1. Criação das Tabelas

drop table if exists connects; drop table if exists lives; drop table if exists wears;

drop table if exists setting; drop table if exists reading; drop table if exists sensor;

drop table if exists actuator; drop table if exists municipality; drop table if exists period;

drop table if exists device; drop table if exists pan; drop table if exists patient;

create table patient

(number numeric(20), name varchar(255), address varchar(255),

primary key(number));

create table pan

(domain varchar(255), phone numeric(20), primary key(domain));

create table device

(serialnum numeric(20), manufacturer varchar(255), description varchar(255),

primary key(serialnum, manufacturer));

create table sensor

(snum numeric(20), manuf varchar(255), units varchar(255),

primary key(snum, manuf),

foreign key(snum, manuf) references device(serialnum, manufacturer));

create table actuator

(snum numeric(20), manuf varchar(255), units varchar(255),

primary key(snum, manuf),

foreign key(snum, manuf) references device(serialnum, manufacturer));

create table municipality

(nut4code numeric(20), name varchar(255),

primary key(nut4code));

create table period

(start date, end date,

primary key(start, end));

create table reading

(snum numeric(20), manuf varchar(255), datetime timestamp, value numeric(20,2),

primary key(snum, manuf, datetime),

foreign key(snum, manuf) references sensor(snum, manuf));

create table setting

(snum numeric(20), manuf varchar(255), datetime timestamp, value numeric(20,2),

primary key(snum, manuf, datetime),

foreign key(snum, manuf) references actuator(snum, manuf));

create table wears

(start date, end date, patient numeric(20), pan varchar(255),

primary key(start, end, patient),

foreign key(start, end) references period(start, end),

foreign key(patient) references patient(number),

foreign key(pan) references pan(domain));

create table lives

(start date, end date, patient numeric(20), muni numeric(20),

primary key(start, end, patient),

foreign key(start, end) references period(start, end),

foreign key(patient) references patient(number),

foreign key(muni) references municipality(nut4code));

create table connects

(start date, end date, snum numeric(20), manuf varchar(255), pan varchar(255),

primary key(start, end, snum, manuf),

foreign key(start, end) references period(start, end),

foreign key(snum, manuf) references device(serialnum, manufacturer),

foreign key(pan) references pan(domain));

1. Triggers

delimiter $$

create trigger check\_overlapping\_periods\_wears\_insert before insert on wears

for each row

begin

if new.start < some (select wears.end from wears where new.pan = wears.pan)

and new.pan in (select wears.pan from wears where new.pan = wears.pan) then

call pan\_already\_in\_use\_1();

end if;

end$$

create trigger check\_overlapping\_periods\_wears\_update before update on wears

for each row

begin

if (new.start < some (select wears.end from wears where wears.patient != new.patient and wears.pan = new.pan)

and new.end > some (select wears.start from wears where wears.patient != new.patient and wears.pan = new.pan))

or (new.end > some (select wears.start from wears where wears.patient != new.patient and wears.pan = new.pan)

and new.start < some (select wears.end from wears where wears.patient != new.patient and wears.pan = new.pan)) then

call pan\_already\_in\_use\_2();

end if;

end$$

create trigger check\_overlapping\_periods\_connects\_insert before insert on connects

for each row

begin

if new.start < some (select connects.end from connects where new.snum = connects.snum and new.manuf = connects.manuf) then

call pan\_already\_in\_use\_3();

end if;

end$$

create trigger check\_overlapping\_periods\_connects\_update before update on connects

for each row

begin

if (new.start < some (select connects.end from connects where new.snum = connects.snum and new.manuf = connects.manuf and new.pan != connects.pan)

and new.end > some (select connects.start from connects where new.snum = connects.snum and new.manuf = connects.manuf and new.pan != connects.pan))

or (new.end > some (select connects.start from connects where new.snum = connects.snum and new.manuf = connects.manuf and new.pan != connects.pan)

and new.start < some (select connects.end from connects where new.snum = connects.snum and new.manuf = connects.manuf and new.pan != connects.pan)) then

call pan\_already\_in\_use\_4();

end if;

end$$

delimiter ;

