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<u>Thema :</u> Statemate

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Aufgabe 1:

Give a Statechart, Activity-chart and Panel for a Traffic-light Controller, the informal description of which is as follows:

There are two sets of lights: one is positioned over the main road (MAIN) entering the cross-junction, and the other is over the secondary road (SEC).

During the daytime the controller operates according to one of two possible programs (option externally determined):
Program A gives two minutes for the vehicles on MAIN, and half a minute for the vehicles on SEC, alternatingly.
Program B gives half a minute for the vehicles in SEC once a signal “SEC_FULL” goes on (the “SEC_FULL” signal coming from an external sensor).

During the night the controller gives precedence to the cars in MAIN until one of the following two possibilities occurs:

1. Two minutes have passed since MAIN became green and either a pedestrian wants to cross MAIN or a new car appears on SEC;
2. Three cars have appeared on SEC.

When one of these conditions occurs, vehicles on SEC are given half a minute.

The controller can also be operated manually. In this mode, when a policeman pushes a button, the precedence is given to the other direction.
This manual operation and any transition from day to night and vice-versa, must start with 5 seconds of flashing amber lights after which the MAIN receives the green light.

The controller can receive an ambulance signal (by remote-control), notifying the controller that an ambulance is approaching the junction from MAIN or from SEC. It should then synchronize the lights according to the direction of the ambulance, and ignore all other events. Once the ambulance enters the junction the controller is notified and should return to its previous operational mode (DAY or NIGHT).

The controller can receive an error message (assumed to be an external signal) and must then flicker both amber lights.
Another possibility for an error to occur is when the controller operates manually for more than fifteen minutes without the policeman pushing the button. A RESET signal then resets the controller to the automatic mode.

Hint:
First identify the external input events and conditions. The outputs of the controller are the boolean signals (conditions):
MRED, MAMB, MGRN
SRED, SAMB, SGRN
(MRED or SRED means: the RED light for the MAIN or SEC road).