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1. Histogram clean up method:
    - Iterated over over the matrix 3 times to get rid of faulty data from the 3 categories.
        - By separating code into 3 loops rather 1 loop with many if statements, the code is easier to debug if one of the statements is in itself faulty.
            - First iteration gets rid of ID outliers. For example, [14 75 16] would be gone with this iteration.
            - Second iteration gets rid of length outliers. For example, [6 82 12] would be gone with this iteration.
            - Third iteration gets rid of diameter outliers. For example, [2 100 100000] would be gone with this iteration.
        - This could be adapted to more number of data points in the data set.
    - The cut off for faulty data comes from the “sort data into two length groups” and “sort data into two diameter groups” section of the code that comes with the lab.
    - Matlab code is in Appendix A.

The average diameters are 13.17 mm and 15.07 mm. The average lengths are 74.6 mm and 112.6 mm.

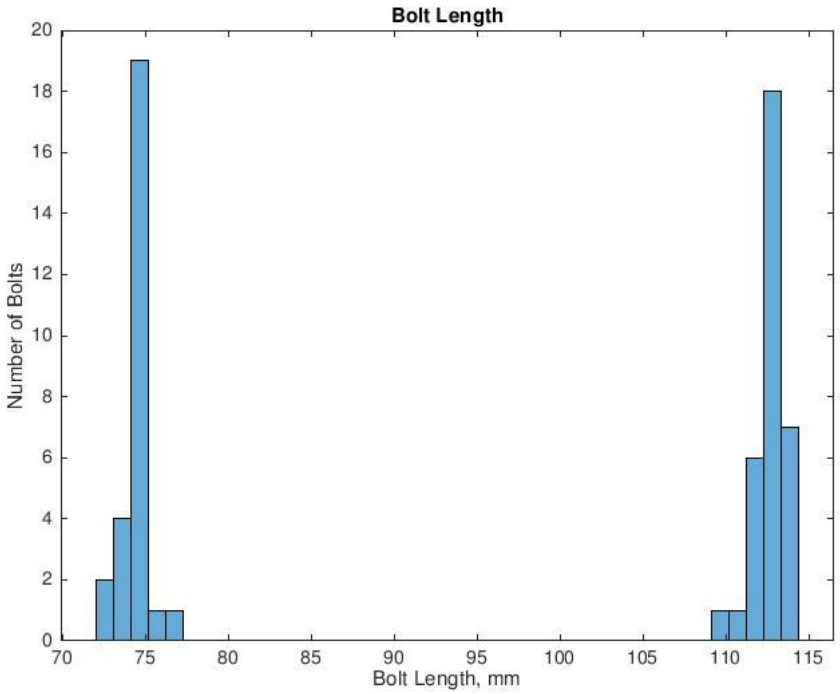

Figure 1: Bolt Length

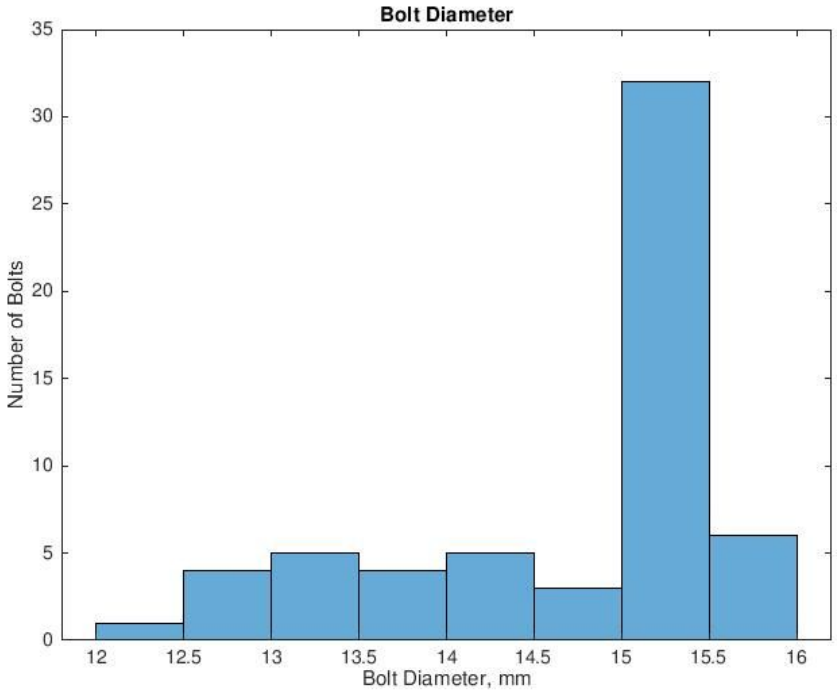

Figure 2: Bolt Diameter

2. These values are consistent with part 1 of the tutorial.
Values are listed from A-D-E-G-H-Aggregate.

- Mean (mm): 112.8 112.7 113.0 111.9 112.5 112.6
- Sigma (mm): 0.5381 0.4880 0.8597 1.0579 0.8165 .8226
- Variance (mm): 0.2895 0.2381 0.7390 1.119 0.6667 .6767
- Quartile (.25) (mm): 112.5 112.5 112.1 111.3 112.0 112.0
- Quartile (.50) (mm): 113.0 112.5 113.0 112.5 112.5 112.5
- Quartile (.75) (mm): 113.3 113.0 113.5 112.5 112.9 113.0
- Median (mm): 113.0 112.5 113.0 112.5 112.5 112.5