* + 1. Primeiro site 4.1

<html>

<body>

<form action="query\_4a.php" method="post">

<fieldset>

<legend>Insert a patient's name</legend>

<table>

<tr>

<td align="right">Patient Name</td>

<td><input type="text" name="patient\_name"/></td>

</tr>

<tr>

<td></td>

<td><input type="submit" value="Submit"/></td>

</tr>

</table>

</fieldset>

</form>

</body>

</html>

* + 1. Segundo site 4.1

<html>

<body>

<?php

$host = "db.ist.utl.pt";

$user = "ist175876";

$pass = "ffar1598";

$dsn = "mysql:host=$host;dbname=$user";

try{

$connection = new PDO($dsn, $user, $pass);

}

catch(PDOException $exception){

echo("<p>Error: ");

echo($exception->getMessage());

echo("</p>");

exit();

}

/\*tabela dos readings\*/

$patient\_request = $\_REQUEST['patient\_name'];

$sql\_readings = "select patient.number, name, serialnum, manufacturer,

value, units, datetime

from reading

join sensor

join device

join connects

join pan

on domain = connects.pan

join wears

on domain = wears.pan

join patient

on wears.patient = patient.number

where patient.name like '%$patient\_request%'

and date(reading.datetime) between wears.start and wears.end

and date(reading.datetime) between connects.start and connects.end

and reading.snum = device.serialnum

and reading.manuf = device.manufacturer

and connects.manuf = device.manufacturer

and connects.snum = device.serialnum

and sensor.manuf = device.manufacturer

and sensor.snum = device.serialnum";

$result = $connection->query($sql\_readings);

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

$nrows = $result->rowCount();

if ($nrows >0){

echo("<table border=\"1\">");

echo("<tr><td>PatientNumber</td><td>PatientName</td><td>DeviceSerial Number</td>

<td>Device Manufacturer</td><td>Readings</td>

<td>Units</td><td>Date Time</td></tr>");

foreach($result as $row){

echo("<tr><td>");

echo($row['number']);

echo("</td><td>");

echo($row['name']);

echo("</td><td>");

echo($row['serialnum']);

echo("</td><td>");

echo($row['manufacturer']);

echo("</td><td>");

echo($row['value']);

echo("</td><td>");

echo($row['units']);

echo("</td><td>");

echo($row['datetime']);

echo("</td></tr>");

}

echo("</table>");

}

echo("<br />");

echo("<br />");

$sql\_settings = "select patient.number, patient.name, device.serialnum, device.manufacturer,

setting.value, actuator.units, setting.datetime

from setting

join actuator

join device

join connects

join pan

on pan.domain = connects.pan

join wears

on pan.domain = wears.pan

join patient

on wears.patient = patient.number

where patient.name like '%$patient\_request%'

and date(setting.datetime) between wears.start and wears.end

and date(setting.datetime) between connects.start and connects.end

and setting.snum = device.serialnum

and setting.manuf = device.manufacturer

and connects.manuf = device.manufacturer

and connects.snum = device.serialnum

and actuator.manuf = device.manufacturer

and actuator.snum = device.serialnum";

$result = $connection->query($sql\_settings);

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

$nrows = $result->rowCount();

if ($nrows >0){

echo("<table border=\"1\">");

echo("<tr><td>Patient Number</td><td>Patient Name</td><td>Device Serial Number</td>

<td>Device Manufacturer</td><td>Settings</td>

<td>Units</td><td>Date Time</td></tr>");

foreach($result as $row){

echo("<tr><td>");

echo($row['number']);

echo("</td><td>");

echo($row['name']);

echo("</td><td>");

echo($row['serialnum']);

echo("</td><td>");

echo($row['manufacturer']);

echo("</td><td>");

echo($row['value']);

echo("</td><td>");

echo($row['units']);

echo("</td><td>");

echo($row['datetime']);

echo("</td></tr>");

}

echo("</table>");

}

$connection = null;

