



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

School of Computing

Academic Session 2019/2020, Semester 2

SCSJ2203 :

SOFTWARE ENGINEERING

Problem Solving 2

Object-Oriented Detailed Design

Team : TECH-C

Team Members:

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Question:

Given the case study below, answer the following questions.

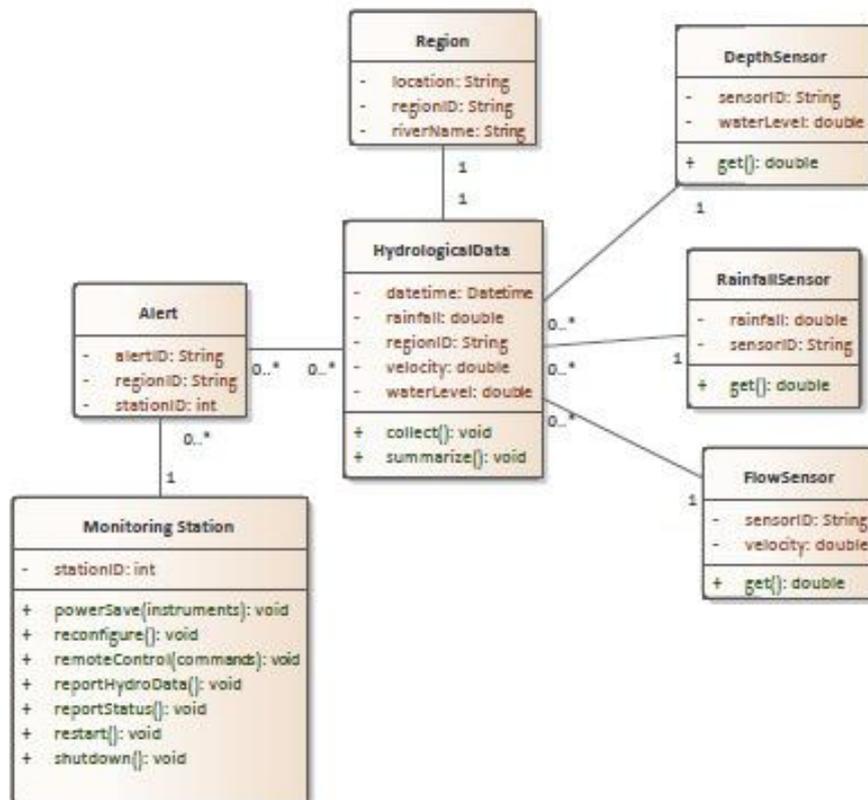
Malaysian Meteorological Department (MetMalaysia) is in the process of developing a Flood Forecasting and Warning System (FFWS). The system collects data, performs some data processing and transmits the data for further processing to alert people if water level of an identified river is at risk. Three important hydrological data that should be considered in the system are water depth level, rainfall and speed of water flow at rivers in different regions.

FFWS should collect the data at each identified location using three sensors (depth sensors, rainfall sensors, flow sensors). A depth sensor is used in each river for measuring the water level. A rainfall sensor is used to gather and measure the amount of rainfall over a set period. A flow sensor is used to measure average speed of water flow (velocity).

