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Description hemodialysis machine.

This simulator has the function of giving a general and interactive idea of the internal operation in a general way on a type hemodialysis machine, hemodialysis system 4008A.

The simulation performed is a hemodialysis machine that works in an ideal way, given that the simulation handles fixed parameters, that is, the management of all the indicators are temperature measurements, which prevent the return of blood to the body. With an inadequate thermal condition, which can cause with temperatures below 37 a hypothermia, and a fever with temperatures higher than 37 celcius, this value is taken thus, given that the human body has on the outside a skin temperature of 32 Degrees, but on the inside, the body handles approximately a temperature of 37 degrees.

Other conditions are arterial and venous pressures, where the arterial pressure according to the guideline is 200 mmHg or less 10 mmHg and a venous pressure of 300 mmHg or less 10 mmHg, these pressures, Handle these values given that the heart expels oxygenated blood to the body, but given that the arteries have a different diameter to the veins, they require a smaller force to push the blood throughout the body, and the venous pressure is 300 MmHg approx. Given that they require greater strength to go against gravity, returning blood from the extremities of the body to the heart.

Within the simulation, there will be a boolean type button, which simulates the reading of the blood sensing sensor, where, if activated, the patient return valve is blocked to prevent embolism.

Within the programming the machine is simulated with the following steps:

1. diagram of connection of the patient to the machine, where the blood entering the machine will be arterial blood, and the blood entering the machine will be by venous blood.
2. Simulation of an on / off system of the machine, where to start, will be assigned the total blood in milliliters that a human has approximately.
3. Simulation of quantity of blood for dialysis, represented by a tank, which has a volume equal to that of the human body.
4. Simulation of valve and roller motor, which will drive the blood through the whole machine
5. The flow of the blood that is intended to be dialyzed is a sinusoidal type signal, which has an additional one which is a noise, thereby simulating blood filled with potassium, sodium, urea and other toxins.
6. conduits or input tubes to the dialyzer, the dialyzer, is simulated by a low-pass filter of the noise-carrying signal, where a signal filtering is generated to leave a pure sinusoidal signal simulating

dialyzed blood, On the side of the dialyzer is a tank which simulates the dialysate liquid, with which the blood is washed. Another of the ducts of the dialyser, is a connection tube to a tank which will collect the total of the toxins that remove from the blood, where said toxins are simulated by a signal generating only noise, and finally, the return flow To the patient, has the safety valve in case there is an air bubble in the return, which will close any blood passage in the blood, until that bubble is eliminated.

