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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%
% ENGR 132
% Program Description
% Analyzes the performance (time to failure) of three different types
 of
%   deburring media – New Age Stone, Triangle, and Ever Last.
%
% Assigment Information
% Assignment:       PS 07, Problem 3
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%   Team ID:            005-12
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%
```

INITIALIZATION

Load the data into the INITIALIZATION section of your program.

```
allData = csvread('Data_DeburringMediaPerformance.csv',2,1);
nasData = allData(:,1);
tData = allData(:,2);
eData = allData(:,3);
```

MEAN TIME TO FAILURE

Calculate the mean time to failure (MTTF) for each media type. The MTTF is the average of all failure times.

```
nasMean = mean(nasData);
tMean = mean(tData);
eMean = mean(eData);

% Display the MTTF to the Command Window for each media type.
fprintf('The MTTF for the deburring of New Age Stone is %.4f\n',
 nasMean);
fprintf('The MTTF for the deburring of Triangle is %.4f\n', tMean);
fprintf('The MTTF for the deburring of Ever Last is %.4f\n', eMean);
```

```
The MTTF for the deburring of New Age Stone is 50.0670
The MTTF for the deburring of Triangle is 50.0751
The MTTF for the deburring of Ever Last is 46.0038
```

HISTOGRAMS & CDPS

Histograms

```
histBinEdges = linspace(35,65,30)
figure(1)
subplot(3,1,1)
nasHist = histogramRight(nasData,histBinEdges);
xlabel('Time to Failure in Hours');
ylabel('Frequency');
title('Frequency of TTF of New Age Stone');

subplot(3,1,2)
tHist = histogramRight(tData,histBinEdges);
xlabel('Time to Failure in Hours');
ylabel('Frequency');
title('Frequency of TTF of Triangle');

subplot(3,1,3)
eHist = histogramRight(eData,histBinEdges);
xlabel('Time to Failure in Hours');
ylabel('Frequency');
title('Frequency of TTF of Ever Last');

% CDPs
figure(2)
% NAS plot data
```

```
nasbin_freq = nasHist.Values;
nasdataSize = length(nasData);
nasfreq_value = nasbin_freq / nasdataSize;
nascum_frac= cumsum(nasfreq_value);
nascum_frac = [0 nascum_frac];
plot(nasHist.BinEdges, nascum_frac, 'b.-');
hold on;

% E plot data
ebin_freq = eHist.Values;
edataSize = length(eData);
efreq_value = ebin_freq / edataSize;
ecum_frac= cumsum(efreq_value);
ecum_frac = [0 ecum_frac];
plot(eHist.BinEdges, ecum_frac, 'r.-');
hold on;

% T plot data
tbin_freq = tHist.Values;
tdataSize = length(tData);
tfreq_value = tbin_freq / tdataSize;
tcum_frac= cumsum(tfreq_value);
tcum_frac = [0 tcum_frac];
plot(tHist.BinEdges, tcum_frac, 'k.-');

legend('New Age Stone','Ever Last','Triangle');
xlabel('Frequency in Hours');
ylabel('Fractional Value of Occurences');
title('Cumulative Distribution of Deburring')
grid on;


histBinEdges =

  Columns 1 through 7

   35.0000   36.0345   37.0690   38.1034   39.1379   40.1724   41.2069

  Columns 8 through 14

   42.2414   43.2759   44.3103   45.3448   46.3793   47.4138   48.4483

  Columns 15 through 21

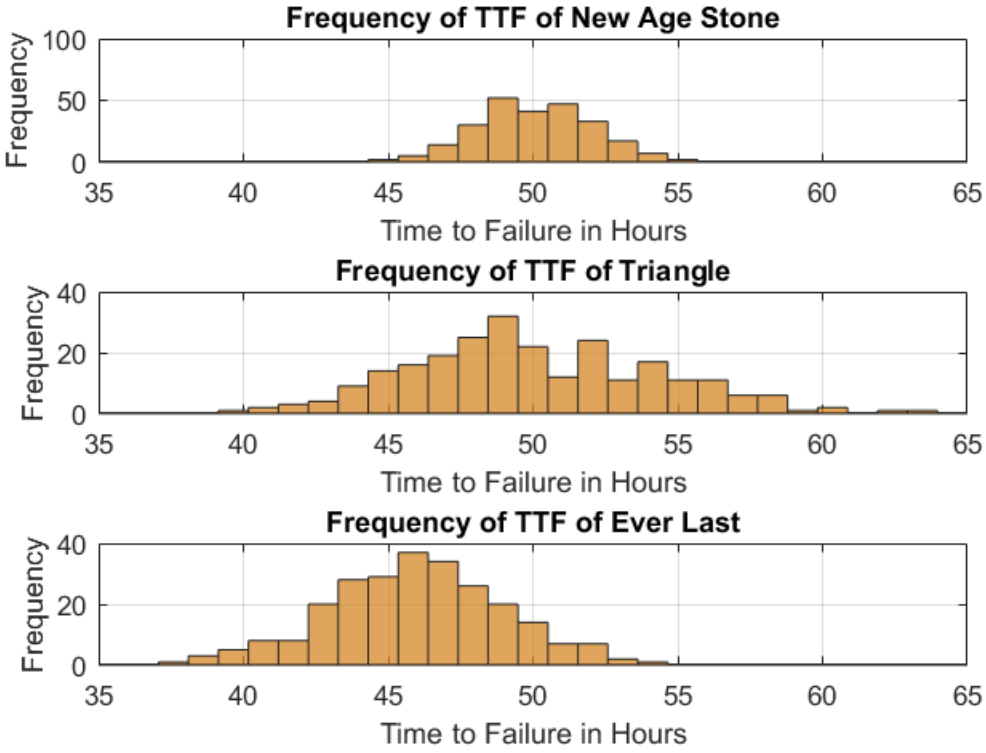
   49.4828   50.5172   51.5517   52.5862   53.6207   54.6552   55.6897

