System description

A traffic accident has happened and it is involved a passengers' bus. **50 passengers** were inside the bus when the accident took place. When the ambulance arrived to the place, the medical staff valuate the situation and, fortunately, there is no people dead. However, after a closer valuation they conclude that there are **6 people in critical state**, **30 people with minor injuries** and **14 unharmed passengers**. Nonetheless, the command centre mandates that **EVERYBODY** has to go to the hospital.

Therefore, albeit EVERYBODY wants to get inside the ambulance at the same time, a priority order is established to move them to the hospital. **Firstly**, the people in **critical state** will be moved. **Secondly**, the people with **minor injuries**. And, **finally**, the **unharmed passengers**.

The ambulance has **capacity to bring 5 patients** simultaneously. To perform as quickly as possible, the ambulance must be fully loaded in each trip, no matter if it contains patients of different types.

To implement this system, you are given several classes (**YOU CANNOT MODIFY THEM[1]**):
- **Driver**. Contains the parameters of the system and creates the required objects and threads.
- **Passenger**. A class that inherits from **Thread** and models the behaviour of the passengers, i.e., calls to waitDisinfection, onBoardAmbulance.
- **PassengerType**. This is an enumeration with three types of passenger, depending on their injuries.
- **Ambulance**. A class that inherits from **Thread** and models the behaviour of the ambulance, i.e., calls to performTrip, waitDisinfection.

You have to develop **TWO implementations of the Bus class** to model the shared resource:
1. Using **binary semaphores**.
2. Using **monitors** (synchronized methods) or **Locks** (you decide which one).

To do this, you are given a skeleton of the **Bus** class that contains the next methods:
- **waitDisinfection** (**ALREADY IMPLEMENTED**). Invoked by both ambulance and passengers and simulates a waiting time to perform a disinfection before and after using the ambulance.
- **onBoardAmbulance**. Invoked by the passengers to try to board on the ambulance observing the established order.
- **performTrip**. Invoked by the ambulance to notify that it is ready to carry on passengers.

NOTES:
- It is **MANDATORY** to use the skeletons given in the Virtual Campus.
- You have to include your name and surname inside each source file you upload.
- You have to upload only two file Bus.java, one with an implementation based on binary semaphores the other based on monitors/Locks.

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[1] The only exception is that it is highly recommended that you move the given *System.out.println* sentences into the methods of the **Bus** class.

An output may be:
CRITICAL 4 is inside the ambulance.
CRITICAL 2 is inside the ambulance.
CRITICAL 3 is inside the ambulance.
CRITICAL 0 is inside the ambulance.
CRITICAL 1 is inside the ambulance.
Performing trip...
Ready to take patients.
CRITICAL 5 is inside the ambulance.
MINOR 18 is inside the ambulance.
MINOR 26 is inside the ambulance.
MINOR 5 is inside the ambulance.
MINOR 25 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 3 is inside the ambulance.
MINOR 29 is inside the ambulance.
MINOR 8 is inside the ambulance.
MINOR 23 is inside the ambulance.
MINOR 11 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 24 is inside the ambulance.
MINOR 21 is inside the ambulance.
MINOR 2 is inside the ambulance.
MINOR 1 is inside the ambulance.
MINOR 28 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 12 is inside the ambulance.
MINOR 4 is inside the ambulance.
MINOR 22 is inside the ambulance.
MINOR 14 is inside the ambulance.
MINOR 0 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 16 is inside the ambulance.
MINOR 10 is inside the ambulance.
MINOR 20 is inside the ambulance.
MINOR 9 is inside the ambulance.
MINOR 13 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 6 is inside the ambulance.
MINOR 19 is inside the ambulance.
MINOR 7 is inside the ambulance.
MINOR 27 is inside the ambulance.
MINOR 17 is inside the ambulance.
Performing trip...
Ready to take patients.
MINOR 15 is inside the ambulance.

UNHARMED 1 is inside the ambulance.
UNHARMED 10 is inside the ambulance.
UNHARMED 11 is inside the ambulance.
UNHARMED 13 is inside the ambulance.
Performing trip...
Ready to take patients.
UNHARMED 9 is inside the ambulance.
UNHARMED 8 is inside the ambulance.
UNHARMED 0 is inside the ambulance.
UNHARMED 7 is inside the ambulance.
UNHARMED 5 is inside the ambulance.
Performing trip...
Ready to take patients.
UNHARMED 3 is inside the ambulance.
UNHARMED 12 is inside the ambulance.
UNHARMED 2 is inside the ambulance.
UNHARMED 6 is inside the ambulance.
UNHARMED 4 is inside the ambulance.
Performing trip...