**ORGANS TRANSPLANTATION DATABASE PROJECT**

We would like to introduce this project by saying that organ donation and transplantation is offering thousands of people across the world a second chance for living. During the past few years it has improved a lot, but it still remains to be a big challenge.

            First of all, it is important to understand what is an organ transplantation. It is the surgical removal of a healthy organ from one person and its transplantation into another individual whose organ has failed or was injured. In most of the cases it becomes lifesaving.[[1]](#footnote-1)

            Organ transplantation is an important surgery that has risks such as organ rejection.

            Organ transplants include kidney, pancreas, liver, heart, lung, and intestine among others. Kidney transplants are the most common type of transplant surgery while the least common are intestines. Vascularized composite allografts (VCAs), which is the transplantation of multiple tissues (muscles, bones, nerves, skins, …) is now also possible, involving face and hand transplantation. In most of the cases, donor organs come from deceased donors.

            Depending upon the organ needed, organs are matched using several characteristics, including blood type and size of the organ demanded, tissue type, life expectancy, waiting time and other medical criteria.

            Assigning an organ to a patient needs to be done in a very fast way since, normally, an organ that has already been surgically removed can last between 12 and 48 hours. Also very often the organ has to be moved from one hospital to another and so does the patient, creating an additional barrier that has to be overcome. This is the main reason that inspired us to choose this project, so **time taken in the transplantation process is minimized.**

            In order to fulfill our objective, we have planned to create a database that is capable of keeping track of the transplants that are being performed in a specific hospital. We are basically focusing in **one** given hospital at a time. The hospital acts as the place where all the process occurs. It is equipped with specialized medical staff and facilities, host the organs, tissues and patients with different pathologies.

Sometimes the organ or the patient or even both are not located at the same hospital, and they need to be moved to the same hospital in order for the transplant to be performed; but we are not taking this into account and we assume that the organ and the patient are already in the same hospital.

We will create a transplant waiting list that takes into account all the crucial factors mentioned before (blood type, size of the organ, tissue type, life expectancy, time spent on the waiting list, and other medical criteria), looking for compatibility.

            Our database will be built on seven entities and along this project we will explain how each and every one of them is interrelated.

            When an organ is available, the data base will look for the “ideal” patient that is compatible with it, matching all the required parameters to come up with the “best” receptor.

            The donor and the patient are linked by the organ that is going to be transplanted. In order to do the compatibility test of our database, we decided to differentiate between the organ that the donor is going to give (organ) and the organ that the patient needs (request). This is graphically expressed in the attached diagram.

When a transplant is being carried out, the main factors that take place are the following four: the donor of the organ, the organ that is donated, the organ that the patient needs and the patient that is going to receive the organ. The hospital where the transplant takes place is also a key factor.

Sometimes, the demand of organs is higher than the supply. To minimize this problem scientists have been searching for alternatives since the XVII Century. They discovered that animal organs could be used in humans. Unfortunately, nobody has been able to survive with an animal organ. However, they found out that animal tissues and cells are easier to transplant so, nowadays, doctors are performing these types of transplants called “xenotransplants”.[[2]](#footnote-2)

            To sum up, our database will be able to match the available organ will the “ideal” receptor that will be identified by its profile in a fast and efficient way.

**STRUCTURE OF OUR DATABASE**

Our database is divided into seven packages. Each package has its own function.

One package contains an Interface that has a lot of methods involved in the functionality of our database. This Interface allows everyone to use our database no matter what type of Java Framework they use.

There is one package that works with JDBC and another package that uses JPA. Each package contains a DBmanager and both managers implement the Interface.

The DBmanager included in the JDBC package contains the methods that our SQL files use and the one included in the JPA package contains the methods that our JPA files use.

Our project also contains a package in which all the POJOs are. We have created nine POJOs which are the following:

* Animal tissue.
* Doctor.
* Donor.
* Hospital.
* Patient.
* Organ.
* Requested organ.
* Person.
* Transplant database.

The first seven classes are the seven entities our database works with. The last two have their own purposes:

For example, the POJO Person is involved in inheritance, specifically, in “One Table Per Subclass Inheritance” so the JAVA classes Donor and Patient inherit from it.

On the other hand, the POJO Transplant database contains the list of hospitals of the whole database in order to create the XML file.

Besides, the project contains a package involved in the creation of the XML file. This package also contains an XML manager although this manager does not implement the Interface because its function is not related with the database in itself.

Moreover, there is a package involved in the interaction with the user. It contains eight classes but there is one called “UIGenericMenu” that is in charge of coordinating the work of the others. These classes are made up of many “Switch-cases” used for visual reasons while showing the information to the user through the console.

To sum up, in this project the user interface package connects with the POJOs through the DBmanager but as we decided to work with some entities in JPA and some in JDBC the DBmanager will be the one in JPA or in JDBC depending on which one will do the work the user asks for.

1. Web med:  [**http://www.webmd.com/a-to-z-guides/organ-transplant-overview#1**](http://www.webmd.com/a-to-z-guides/organ-transplant-overview#1) [↑](#footnote-ref-1)
2. http://www.unicolmayor.edu.co/invest\_nova/NOVA\_8/NOVA6\_REVIS1.pdf [↑](#footnote-ref-2)