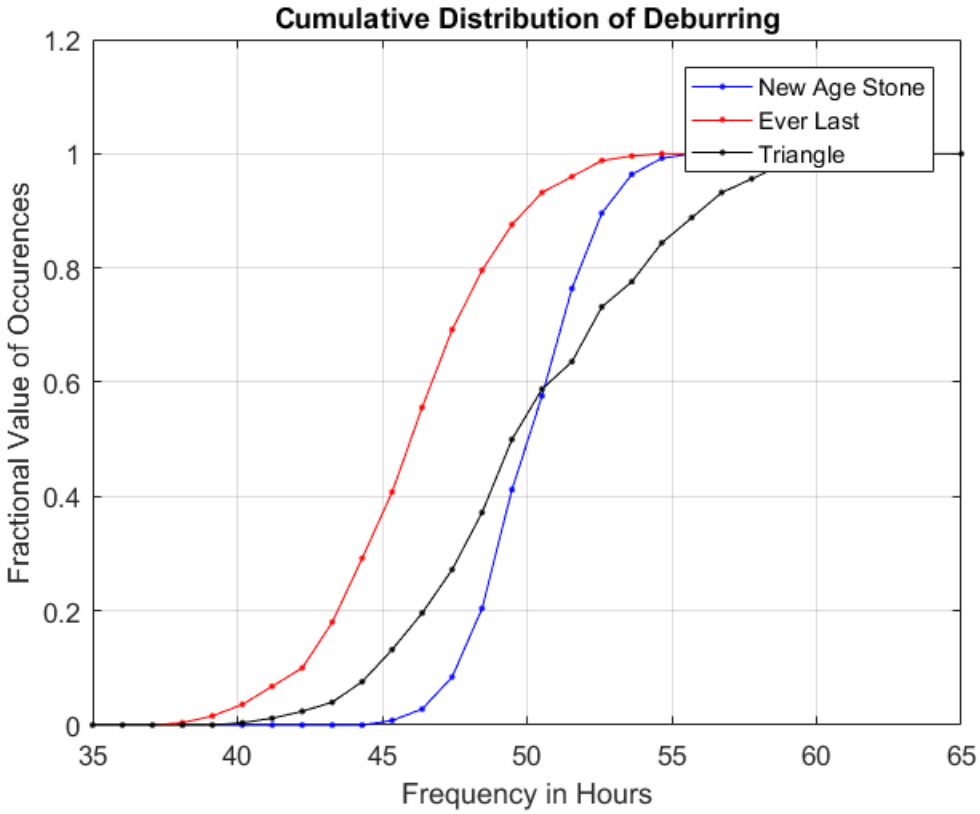
  Columns 22 through 28

   56.7241   57.7586   58.7931   59.8276   60.8621   61.8966   62.9310

  Columns 29 through 30

   63.9655   65.0000
```


Frequency of TTF of New Age Stone
Frequency
100
50
0
35
40
45
50
55
60
65
Time to Failure in Hours
Frequency of TTF of Triangle
Frequency
40
20
0
35
40
45
50
55
60
65
Time to Failure in Hours
Frequency of TTF of Ever Last
Frequency
40
20
0
35
40
45
50
55
60
65
Time to Failure in Hours


Cumulative Distribution of Deburring
Fractional Value of Occurences
1.2
1
0.8
0.6
0.4
0.2
0
35
40
45
50
55
60
65
Frequency in Hours
New Age Stone
Ever Last
Triangle

ANALYSIS

Q1

The MTTF of New Age Stone is around 50, for Ever Last it is around 46, and for Triangle it is around 49. By looking at where each line hits the y value of .5 determine its median on the x-axis as well.

Q2

Triangle has the least variability because of it less slant slope, which means that it has a lower rate of change over time.

Q3

BY looking at the median of the data as shown as the values corelating with the 0.5 value on the y-axis, the New Age Stone and Triangle have values closer to 50 than Ever Last.Therefore these media types closer to 50 will have a higher likelihood of performing effectively for at least 50 hours.

Q4

I would recommend the New Age Stone and Triangle media types due to their higher average MTTF as compared to the Ever Last media type. Looking at the histograms, the 2 aforementioned media types have more frequencies closer to 50 hours, and thus will most likely perform effectively at that time requirement. I would not recommend Ever Last because it has a mean of around 46 hours which is far less than what is required. Also this media type has less frequencies at the 50th hour in the histogram, which demonstrates that many cases of the using the media type have failed.

Q5

The size, shape, thickness, and cost of the media types are considerations that should also be taken into consideration to have an even and fair judegement of all the media types. Having an efficient, but low cost media type that can be replaced easily is far better than a ver expensive one, that is difficult to replace even if it lasts a little longer than its cheaper alternative.

ACADEMIC INTEGRITY STATEMENT

I/We have not used source code obtained from any other unauthorized source, either modified or unmodified. Neither have I/we provided access to my/our code to another. The project I/we am/are submitting is my/our own original work.

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