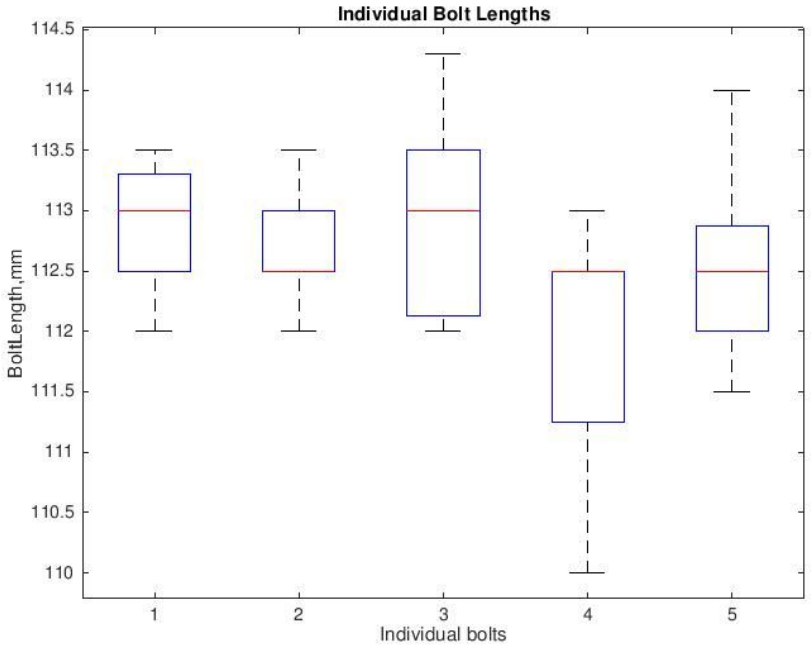

Figure 3: Individual Bolt Lengths

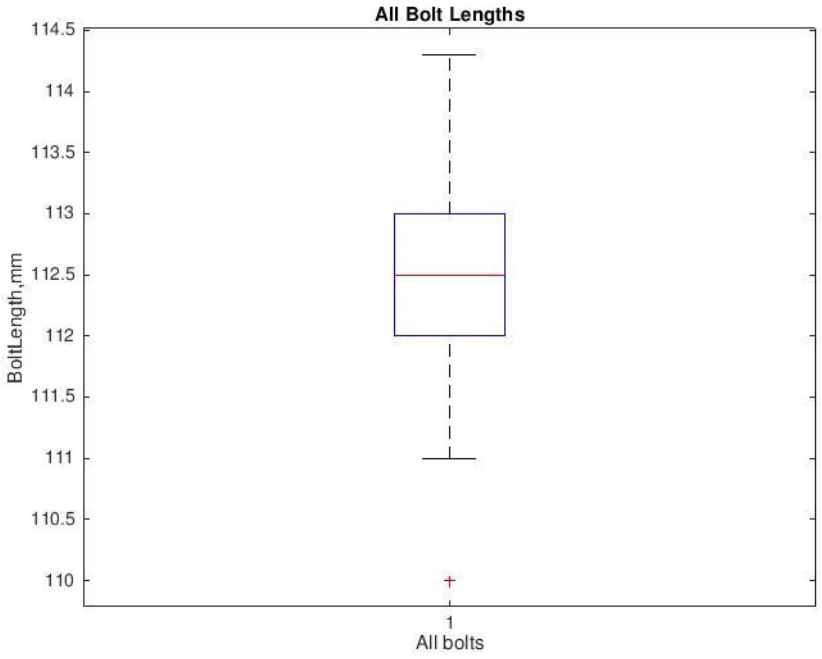

Figure 4: All Bolt Lengths

3.

- Real world parts have quite significant differences (~1%) between them and the dimensions on paper. This may be a combination of manufacturing and measurement errors.
- In case of part 1, changing measurement approach from lumping all data for 2 different bolts to recording them separately would make data processing much easier.

Appendix A

```
BoltDataOld = BoltData;
BoltDataTemp = [];

[row, col] = size(BoltDataOld);
endRow = 1;
for rowCount = 1:row
   if BoltDataOld(rowCount, 1) <= 12 && 1 <= BoltDataOld(rowCount, 1)
      BoltDataTemp(endRow, :) = BoltDataOld(rowCount, :);
      endRow = endRow + 1;
   end
end

[row, col] = size(BoltDataTemp);
BoltDataTemp2 = [];
endRow = 1;
% a = median(BoltDataTemp(:, 2);
for rowCount = 1:row
   if BoltDataTemp(rowCount, 2) <= 115 && 108 <= BoltDataTemp(rowCount, 2)
      BoltDataTemp2(endRow, :) = BoltDataTemp(rowCount, :);
      endRow = endRow + 1;
   end
   if BoltDataTemp(rowCount, 2) <= 78 && 71 <= BoltDataTemp(rowCount, 2)
      BoltDataTemp2(endRow, :) = BoltDataTemp(rowCount, :);
      endRow = endRow + 1;
   end
End

[row, col] = size(BoltDataTemp2);
BoltDataTemp3 = [];
endRow = 1;
% a = median(BoltDataTemp(:, 3));
for rowCount = 1:row
   if BoltDataTemp2(rowCount, 3) <= 16 && 12 <= BoltDataTemp2(rowCount, 3)
      BoltDataTemp3(endRow, :) = BoltDataTemp2(rowCount, :);
      endRow = endRow + 1;
   end
end

BoltData = BoltDataTemp3;
```