# ROS Case Study #1

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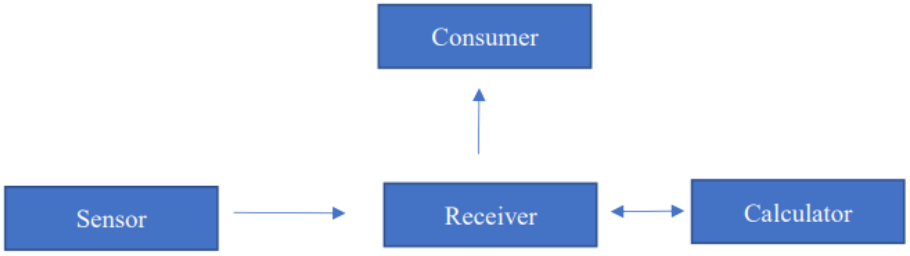
## 1. Assignment Description

You can work alone or in a team of two members:




**Four Nodes – Architecture**

There are four nodes: Sensor – which sends a number to another node Receiver, and the Receiver node uses another node Calculator where it sends the number it received from Sensor and also tells the calculator randomly whether to multiply or divide the number by 2. The result obtained from Calculator is sent to Consumer via Receiver.

Implement the above requirements using Python scripts and ROS. Document the screenshots and explanations of your run and submit the python package as well.

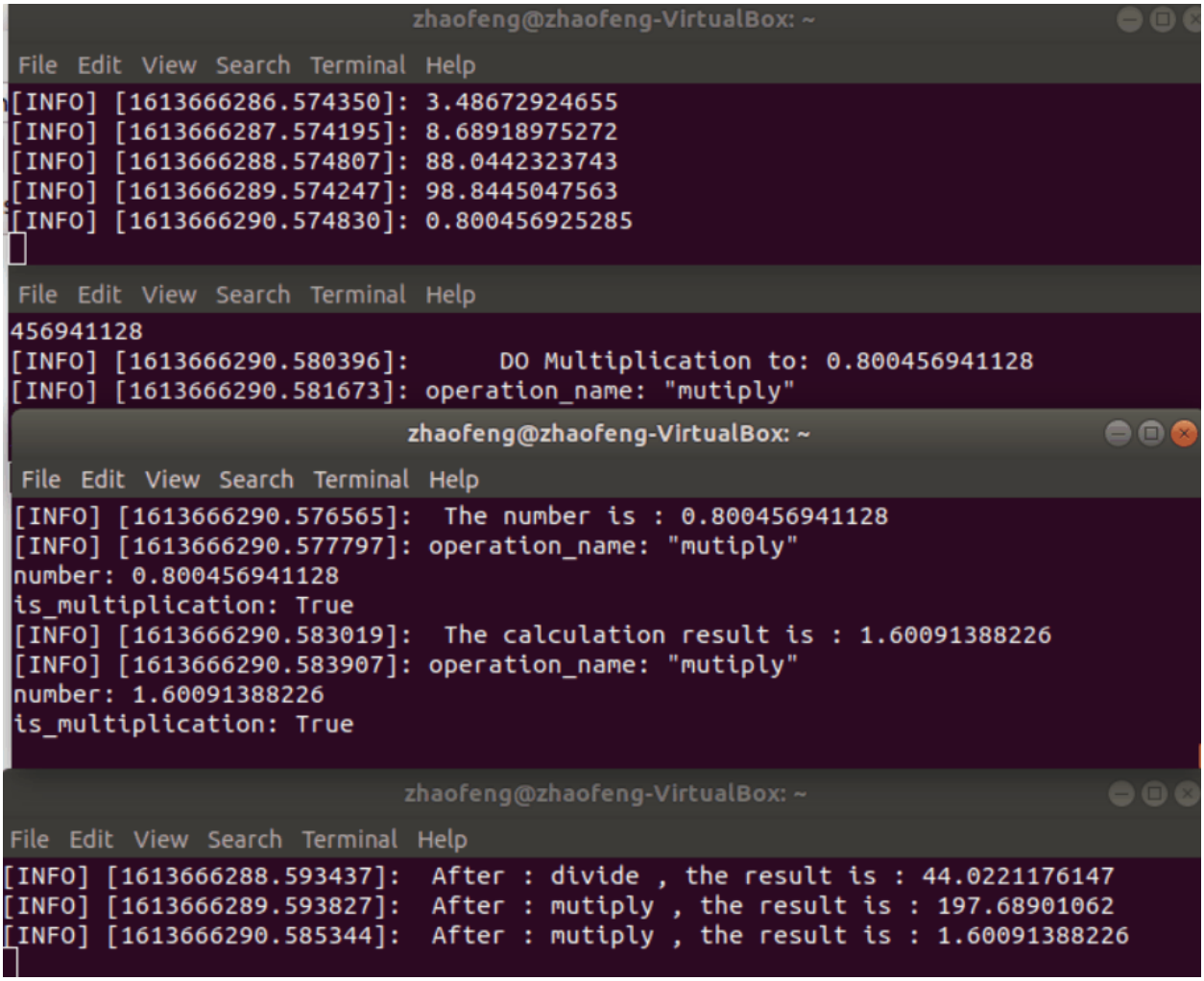
## 2. Solution

Initiate four nodes with names corresponding to the description by using four Python scripts respectively. Also, initiate four topics for convenient communication among four nodes. The structure is shown as below, a rqt_graph image.

