EE432 Fall 08 Homework Problem Set 2 (PS02) SOLUTIONS

Turn in your code and copy/paste the results from the MATLAB command window.

1. MATLAB text, problem 3.8.

```
t=0:2:100;
h=2.13*t.^2 - 0.0013*t.^4 + 0.000034*t.^4.751;
% part a:
table = [t' h'];
% part b:
maxh=max(h);
disp(sprintf('max height is %f\n',maxh));
% part c:
index=find(h==maxh);
disp(sprintf('max height occurred at %f seconds\n',t(index)));
```

```
table =

  1.0e+003 *

         0         0
    0.0020    0.0085
    0.0040    0.0338
    0.0060    0.0752
    0.0080    0.1317
    0.0100    0.2019
    0.0120    0.2843
    0.0140    0.3770
    0.0160    0.4780
    0.0180    0.5849
    0.0200    0.6956
    0.0220    0.8075  (this is only the 1st 12 rows of the table)
```

max height is <u>1469.523627</u>

max height occurred at <u>40.000000 seconds</u>

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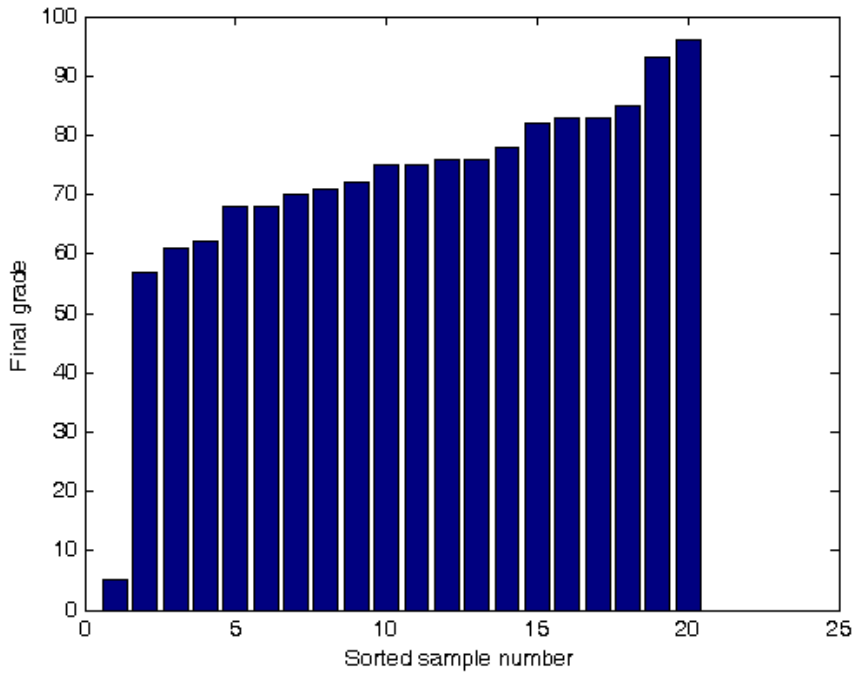
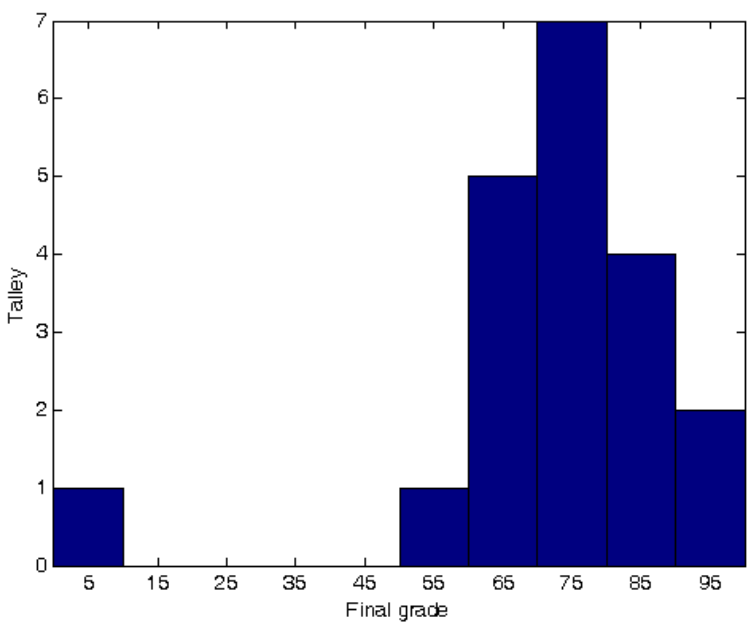
2. MATLAB text, problem 4.7.

```
% part a
G=[68,83,61,70,75,82,57,5,76,85,62,71,96,78,76,68,72,75,83,93];
Gsort=sort(G);
bar(Gsort), xlabel('Sorted sample number')
ylabel('Final grade')
```




```
% part b
midpts=5:10:100;  % choose mid points of histogram bins
hist(G,midpts),xlabel('Final grade'),ylabel('Talley')
```