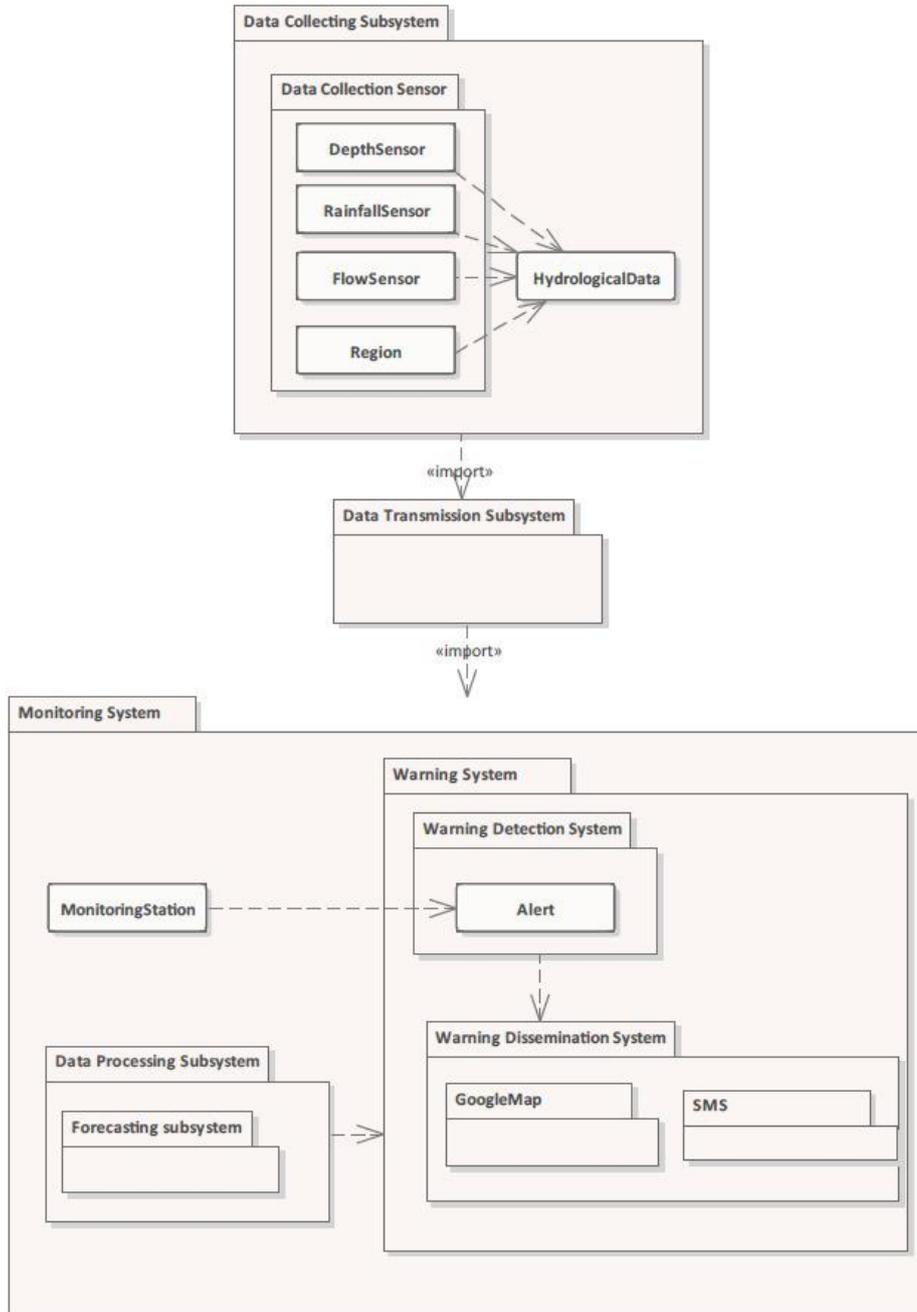
Once FFWS is activated by a meteorologist, the hydrological data are collected by reading the data from all sensors (identified by sensor ID, river name and its location, region ID) sent to the centralized monitoring station in MetMalaysia for every 15 minutes interval during the monitoring mode. Monitoring station processes the data received and when more than 50% of the sensors data in a particular area indicates that the water level, rainfall and velocity are greater than a threshold, local warning is activated. Meanwhile, for a query-based mode, the meteorologist as a user at the central monitoring station may request report of hydrological data at a particular region of the monitoring area.

FFWS uses Google map Web service for the location monitoring assistance and Short Message Service (SMS) service from cellular service provider to alert the local residents when warning is activated.

- a) Draw a **design class diagram** for FFWS that includes the dependency relationships. Identify required attributes and methods/operations for all classes.



- b) Based on the design class diagram in (a), identify suitable subsystems for FFWS. Draw a **package diagram** to represent the subsystems that you have identified. Include the classes in respective subsystems without attributes and operations. It is not necessary to show a multi-layer package.



c) Draw a **sequence diagram** for the scenario activate flood warning. The diagram should include the three stereotypes <<boundary>>, <<control>>, <<entity>>.