?>

</body>

</html>

* + 1. Primeiro site 4.2

<html>

<body>

<form action="site\_b\_2.php" method="post">

<fieldset>

<legend>Insert a patient's name</legend>

<table>

<tr>

<td align="right">Patient Name</td>

<td><input type="text" name="patient\_name"/></td>

</tr>

<tr>

<td><input type="submit" value="Submit"/></td>

</tr>

</table>

</fieldset>

</form>

</body>

</html>

4.2.2 Segundo site 4.2

<html>

<body>

<form action="query\_4b.php" method="post">

<fieldset>

<legend>Choose the patient and his/hers new PAN</legend>

<table>

<tr>

<td align="right">Patient Number and Name</td>

<td><p>

<?php

$host = "db.ist.utl.pt";

$user = "ist175876";

$pass = "ffar1598";

$dsn = "mysql:host=$host;dbname=$user";

try{

$connection = new PDO($dsn, $user, $pass);

}

catch(PDOException $exception){

echo("<p>Error: ");

echo($exception->getMessage());

echo("</p>");

exit();

}

$patient\_request = $\_REQUEST['patient\_name'];

$sql\_patient = "select number, name from patient

where name like '%$patient\_request%'";

$result = $connection->query($sql\_patient);

$nrows = $result->ROWCOUNT();

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

if($nrows <= 0){

echo("<p>Error: There is no patient with that name.</p>");

exit();

}

foreach($result as $row){

$patient\_number = $row['number'];

$patient\_name = $row['name'];

echo("<input type=\"radio\" name = \"patient\_number\" value=\"$patient\_number\" checked=\"checked\"> $patient\_number $patient\_name<br/>");

}

$connection = null;

?>

</p></td>

</tr>

<td><input type="submit" value="Submit"/></td>

</tr>

</table>

</fieldset>

</form>

</body>

</html>

4.2.3 Terceiro site 4.2

<html>

<body>

<form action="site\_final\_4b.php" method="post">

<fieldset>

<?php

$host = "db.ist.utl.pt";

$user = "ist175876";

$pass = "ffar1598";

$dsn = "mysql:host=$host;dbname=$user";

try{

$connection = new PDO($dsn, $user, $pass);

}

catch(PDOException $exception){

echo("<p>Error: ");

echo($exception->getMessage());

echo("</p>");

exit();

}

/\*QUERY DA PARA DESCOBRIR PAN DO PACIENTE\*/

$patient\_request = $\_REQUEST['patient\_number'];

$patient\_request\_hidden = $\_REQUEST['patient\_number'];

//ENVIO DO PATIENT NUMBER PARA A PROXIMA PAGINA

echo("<input type='hidden' name='patient\_number\_hidden' value='$patient\_request\_hidden'/>");

//QUERY DA PAN ACTUAL

$sql\_pan = "select pan from wears where '$patient\_request' = patient";

$result\_pan = $connection->query($sql\_pan);

$nrows = $result\_pan->ROWCOUNT();

if($nrows <= 0){

echo("<p>Error: There is no PAN associated with that patient.</p>");

exit();

}

foreach($result\_pan as $row){

$current\_pan = $row['pan'];

}

echo("<input type='hidden' name='current\_pan\_hidden' value='$current\_pan'/>");

/\*QUERY DEVICES ACTUAL PAN\*/

$sql\_devices = "select serialnum, manufacturer, description

from device, wears, connects

where wears.patient = '$patient\_request'

and wears.end > CURDATE()

and connects.pan = wears.pan

and connects.end > CURDATE()

and serialnum = snum

and manufacturer = manuf";

$result = $connection->query($sql\_devices);

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

$nrows = $result->ROWCOUNT();

if($nrows <= 0){

echo("<p>Error: There are no medical devices associated with that PAN.</p>");

exit();

}

echo("<table border=\"1\">");

echo("Devices on Actual PAN");

echo("<tr><td>Serial Number</td><td>Manufacturer</td><td>Description</td>");

foreach($result as $row){

echo("<tr><td>");

echo($row['serialnum']);

echo("</td><td>");

echo($row['manufacturer']);

echo("</td><td>");

echo($row['description']);

echo("</td></tr>");

}

echo("</table>");

echo("<br/>");

