```matlab
%%=========================================================================
% Sec 3,1 The program design procedure
%%=========================================================================


%% (I)  the temperature translation problem.
% 1. input temperature in degree F


% 2. calculate C degree by (F-32)*5/9

% 3. display C degree


%% The proctile problem with zero air resistance
% The proctile problem with zero air resistance
% in a gravitational field with constant g.
% Written by Daniel T. Valentine .. September 2006
% Revised by D. T. Valentine ........... 2012/2016
% An eight-step structure plan applied in MATLAB:
%
% 1. Define the input variables.
%
g = 9.81; % Gravity in m/s/s.
vo = input('What is the launch speed in m/s?');
tho = input('What is the launch angle in degrees?');
tho = pi*tho/180; % Conversion of degrees to radians.
%
% 2. Calculate the range and duration of the flight.
%
txmax = (2*vo/g) * sin(tho);
xmax = txmax * vo * cos(tho);
%
% 3. Calculate the sequence of time steps to compute
% trajectory.
%
dt = txmax/100;  % time step
t = 0:dt:txmax;
%
% 4. Compute the trajectory.
%
x = (vo * cos(tho)) .* t;
y = (vo * sin(tho)) .* t - (g/2) .* t.^2;
%
% 5. Compute the speed and angular direction of the
```

```matlab
% projectile. Note that vx = dx/dt, vy = dy/dt.
%
vx = vo * cos(tho);
vy = vo * sin(tho) - g .* t;
v = sqrt(vx.*vx + vy.*vy);% Speed
th = (180/pi) .* atan2(vy,vx);% Angular direction
%
% 6. Compute the time and horizontal distance at the
% maximum altitude.
%
tymax = (vo/g) * sin(tho);
xymax = xmax/2;
ymax = (vo/2) * tymax * sin(tho);
%
% 7. Display in the Command Window and on figures the ouput.
%
disp(['Range in meters =',num2str(xmax),',' ...
' Duration in seconds =', num2str(txmax)]);
disp(' ')
disp(['Maximum altitude in meters = ',num2str(ymax), ...
', Arrival at this altitude in seconds = ', num2str(tymax)])
plot(x,y,'k:',xmax,y(size(t)),'o',xmax/2,ymax,'o')
title(['Projectile flight path: v_o = ', num2str(vo),' m/s' ...
', \theta_o = ', num2str(180*tho/pi),' degrees'])
xlabel('x'), ylabel('y') % Plot of Figure 3.4.
figure % Creates a new figure.
plot(v,th,'r')
title('Projectile speed vs. angle')
xlabel('V'), ylabel('\theta') % Plot of Figure 3.5.
%
% 8. Stop.

%%=======================================================================
% Sec 3.2 Matlab function p. 92
%%=======================================================================

h = inline( 'cos(8*t) + cos(9*t)');
x = 0 : 20/300 : 20;
plot(x, h(x)), grid

h = inline( 'x.^2+y.^2','x','y');
tho=-pi:pi/10:pi;
x=cos(tho);y=sin(tho);
figure;polar(tho,h(x,y))
```

```

 % input the number of the student
clear all;close all;
N=input('   number of student:   ');
score=zeros(2,N);
% input the name and score of the student evaluate the average score
for i=1:N
    str1= input('student name:','s');
    eval(['name',int2str(i),'=str1;']);
%     if (i==1)
%         name=str1;
%     else
%         name=char(name,str1); % Create a character array.
%     end
score(1,i)=input('math score:   ');
score(2,i)=input('english score:   ');
avg(i)=(score(1,i)+score(2,i))/2;% avg(i) = sum(score(:,i))/2;
end

% output value
for i=1:N
    eval(['str1=name',int2str(i),';']);
 fprintf('the average score of %s is %3.2f \n',str1,avg(i));
end
save score_data N score


%% Exercise to write the average as a in-line function
close all; clear all;
load score_data % input N score



%%=========================================================================
% p. 93 matlab function
%%=========================================================================
% Use the following to write a matlab *.m script to evaluate the balance
%  function average = func1(vector)
%  average = sum(vector)/length(vector);

%% define two functions  save in stat2,m
% function [m,s] = stat2(x)
% n = length(x);
% m = avg(x,n);
% s = sqrt(sum((x-m).^2/n));
```

```matlab
% end
%
% function m = avg(x,n)
% m = sum(x)/n;
% end
% values = [12.7, 45.4, 98.9, 26.6, 53.1];
% [ave,stdev] = stat2(values)
clc;clear;close all
money=50;%%本金
newBalance = zeros(1,12);
for k=1:12 %% 月份
   money = money *1.01;%%本金加利息
    newBalance(k)=money;%%每月存款結算
    money=money+50;%%每月定存
end
%%  write this program as the matlab function
% Temperature conversion from C to F
% or F to C as requested by the user
%
Dec = input(' Which way?: 1 => C to F? 0 => F to C: ');
Temp = input(' What is the temperature you want to convert? ');
%
% Note the logical equals sgn (==)
if Dec == 1
    TF = (9/5)*Temp + 32;
    disp(' Temperature in F: ')
    disp(TF)
else
    TC = (5/9)*(Temp-32);
    disp(' Temperature in C: ')
    disp(TC)
end
function x = quadratic(a,b,c)
% Equation:
```

```
% a*x^2 + b*x + c = 0
% Input: a,b,c
% Output: x = [x1 x2], the two solutions of
% this eequation.
if a==0 & b==0 & c==0
disp(' ')
disp('Solution indeterminate')
elseif a==0 & b==0
disp(' ')
disp('There is no solution')
elseif a==0
disp(' ')
disp('Only one root: equation is linear')
disp(' x ')
x1 = -c/b;
x2 = NaN;
elseif b^2 < 4*a*c
disp(' ')
disp(' x1, x2 are complex roots ')
disp(' x1 x2')
x1 = (-b + sqrt(b^2 - 4*a*c))/(2*a);
x2 = (-b - sqrt(b^2 - 4*a*c))/(2*a);
elseif b^2 == 4*a*c
x1 = -b/(2*a);
x2 = x1;
disp('equal roots')
disp(' x1 x2')
else
x1 = (-b + sqrt(b^2 - 4*a*c))/(2*a);
x2 = (-b - sqrt(b^2 - 4*a*c))/(2*a);
disp(' x1 x2')
end
if a==0 & b==0 & c==0
elseif a==0 & b==0
else
disp([x1 x2]);
end
end


%% Exercise 3.2
m=44; n=28;
while m~=n
    if m > n
        m = m-n;
```

```
    else
        n = n-m;
    end
end
display(m)




t = 0:.1:2*pi;
subplot(2,2,1)
plot(t,sin(t))
subplot(2,2,2)
plot(t,cos(t))
subplot(2,2,3)
plot(t,exp(t))
subplot(2,2,4)
plot(t,1./(1+t.^2))
```