TecTask IoT

You are a software developer at Audi Electronics Venture GmbH and your tec lead asks you to quickly develop a software component on short notice.

Your component – called "SensorPreFusion" - receives continous signals from four sensors. Two of them are placed in front of the car, two of them are placed in the back. The component shall be integrated to the "DriverAssistance" ECU's application layer. The physical connection shall be realized via automotive Ethernet.

Each sensor delivers the following information:

- Coordinates of a detected object with respect to the vehicle's mass center [Xv, Yv, Zv] in meter as a scaled 16 bit unsigend integer value, scaling factor 1/1000, the default/init value is 0xFFFF
- timestamp as 32bit unsigned integer, default/init value 0
- objectClass as 8bit unsigned integer, default/init value 0

The "SensorPreFusion" software component shall be triggered every 10ms and reads the sensor signals from a middleware called "Runtime Environment".

If an object has been detected twice in the same location via several sensors then the component shall output it's objectClass and the timestamp of the first appearance. The result shall be written to the middleware.

Your job is to implement a first version of the "SensorPreFusion" component. Your implementation language is C++. Since you are programming a real-time system you are looking to optimize your algorithm for run-time. The usage of standard libraries is allowed. You can earn extra credit if you do not use any standard libraries though.

A mid-term goal is to use the outputs of "SensorPreFusion" for data analytics in a cloud-based system. Create a short design documentation to describe a conceptional system architecure. Show important static, behavior and interaction views. Allocate the most important requirements to your design elements.

Use any tools you want. Please make sure that your results are C++ code and pdf files. Send your results at least on day prior to your interview.

Be ready to answer some question regarding your TecTask solution during your interview.

Have fun and good luck!