/\*QUERY DEVICES LAST PAN\*/

$sql\_devices\_last = "select serialnum, manufacturer, description, wears.pan

from connects, device, wears

where patient = '$patient\_request'

and wears.end < CURDATE() and wears.end >= all

(select end from wears where end < CURDATE()

and patient = '$patient\_request')

and connects.pan = wears.pan

and serialnum = snum

and manufacturer = manuf

and ((connects.start >= wears.start and connects.end <= wears.end)

or (connects.start <= wears.start and connects.end >= wears.start)

or (connects.start <= wears.end and connects.end >= wears.end))";

$result = $connection->query($sql\_devices\_last);

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

$nrows = $result->ROWCOUNT();

if($nrows <= 0){

echo("<p>Error: There are no medical devices currently associated with the last PAN of this patient.</p>

<p>Or the PAN is already in use by another patient.</p>

<p>Or the patient doesn't have a last PAN.</p>");

exit();

}

echo("<p>Devices on Last used PAN</p>");

echo("<p>Choose the ones you want to move to your actual PAN:</p>");

foreach($result as $row){

$device\_serialnum = $row['serialnum'];

$device\_manufacturer = $row['manufacturer'];

$description = $row['description'];

$last\_pan = $row['pan'];

//QUERY PARA A PAN ACTUAL DO DEVICE

$sql\_pan\_device = "select pan

from connects

where end >= all

(select end from connects)

and end > CURDATE()

and snum = '$device\_serialnum'

and manuf = '$device\_manufacturer'";

$result\_pan\_device = $connection->query($sql\_pan\_device);

foreach($result\_pan\_device as $row\_pan\_device){

$current\_pan\_device = $row\_pan\_device['pan'];

}

$sql\_user\_device = "select end

from wears

where end >= all

(select end from wears where pan = '$current\_pan\_device') and pan = '$current\_pan\_device'";

$result\_user\_device = $connection->query($sql\_user\_device);

foreach($result\_user\_device as $row\_user\_device){

$current\_user\_device = $row\_user\_device['end'];

}

$time\_of\_device = strtotime($current\_user\_device);

$todays\_date = date("Y-m-d");

$today = strtotime($todays\_date);

if($current\_pan != $current\_pan\_device and $time\_of\_device < $today){

echo("<input type=\"checkbox\" name = \"device[]\" value=\"$device\_serialnum|$device\_manufacturer\"> $device\_serialnum : $device\_manufacturer : $description<br/>");

}

}

echo("<br/>");

//ENVIO DA ULTIMA PAN USADA PARA A PROXIMA PAGINA

echo("<input type='hidden' name='last\_pan\_hidden' value='$last\_pan'/>");

$connection = null;

?>

<input type="submit" value="Submit"/>

</fieldset>

</form>

</body>

</html>

4.2.4 Quarto site 4.2

<html>

<body>

<form action="site\_b\_1.php" method="post">

<fieldset>

<?php

$host = "db.ist.utl.pt";

$user = "ist175876";

$pass = "ffar1598";

$dsn = "mysql:host=$host;dbname=$user";

try{

$connection = new PDO($dsn, $user, $pass);

}

catch(PDOException $exception){

echo("<p>Error: ");

echo($exception->getMessage());

echo("</p>");

exit();

}

$patient\_request = $\_POST['patient\_number\_hidden'];

$last\_pan\_request = $\_POST['last\_pan\_hidden'];

$current\_pan\_request = $\_POST['current\_pan\_hidden'];

if( (!empty($\_POST['device'])) ) {

foreach($\_POST['device'] as $check) {

$device = explode('|',$check);

/\*RETIRAR TEMPOS DE INCIO E FIM DE UM CERTO DISPOSITIVO QUE VAI SER TROCADO\*/

$sql\_times = "select connects.start, connects.end

from wears, connects

where patient = '$patient\_request'

and connects.pan = '$last\_pan\_request'

and connects.pan = wears.pan

and snum = '$device[0]'

and manuf = '$device[1]'";

$result\_times = $connection->query($sql\_times);

if ($result\_times == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

foreach($result\_times as $row){

$start = $row['start'];

