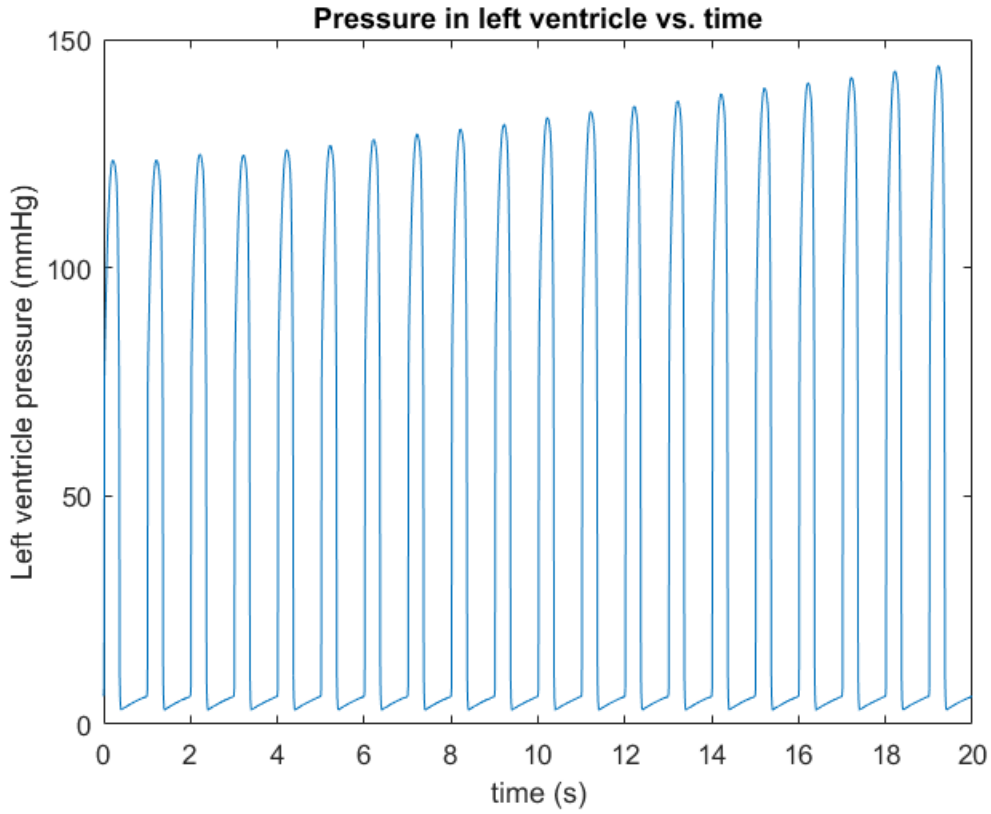
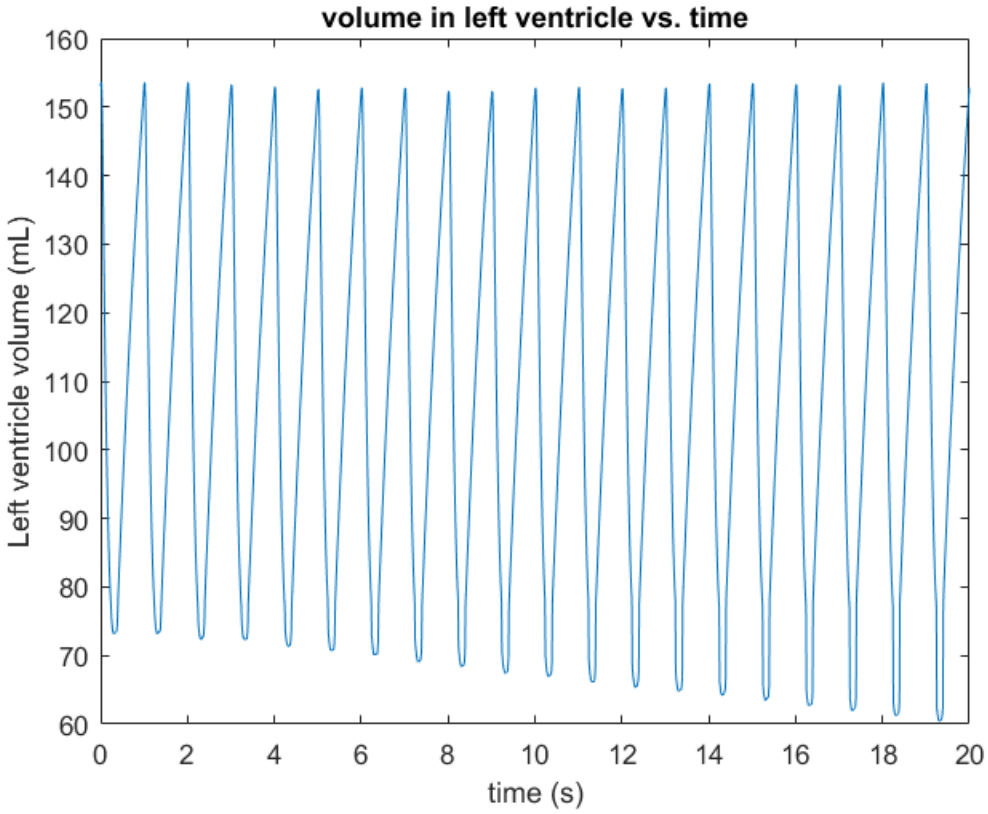
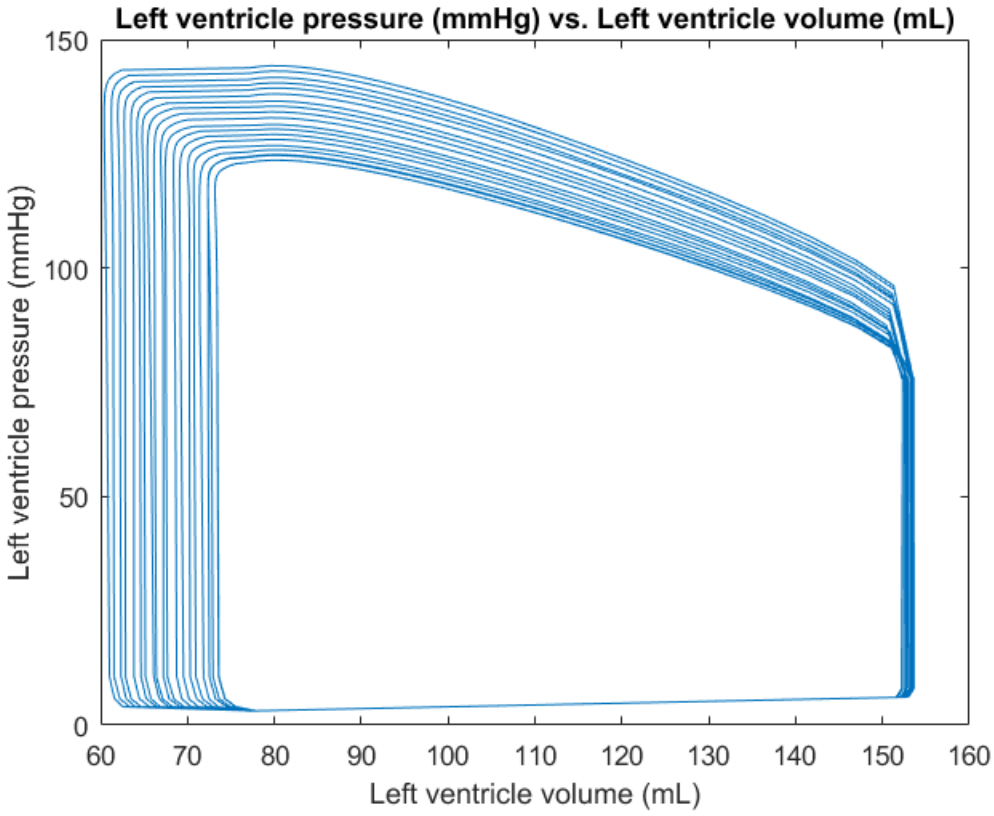
```
% Question 1:

% Part
 a:-------------------------------------------------------------------
clear

A = load('C:\Users\Minh Quan Do\Desktop\GMU\year 3 contents\beng
 313\hw4\Pressure_volume_data_left_ventricle_2017.mat');
LH_pressure = A.LH_pressure;
LH_volume = A.LH_volume;
t = A.time;

figure(1)
plot(t, LH_pressure)
title('Pressure in left ventricle vs. time')
ylabel('Left ventricle pressure (mmHg)')
xlabel('time (s)')

figure(2)
plot(t, LH_volume)
title('volume in left ventricle vs. time')
ylabel('Left ventricle volume (mL)')
xlabel('time (s)')

peak_systolic_pressure = findpeaks(LH_pressure);
end_systolic_volume = abs(findpeaks(-
LH_volume, 'MinPeakDistance',50));

initial_peak_systolic_pressure = peak_systolic_pressure(1)
final_peak_systolic_pressure =
 peak_systolic_pressure(length(peak_systolic_pressure))
initial_end_systolic_volume = end_systolic_volume(1)
final_end_systolic_volume =
 end_systolic_volume(length(end_systolic_volume))

% Peak systolic pressure is increasing over time
% End systolic volume is decreasing over time

% Part
 b:-------------------------------------------------------------------
figure(3)
plot(LH_volume, LH_pressure)
xlabel('Left ventricle volume (mL)')
ylabel('Left ventricle pressure (mmHg)')
title('Left ventricle pressure (mmHg) vs. Left ventricle volume (mL)')

end_diastolic_volume = findpeaks(LH_volume, 'MinPeakHeight', 150);
stroke_volume = end_diastolic_volume - end_systolic_volume;
