```
%Name: David George
%StudentID:251004839
T = input_data();
%To conduct anova testing,the population must be normally distributed,
%independenat, and there most be homoegenity of vareinces between
 groups.


%Checking to see if the population is normally distributed on the 12th
 and 21st day.
%Kolmogorov Smirnov Test:
% H0: "the data is normally distributed"

% Rescale data for Norm(0,1) comparison 12th day:


    day12TestD1 = (( T.weight(T.Time ==12 & T.Diet ==
 1)) - mean(T.weight(T.Time ==12 & T.Diet == 1))) /
 (sqrt(var(T.weight(T.Time ==12 & T.Diet ==1))));
    day12TestD2 = (( T.weight(T.Time ==12 & T.Diet ==
 2)) - mean(T.weight(T.Time ==12 & T.Diet == 2))) /
 (sqrt(var(T.weight(T.Time ==12 & T.Diet ==2))));
    day12TestD3 = (( T.weight(T.Time ==12 & T.Diet ==
 3)) - mean(T.weight(T.Time ==12 & T.Diet == 3))) /
 (sqrt(var(T.weight(T.Time ==12 & T.Diet ==3))));
    day12TestD4 = (( T.weight(T.Time ==12 & T.Diet ==
 4)) - mean(T.weight(T.Time ==12 & T.Diet == 4))) /
 (sqrt(var(T.weight(T.Time ==12 & T.Diet ==4))));

% H: 0 (cannot reject) or 1 (reject: data unlikely normal)

    [rejectday12D1 p12D1] = kstest(day12TestD1, 'Alpha', 0.05);
    [rejectday12D2 p12D2] = kstest(day12TestD2, 'Alpha', 0.05);
    [rejectday12D3 p12D3] = kstest(day12TestD3, 'Alpha', 0.05);
    [rejectday12D4 p12D4] = kstest(day12TestD4, 'Alpha', 0.05);


     if rejectday12D1 == 0 & rejectday12D2 == 0 & rejectday12D3 == 0 &
 rejectday12D4 == 0

        disp("Population on the 12th day is normally distriubuted");
    end


% Rescale data for Norm(0,1) comparison 21th day:


    day21TestD1 = (( T.weight(T.Time ==21 & T.Diet ==
 1)) - mean(T.weight(T.Time ==21 & T.Diet == 1))) /
 (sqrt(var(T.weight(T.Time ==21 & T.Diet ==1))));
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   day21TestD2 = (( T.weight(T.Time ==21 & T.Diet ==
2)) - mean(T.weight(T.Time ==21 & T.Diet == 2))) /
(sqrt(var(T.weight(T.Time ==21 & T.Diet ==2))));
   day21TestD3 = (( T.weight(T.Time ==21 & T.Diet ==
3)) - mean(T.weight(T.Time ==21 & T.Diet == 3))) /
(sqrt(var(T.weight(T.Time ==21 & T.Diet ==3))));
   day21TestD4 = (( T.weight(T.Time ==21 & T.Diet ==
4)) - mean(T.weight(T.Time ==21 & T.Diet == 4))) /
(sqrt(var(T.weight(T.Time ==21 & T.Diet ==4))));



   [rejectday21D1 p21D1] = kstest(day21TestD1, 'Alpha', 0.05);
   [rejectday21D2 p21D2] = kstest(day21TestD2, 'Alpha', 0.05);
   [rejectday21D3 p21D3] = kstest(day21TestD3, 'Alpha', 0.05);
   [rejectday21D4 p21D4] = kstest(day21TestD4, 'Alpha', 0.05);

% H: 0 (cannot reject) or 1 (reject: data unlikely normal)


    if rejectday21D1 == 0 & rejectday21D2 == 0 & rejectday21D3 == 0 &
rejectday21D4 == 0

       disp("Population on the 21st day is normally distriubuted");
   end

