st.description and e2.series_id = e.↵
          series_id and e.elem_index = e2.elem_index) where st.↵
          request_number = $r_number and st.description=↵
          $description";
21     $result = $connection->query($sql);

```

```

22     if ($result== FALSE) {
23         $info = $connection->errorInfo();
24         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
25         exit(0);
26     }
27
28     echo("<table style=\"width:100%\">");
29     echo("
30         <tr>
31             <th>Series ID</th>
32             <th>Name</th>
33             <th>Description</th>
34             <th>Elements</th>
35         </tr>");
36     foreach($result as $row){
37         $series_id = $row['series_id'];
38         $name = $row['name'];
39         $description = $row['description'];
40         $count = $row['count(e.elem_index)'];
41         echo("
42             <tr>
43                 <td>$series_id</td>
44                 <td>$name</td>
45                 <td>$description</td>
46                 <td><a href =\"elements.php?series_id=$series_id\">
47                     \>$count</a></td>
48             </tr>");
49     }
50     echo("</table>");
51     ?>
52     <br><a href = "studies.php">Return Studies List</a>
53 <?php include '../footer.php';?>
54 </body>
55 </html>

```

8.3 Elements List

```

1 <?php
2     session_start();
3 ?>
4 <html>
5     <head>
6         <meta charset="utf-8">
7         <title>SIBD Project</title>

```

```

8         <link rel="stylesheet" type="text/css" href="../css/↵
           style.css">
9         <link rel="stylesheet" type="text/css" href="../css/↵
           table_style.css">
10    </head>
11    <body>
12    <?php include '../header.php';?>
13    <?php include '../database/db.php';?>
14        <h3>Elements List</h3>
15    <?php
16        $r_number = $_SESSION['r_number'];
17        $description = $_SESSION['description'];
18        $s_id = $_GET['series_id'];
19        $_SESSION['series_id'] = $s_id;
20        $sql = "SELECT e.elem_index,s.description, count(r.x1) as ↵
           n_regions
21            FROM Series AS s
22            NATURAL JOIN Element AS e
23            LEFT OUTER JOIN Region AS r
24            ON EXISTS(
25                SELECT r2.x1
26                FROM Element AS e2
27                NATURAL JOIN Region AS r2
28                WHERE r.x1 = r2.x1
29                AND r.x2 = r2.x2
30                AND r.y1 = r2.y1
31                AND r.y2 = r2.y2
32                AND e2.elem_index = e.elem_index
33                AND e.series_id = e2.series_id)
34            WHERE e.series_id = $s_id
35            GROUP BY e.elem_index";
36    $result = $connection->query($sql);
37    if ($result== FALSE) {
38        $info = $connection->errorInfo();
39        echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
40        exit(0);
41    }
42
43    echo("<table style=\"width:100%\">");
44    echo("
45        <tr>
46            <th>Element Index</th>
47            <th>description</th>
48            <th>No of Regions</th>
49        </tr>");
50
51    foreach($result as $row){
52        $index = $row['elem_index'];
53        $description = $row['description'];

```

```

54         $count = $row['n_regions'];
55         echo("
56             <tr>
57                 <td>$index</td>
58                 <td>$description</td>
59                 <td><a href =\"regions.php?ind=$index\" >$count<
                    </a></td>
60             </tr>");
61     }
62     echo("</table>");
63     echo("<br><a href = \"series.php?r_number=$r_number&
        description=$description\">Return Series List</a>");
64 ?>
65 <?php include '../footer.php';?>
66 </body>
67 </html>

```

8.4 Regions List

```

1  <?php
2      session_start();
3  ?>
4  <html>
5      <head>
6          <meta charset="utf-8">
7          <title>SIBD Project</title>
8          <link rel="stylesheet" type="text/css" href="../css/
                style.css">
9          <link rel="stylesheet" type="text/css" href="../css/
                table_style.css">
10     </head>
11     <body>
12 <?php include '../header.php';?>
13 <?php include '../database/db.php';?>
14 <?php
15     $s_id = $_SESSION['series_id'];
16     $e_index = $_GET['ind'];
17     $_SESSION['e_ind'] = $e_index;
18     $sql = "SELECT name
19             FROM Series
20             WHERE series_id = $s_id";
21     $result = $connection->query($sql);
22     if ($result== FALSE) {
23         $info = $connection->errorInfo();
24         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
25         exit(0);

```

```

26     }
27     $name = $result->fetchColumn(0);
28
29     echo("<h3>Regions List for Series $name - Element $e_index <←
        </h3>");
30
31     $sql_count = "SELECT count(r.x1) AS count
32                  FROM Region AS r
33                  WHERE r.series_id = $s_id
34                  AND r.elem_index = $e_index";
35     $result_count = $connection->query($sql_count);
36     if ($result_count == FALSE) {
37         $info = $connection->errorInfo();
38         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
39         exit(0);
40     }
41     $counter = $result_count->fetchColumn(0);
42     if($counter == 0){
43         echo("<h3><span style='color:red'>The selected Element <←
            has no Region assigned</span></h3>");
44     }
45     else {
46         $sql = "SELECT *
47               FROM Element AS e
48               NATURAL JOIN Region AS r
49               WHERE r.series_id = $s_id
50               AND r.elem_index = $e_index";
51         $result = $connection->query($sql);
52         if ($result== FALSE) {
53             $info = $connection->errorInfo();
54             echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p><←
                ");
55             exit(0);
56         }
57         echo("<table style=\"width:100%\">");
58         echo("
59             <tr>
60                 <th>x1</th>
61                 <th>y1</th>
62                 <th>x2</th>
63                 <th>y2</th>
64             </tr>");
65         foreach($result as $row) {
66             $x1 = $row['x1'];
67             $y1 = $row['y1'];
68             $x2 = $row['x2'];
69             $y2 = $row['y2'];
70             echo("
71                 <tr>

```

