C++ Implementation Test

Description

Introduction

An intersection between two roads is protected by traffic lights. Both roads allow traffic in both directions, there is a total of four traffic lights. The traffic lights allow vehicles to pass the intersection only on one road at a time, stopping the traffic on the other road.

Phases

The sequence of the traffic lights is:

- Red: No car on this road is allowed to enter the intersection.
- Green: Cars are allowed to enter the intersection.
- Amber: Cars approaching the intersection shall slow down and stop.

As well, there is a short all-red phase, to allow cars to clear the intersection before the light turns green for the cross traffic.

For simplicity, there shall be no traffic lights for pedestrians or for turning to the other road.

Timing

One complete cycle, between the lights turning green for one road until they turn green again, shall take 40 seconds.
The traffic lights shall show amber for 2 seconds.
The lights shall show all-red for 2 seconds.
The lights shall show green for both roads the same amount of time.

Task

Please solve these tasks and deliver the result in at most 24 hours after it was provided to you.

1. Create a state diagram in the UML tool of your choice.
    a. The initial state shall be an all-red phase.
    b. Please provide a screenshot or a PDF export.

2. Please implement these traffic lights in a console application in C++.
    a. The application shall compile with GCC in a modern Linux distribution. It shall compile well with no compiler warnings when compiling with all warnings enabled (compiler option “-Wall”).
    b. The application shall output the state of the traffic lights in stdout. It shall write one line for each transition, showing the state of the traffic lights of both roads.
    c. Once started, the application shall run in an endless loop.
    d. The application shall use the C/C++ stdlib, but no other libraries.
    e. Please provide the full source code.