ejection_fraction = stroke_volume./end_diastolic_volume;

[max_stroke_volume, loc] = max(stroke_volume)
[min_stroke_volume, loc2] = min(stroke_volume)
```

```
ejection_fraction_at_max = ejection_fraction(loc)
ejection_fraction_at_min = ejection_fraction(loc2)

% Part
 C:-----------------------------------------------------------------

heartrate = 5000./stroke_volume

% End of
 code---------------------------------------------------------------

%
 Output:-------------------------------------------------------------------


initial_peak_systolic_pressure =

  123.5660


final_peak_systolic_pressure =

  144.2442


initial_end_systolic_volume =

   73.1691


final_end_systolic_volume =

   60.4105


max_stroke_volume =

   92.9977


loc =

    20


min_stroke_volume =

   80.4342


loc2 =

     2
```

```
ejection_fraction_at_max =

    0.6062

ejection_fraction_at_min =

    0.5237

heartrate =

  Columns 1 through 7

   62.1475   62.1626   61.5855   61.8199   61.2963   61.0732   60.4376

  Columns 8 through 14

   59.7513   59.5797   58.8974   58.2358   57.6387   57.2635   56.8162

  Columns 15 through 20

   56.0414   55.5597   55.2071   54.8254   54.1850   53.7648
```




volume in left ventricle vs. time
Left ventricle volume (mL)
time (s)
160
150
140
130
120
110
100
90
80
70
60
0
2
4
6
8
10
12
14
16
18
20


Left ventricle pressure (mmHg) vs. Left ventricle volume (mL)
Left ventricle pressure (mmHg)
Left ventricle volume (mL)
150
100
50
0
60
70
80
90
100
110
120
130
140
150
160

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