%Checking to determine homongenitity of variences between  diets on
 day 12
%and 21 using the levene test

p12Var = vartestn(T.weight(T.Time ==12), T.Diet(T.Time
 ==12),'TestType','LeveneAbsolute', 'Display', 'off');
p21Var = vartestn(T.weight(T.Time ==21), T.Diet(T.Time
 ==21),'TestType','LeveneAbsolute', 'Display', 'off');

 if p12Var > 0.05

       disp("The groups of chicks on the 12th, divided by diets, have
 homogoenous variences");
 end

 if p21Var > 0.05

       disp("The groups of chicks on the 21st day, divided by diets,
 have homogoenous variences");
 end



% For both day 12 and day 21, the independence assumption holds up
 because
% the probaility of one event occuring in no away affects the
 probaility of
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% another event. In this case, the weight of any given chick in any
 group,
% has no bearing on the weight of any given chick in another group,
 nor
%does knowing the weight of one chick give insight into the probaility
 of
%any other chick beign a certain weight either. Therfore the
 indepdenace
%assumption holds up on both the 12th and 21st day.

%Since all assumptions (normaility, independence, and homogenity of
%variences) are held up, anova testing can be performed, with post-hoc
%testing to determine the best diet.

%Anova testing and Post Hoc testing for day 12:

    [pval12 tab12 stats12] = anova1(T.weight(T.Time ==12),
 T.Diet(T.Time ==12), 'off');

    figure

    [c12,m12,h12,nms12] = multcompare(stats12, 'Alpha',
 0.05, 'CType','bonferroni');
    title("Day 12");
    xlabel("Weight (grams)");
    ylabel("Diet Number");

%Anova testing and Post Hoc testing for day 21:

    [pval21 tab21 stats21] = anova1(T.weight(T.Time ==21),
 T.Diet(T.Time ==21), 'off');

    figure

    [c21,m21,h21,nms21] = multcompare(stats21, 'Alpha',
 0.05, 'CType','bonferroni');
    title("Day 21");
    xlabel("Weight (grams)");
    ylabel("Diet Number");


    Day12statarray = grpstats(T(T.Time
 ==12, :),'Diet','mean','DataVars',{'weight'});
    Day21statarray = grpstats(T(T.Time
 ==21, :),'Diet','mean','DataVars',{'weight'});

    Day12statarray.Properties.VariableNames{'Diet'} = 'DietsForDay12';
    Day12statarray.Properties.VariableNames{'GroupCount'}
 = 'GroupCountDay12';
    Day12statarray.Properties.VariableNames{'mean_weight'}
 = 'mean_weight_day12';

    Day21statarray.Properties.VariableNames{'Diet'} = 'DietsForDay21';
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    Day21statarray.Properties.VariableNames{'GroupCount'}
 = 'GroupCountDay21';
    Day21statarray.Properties.VariableNames{'mean_weight'}
 = 'mean_weight_day21';
    both  = [ Day12statarray Day21statarray ];
    disp(both);
```
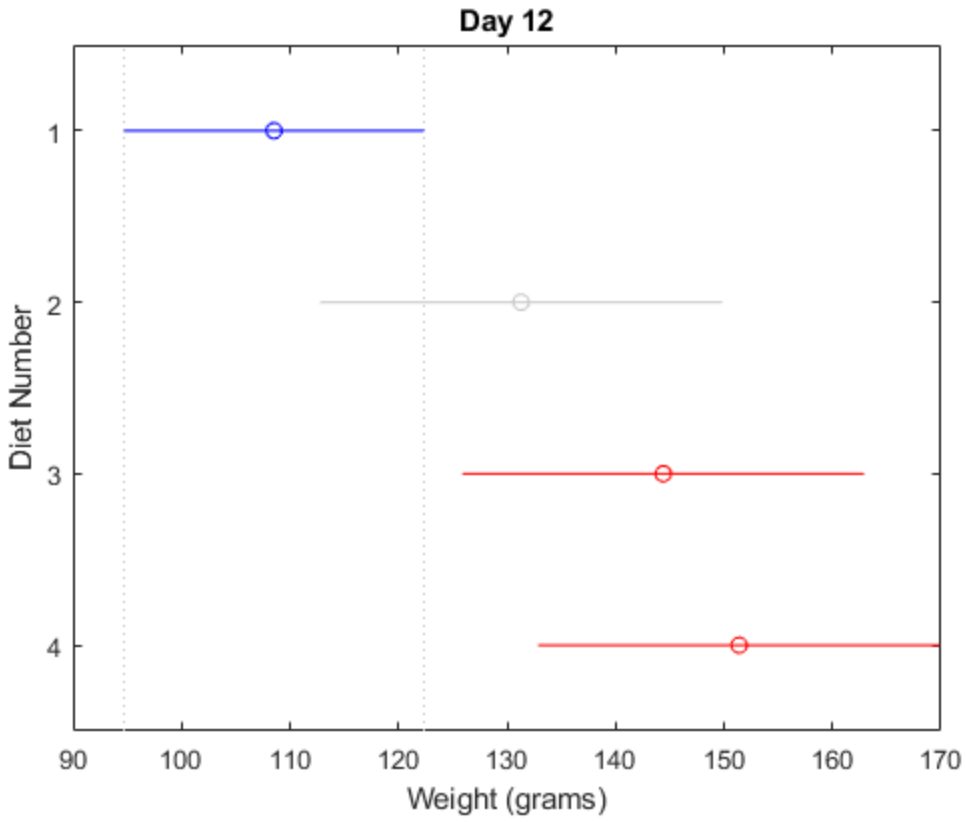
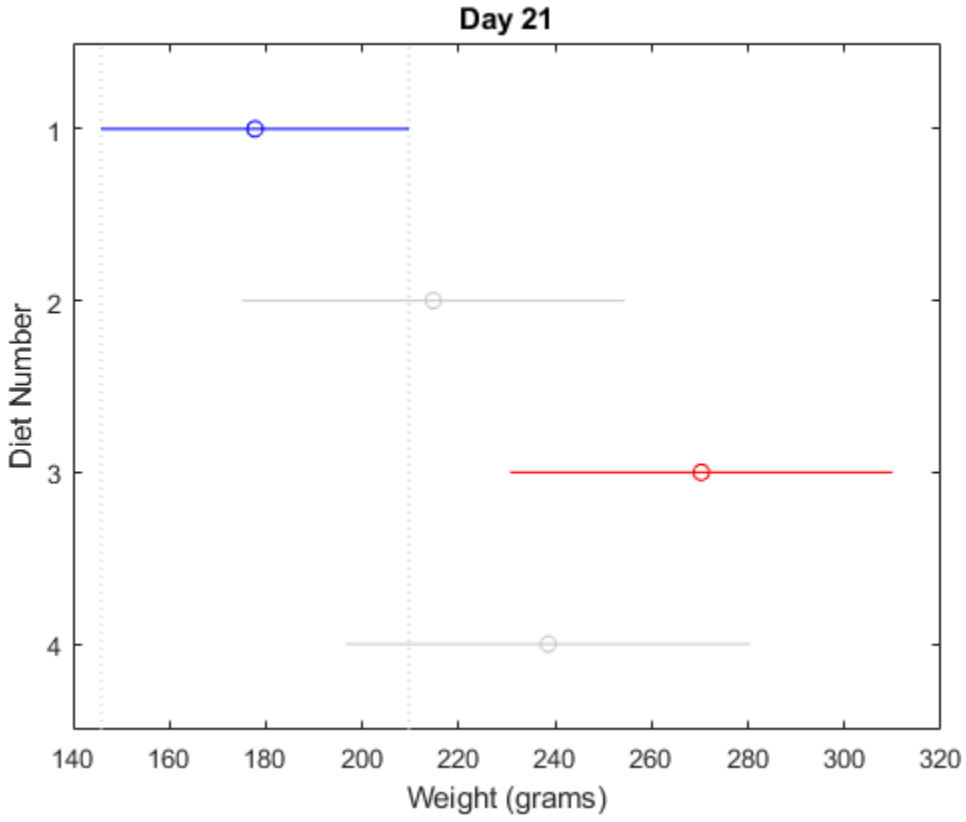

