1. Give the equivalent assembly code for the following three cases in ARM Mode and Thumb mode using IAR Toolset:

Assume that variables *b*, *x*, and *z* reside in registers **r3**, **r5**, and **r8**, respectively.

if (3 \* x > b)

x = b & 29;

else

b = x / 4;

if ((3 \* x > b) || (z - b < 25))

x = b & 29;

else

b = x / 4;

if ((3 \* x > b) && ((z - b < 25) || (z + 14 > x)))

x = b & 29;

else

b = x / 4;

**Note:** Assembly code written with minimum number of instructions getting rewarded with maximum marks.

2. Implement a publisher and subscriber model using mosquito open source MQTT broker. The publisher and subscriber remain on the same system, and data generated from the publisher send to the broker with multiple topic of commercial shopping mall discount and offers on various segment of times. Consider at list five different topics and publish this offer via brokers to subscriber. The list of items must be incorporated in the topic such as shopping mall/shoes {Bata 10% off, nike, 40%, addidas 30%, puma 20%}. Each subscriber selects the offer and send it via broker to publisher for booking the order. The order confirmation message publishers send via broker to subscriber in the similar way.

**Note:** implement a basic html website visualizes and coordinates the data between publisher and subscriber (basic html website displays the product and offer to their subscriber”.