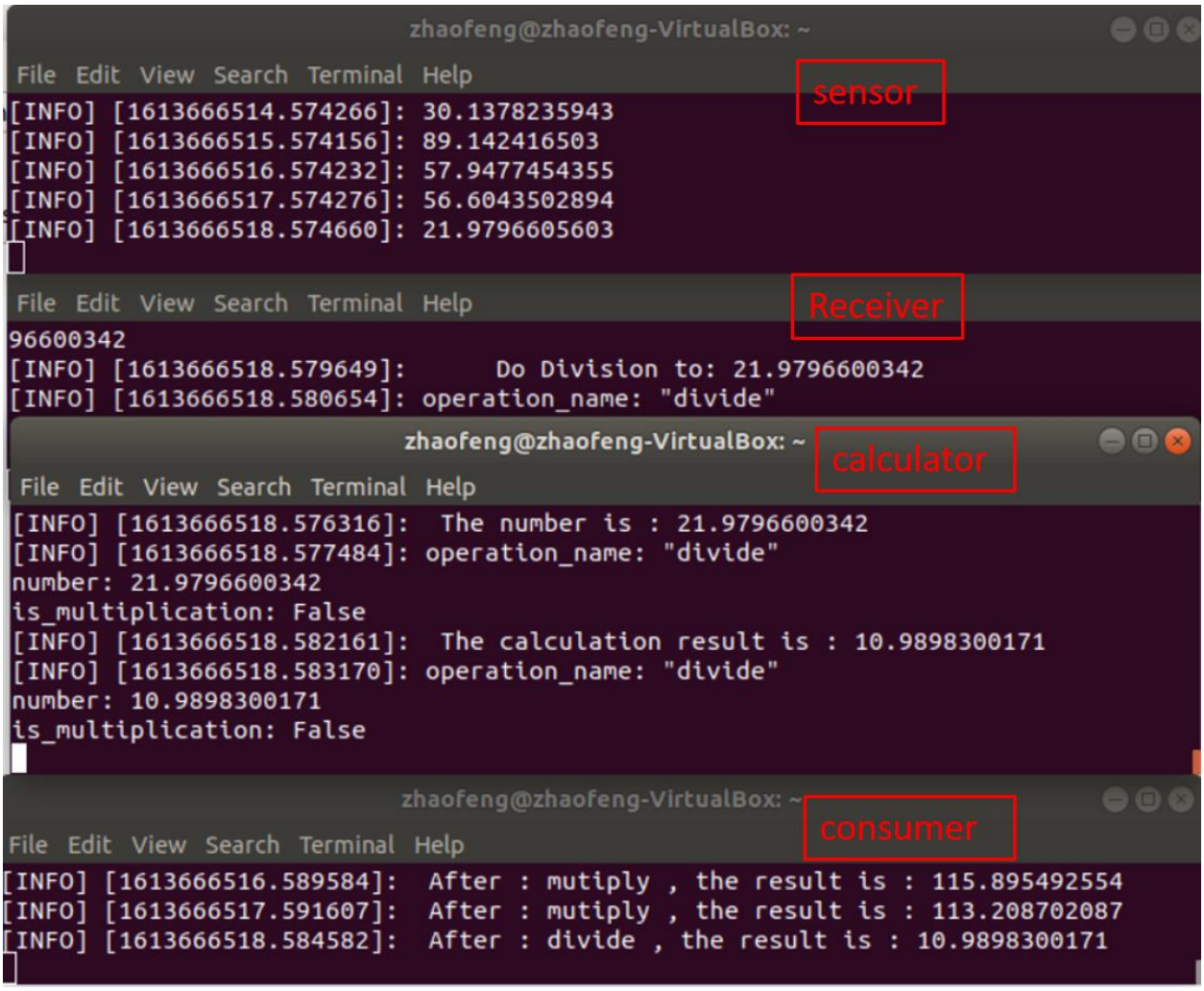
As we can see, random_number, msg_ex, calculated and customer, these four topics are generated.

## 3. Results

The results are shown as a gif image.




Description:




Sensor: publish a random number at 1 Hz to random_number topic.

Receiver: receive a number from random_number, and convert it into number_msg, then publish it as a calculation request to msg_ex topic. After getting a result from calculator via calculated topic in a number_msg, publish it into consumer node via customer topic.

Calculator: Randomly do multiply or divide the number received from receiver by 2, and then publish it to calculated topic.

Consumer: receive the result from receiver via customer topic.