Recomondations:

If the farmer is to select a chick on day 12, I advice the farmer to choose either diet 3 or diet 4. Looking at the figure for day 12, diet 3 and diet 4 are the only diets with statiscially differnt mean weights from diet 1, so either or works.

```
%If the farmer is to select a chick on day 21, I advice the farmer to
%choose diet 3. Looking at the figure for day 21, diet 3 is the only
 diet
%that is statistically differnt from diet one.



function T = input_data()


%This function reads the input file and casts the data properly
T = readtable("chicks.csv");
T.weight = double(T.weight);
T.Time = double(T.Time);
T.Chick = uint32(T.Chick);
T.Diet = uint32(T.Diet);
end
```

```
Population on the 12th day is normally distriubuted
Population on the 21st day is normally distriubuted
The groups of chicks on the 12th, divided by diets, have homogoenous
 variences
The groups of chicks on the 21st day, divided by diets, have
 homogoenous variences
        DietsForDay12    GroupCountDay12    mean_weight_day12
 DietsForDay21    GroupCountDay21    mean_weight_day21
        _____________    _____________    _________________
 _____________    _____________    _________________

   1          1                19           108.526315789474
 1                16                    177.75
   2          2                10                      131.3
 2                10                     214.7
   3          3                10                      144.4
 3                10                     270.3
   4          4                10                      151.4
 4                 9           238.555555555556
```


Day 12
Diet Number
1
2
3
4
90
100
110
120
130
140
150
160
170
Weight (grams)


Day 21
Diet Number
1
2
3
4
140
160
180
200
220
240
260
280
300
320
Weight (grams)

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