$end = $row['end'];

}

//QUERIES PARA A ALTERAÇÃO DE CADA DEVICE

$sql\_insert\_periods\_1 = "insert into period values ('$start', CURDATE())";

$result1 = $connection->query($sql\_insert\_periods\_1);

$sql\_insert\_periods\_2 = "insert into period values (CURDATE(), '2999-12-31')";

$result2 = $connection->query($sql\_insert\_periods\_2);

$sql\_update = "update connects set end = CURDATE()

where snum = '$device[0]'

and manuf = '$device[1]'

and start = '$start'

and end = '$end'";

$result3 = $connection->query($sql\_update);

$sql\_insert\_device = "insert into connects values (CURDATE(), '2999-12-31', '$device[0]', '$device[1]', '$current\_pan\_request')";

$result4 = $connection->query($sql\_insert\_device);

}

}

/\*DEVICES NA PAN ACTUAL ACTUALIZADA\*/

$sql\_devices = "select serialnum, manufacturer, description

from device, wears, connects

where wears.patient = '$patient\_request'

and wears.end > CURDATE()

and connects.pan = wears.pan

and connects.end > CURDATE()

and device.serialnum = connects.snum

and device.manufacturer = connects.manuf";

$result = $connection->query($sql\_devices);

if ($result == FALSE){

$info = $connection->errorInfo();

echo("<p>Error: {$info[2]}</p>");

exit();

}

$nrows = $result->ROWCOUNT();

if($nrows <= 0){

echo("<p>Error: There are no medical devices associated with that PAN.</p>");

exit();

}

echo("<table border=\"1\">");

echo("Devices on Actual PAN");

echo("<tr><td>Serial Number</td><td>Manufacturer</td><td>Description</td>");

foreach($result as $row){

echo("<tr><td>");

echo($row['serialnum']);

echo("</td><td>");

echo($row['manufacturer']);

echo("</td><td>");

echo($row['description']);

echo("</td></tr>");

}

echo("</table>");

echo("<br/>");

$connection = null;

?>

<tr>

<td></td>

<td><input type="Submit" value="Return"/></td>

</tr>

</fieldset>

</form>

</body>

</html>

5. Base de dados

insert into patient values (1, 'ricardo miranda', 'rua das vacas');

insert into patient values (2, 'ze', 'rua do barnabe');

insert into patient values (3, 'tomas', 'rua da alameda');

insert into patient values (4, 'ricardo', 'rua de telheiras');

insert into patient values (5, 'catarina', 'aveiro');

insert into municipality values (11111, 'lisboa');

insert into municipality values (22222, 'almada');

insert into municipality values (33333, 'peniche');

insert into municipality values (44444, 'nazare');

insert into municipality values (55555, 'fonte da vaca');

insert into period values ('2010-01-01', '2010-12-31');

insert into period values ('2011-01-01', '2011-12-31');

insert into period values ('2012-01-01', '2999-12-31');

insert into lives values ('2010-01-01', '2010-12-31',1,11111);

insert into lives values ('2011-01-01', '2011-12-31',1,33333);

insert into lives values ('2012-01-01', '2999-12-31',1,55555);

insert into lives values ('2012-01-01', '2999-12-31',2,22222);

insert into lives values ('2012-01-01', '2999-12-31',3,11111);

insert into lives values ('2012-01-01', '2999-12-31',4,11111);

insert into period values ('2014-11-21', '2014-11-25');

insert into period values ('2015-11-10', '2015-11-12');

insert into device values (11,'siemens', 'blood pressure');

insert into device values (77,'philips', 'blood pressure');

insert into device values (22,'electrolux', 'insulin pump');

insert into device values (33,'philips', 'insulin pump');

insert into device values (44,'philips', 'insulin pump');

insert into device values (55,'nokia', 'blood pressure');

insert into device values (66,'philips', 'insulin pump');

insert into sensor values (11,'siemens', 'mm Hg');

insert into sensor values (33,'philips', 'mm Hg');

insert into sensor values (55,'nokia', 'mm Hg');

insert into sensor values (77,'philips', 'mm Hg');