```

72         <td>$x1</td>
73         <td>$y1</td>
74         <td>$x2</td>
75         <td>$y2</td>
76     </tr>");
77     }
78 }
79 echo("</table>");
80 ?>
81 <h4>Add New Region</h4>
82 <form method="post" action="region_result.php">
83     <p>Series ID: <?php echo($s_id)?> | Element Index: <?php
84         echo($e_index)?></p>
85     <p>x1: <input value="" type="text" name="x1" required/> ↵
86         y1: <input value="" type="text" name="y1" required/> ↵
87         </p>
88     <p>x2: <input value="" type="text" name="x2" required/> ↵
89         y2: <input value="" type="text" name="y2" required/> ↵
90         </p>
91     <p><input type="submit" value="Submit"/></p>
92 </form>
93 <?php echo("<a href = \"elements.php?series_id=$s_id\">Return ↵
94     Elements List</a>");?>
95 <?php include '../footer.php';?>
96 </body>
97 </html>

```

8.5 Region Result

```

1 <?php
2     session_start();
3 ?>
4 <html>
5     <head>
6         <meta charset="utf-8">
7         <title>SIBD Project</title>
8         <link rel="stylesheet" type="text/css" href="../css/↵
9             style.css">
10        <link rel="stylesheet" type="text/css" href="../css/↵
11            table_style.css">
12    </head>
13    <body>
14        <?php include '../header.php';?>
15        <?php include '../database/db.php';?>
16        <?php

```

```

16     $s_id = $_SESSION['series_id'];
17     $e_index = $_SESSION['e_ind'];
18
19     $x1 = $_POST['x1'];
20     $x2 = $_POST['x2'];
21     $y1 = $_POST['y1'];
22     $y2 = $_POST['y2'];
23
24     $result_validation = $connection->prepare(
25         "SELECT region_overlaps_element(:s_id, :e_index, :x1, :↵
26             y1, :x2, :y2) as verify");
27     $result_validation->bindParam(':s_id', $s_id);
28     $result_validation->bindParam(':e_index', $e_index);
29     $result_validation->bindParam(':x1', $x1);
30     $result_validation->bindParam(':y1', $y1);
31     $result_validation->bindParam(':x2', $x2);
32     $result_validation->bindParam(':y2', $y2);
33     $result_validation->execute();
34     if ($result_validation == FALSE) {
35         $info = $connection->errorInfo();
36         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
37         exit(0);
38     }
39     foreach($result_validation as $row){
40         $validation = $row['verify'];
41     }
42
43     $sql = "SELECT p.p_number, p.name as p_name, req.r_number, s↵
44         .name as s_name, st.doctor_id
45         FROM Patient as p, Request as req , Study as st , ↵
46         Series as s
47         WHERE p.p_number = req.patient_id
48         AND req.r_number = st.request_number
49         AND st.request_number = s.request_number
50         AND st.description = s.description
51         AND s.series_id = $s_id";
52     $result = $connection->query($sql);
53     if ($result== FALSE) {
54         $info = $connection->errorInfo();
55         echo("<p>ERROR: {$info[0]} {$info[1]} {$info[2]}</p>");
56         exit(0);
57     }
58
59     if($validation == 0){
60         $result_insert = $connection->prepare(
61             "INSERT INTO Region values(:s_id, :e_index, :x1, :y1↵
62                 , :x2, :y2)");
63         $result_insert->bindParam(':s_id', $s_id);
64         $result_insert->bindParam(':e_index', $e_index);

```



```

61         $result_insert->bindParam(':x1', $x1);
62         $result_insert->bindParam(':y1', $y1);
63         $result_insert->bindParam(':x2', $x2);
64         $result_insert->bindParam(':y2', $y2);
65         $result_insert->execute();
66         $msg = "There is ";
67         $style_color = "MediumSeaGreen;";
68
69     }
70     else{
71         $msg = "ERROR REGION OVERLAP - Could not add the ";
72         $style_color = "Tomato;";
73     }
74     foreach($result as $row){
75         $p_number = $row['p_number'];
76         $p_name = $row['p_name'];
77         $r_number = $row['r_number'];
78         $s_name = $row['s_name'];
79         $doctor_id = $row['doctor_id'];
80     }
81
82     echo("
83         <p style=\"color:$style_color\">".$msg . "new clinical ↵
84             evidence on: </p><p id=\"newstyle\">Patient Name: ↵
85                 $p_name
86                 <br>Patient Number: $p_number <br>Element index: ↵
87                 $e_index <br>Series Name: $s_name
88                 (ID $s_id)<br>Study Request Number: $r_number <br> ↵
89                 requested by: Doctor $doctor_id
90             </p>");
91     echo("<br><a href = \"regions.php?ind=$e_index\">Go Back</a>↵
92         ");
93 }
94
95 <?php include '../footer.php';?>
96 </body>
97 </html>

```