---

3. MATLAB text, problem 5.2. Be sure you use the equation in problem 5.1.

```
function d=distance(radius,height)
% function d=distance(radius,height)
%
% This function will compute distance to the horizon based on the
%   input radius of the planet you're on, and the height above the
```

```
%   surface. Radius is in miles, height is in feet and d is in miles.
d=sqrt(2*radius.*height + height.*height);
------------------

% Problem 3:  Text 5.2
h=0:1000:10000;     % big step to give a small table
R_earth=7926/2;      % radius = diameter/2
R_mars=4217/2;
d_earth=distance(R_earth,h);
d_mars=distance(R_mars,h);
fprintf('Height\tEarth\tMars\n');
for k=1:length(h)
    fprintf('%5.1f\t%5.1f\t%5.1f\n',h(k),d_earth(k),d_mars(k))
end
```

```
Height    Earth     Mars
  0.0       0.0       0.0
1000.0    2987.6    2284.1
2000.0    4455.6    3526.2
3000.0    5725.2    4653.1
4000.0    6906.8    5733.1
5000.0    8039.3    6788.6
6000.0    9140.9    7829.6
7000.0    10221.6   8861.1
8000.0    11287.5   9886.2
9000.0    12342.4   10906.6
10000.0   13388.8   11923.5
```

---

4. MATLAB text, problem 5.3. Print your tables into separate text files, but instead of printing 25 lines in each table, only print 10 lines.

I used: http://www.xe.com/ucc/
Euro to US: 1 EUR = 1.46341 USD
UK Pounds to US: 1 GBP = 1.83715 USD
Japanese Yen to US: 1 JPY = 0.00910755 USD

```
% Part a: Yen to USD
Yen_to_USD=0.00910755;
Yen = 0:5:120;  % will give 25 lines
disp('Table of conversions, Yen->USD')
fprintf('Yen   USD\n');
for k=1:10      % print only 10 lines, not 25
    fprintf('%3d\t%6.2f\n',Yen(k),Yen(k)*Yen_to_USD);
end
```

```
Table of conversions, Yen->USD
Yen   USD
  0    0.00
  5    0.05
 10    0.09
 15    0.14
 20    0.18
```

```
 25    0.23
 30    0.27
 35    0.32
 40    0.36
 45    0.41
```

```
Euro_to_USD=1.46341;
Euro = 1:2:20;  % will give 25 lines
disp('Table of conversions, Euro->USD')
fprintf('Euro   USD\n');
for k=1:10      % print only 10 lines, not 25
    fprintf('%3d\t%6.2f\n',Euro(k),Euro(k)*Euro_to_USD);
end
```

```
Table of conversions, Euro->USD
Euro   USD
  1    1.46
  3    4.39
  5    7.32
  7   10.24
  9   13.17
 11   16.10
 13   19.02
 15   21.95
 17   24.88
 19   27.80
```

```
% Part c: all conversions
GBP_to_USD=1.83715;
USD=0:2:20;
disp('Table of Conversions')
fprintf('USD   EUR     GBP     Yen\n')
for k=1:length(USD)

fprintf('%3d\t%5.2f\t%5.2f\t%5.1f\n',USD(k),USD(k)/Euro_to_USD,USD(k)/GBP_to_USD,U
SD(k)/Yen_to_USD);
end
```

```
Table of Conversions
USD   EUR     GBP     Yen
  0   0.00      0.00       0.0
  2   1.37      1.09     219.6
  4   2.73      2.18     439.2
  6   4.10      3.27     658.8
  8   5.47      4.35     878.4
 10   6.83      5.44     1098.0
 12   8.20      6.53     1317.6
 14   9.57      7.62     1537.2
 16  10.93      8.71     1756.8
 18  12.30      9.80     1976.4
 20  13.67     10.89     2196.0
```