insert into actuator values (44,'philips', 'rpm');

insert into pan values ('pan1', 999);

insert into pan values ('pan2', 999);

insert into pan values ('pan3', 999);

insert into pan values ('pan4', 999);

insert into pan values ('pan5', 999);

insert into period values ('2012-01-01', '2015-03-30');

insert into period values ('2015-03-30', '2999-12-31');

insert into period values ('2015-03-30', '2015-05-30');

insert into period values ('2015-05-31', '2999-05-31');

insert into period values ('2012-01-01', '2015-11-17');

insert into period values ('2015-11-17', '2999-12-31');

insert into connects values ('2012-01-01', '2999-12-31', 55, 'nokia', 'pan3');

insert into connects values ('2012-01-01', '2999-12-31', 77, 'philips', 'pan3');

insert into connects values ('2012-01-01', '2999-12-31', 44, 'philips', 'pan3');

insert into connects values ('2012-01-01', '2999-12-31', 33, 'philips', 'pan3');

insert into connects values ('2012-01-01', '2999-12-31', 11, 'siemens', 'pan5');

update connects set connects.end = '2015-11-17' where connects.snum = 55 and connects.manuf = 'nokia';

insert into connects values ('2015-11-17', '2999-12-31', 55, 'nokia', 'pan2');

insert into wears values ('2012-01-01', '2999-12-31', 3, 'pan1');

insert into wears values ('2012-01-01', '2999-12-31', 2, 'pan3');

insert into wears values ('2012-01-01', '2999-12-31', 4, 'pan2');

insert into wears values ('2012-01-01', '2999-12-31', 1, 'pan5');

insert into period values ('2015-06-30', '2999-05-31');

update wears set wears.end = '2015-03-30' where wears.patient = 2 and wears.pan = 'pan3';

update wears set wears.end = '2015-03-30' where wears.patient = 4 and wears.pan = 'pan2';

insert into wears values ('2015-03-30', '2999-12-31', 4, 'pan3');

update wears set wears.end = '2015-05-30' where wears.patient = 4 and wears.pan = 'pan3';

insert into wears values ('2015-05-31', '2999-05-31', 2, 'pan3');

insert into connects values ('2015-05-31', '2999-05-31', 66, 'philips', 'pan3');

insert into period values ('2012-01-01', '2015-06-10');

insert into period values ('2015-06-11', '2999-12-31');

update connects set connects.end = '2015-06-10' where connects.snum = 33 and connects.manuf = 'philips' and connects.start = '2012-01-01';

insert into connects values ('2015-06-11', '2999-12-31', 33, 'philips', 'pan1');

/\*COMENTAR PARA O 33 NAO SER TRANSFERIDO E APARECER NO QUERY\*/

insert into period values ('2015-05-31', '2015-06-15');

update wears set wears.end = '2015-06-15' where wears.patient = 2 and wears.pan = 'pan3' and wears.start = '2015-05-31';

insert into wears values ('2015-06-30', '2999-05-31', 4, 'pan2');

insert into reading values (11, 'siemens','2014-11-23 15:00:00' , '100');

insert into reading values (11, 'siemens','2015-11-11 00:00:01' , '10');

insert into reading values (11, 'siemens','2015-11-11 00:30:00' , '11');

insert into reading values (11, 'siemens','2015-11-11 01:00:00' , '12');

insert into reading values (11, 'siemens','2015-11-11 06:00:00' , '9');

insert into reading values (33, 'philips','2014-01-01 15:00:00' , '1000');

insert into reading values (55, 'nokia','2012-07-05 00:00:01' , '1');

insert into reading values (55, 'nokia','2013-05-05 00:00:01' , '2');

insert into reading values (55, 'nokia','2015-11-18 00:00:01' , '50');

insert into reading values (55, 'nokia','2015-11-18 00:00:02' , '51');

insert into reading values (77, 'philips','2015-04-18 00:00:01' , '700');

insert into reading values (77, 'philips','2015-11-18 00:00:01' , '701');

insert into setting values (44, 'philips','2012-07-05 00:00:01' , '2000');