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```
% -----  
% HW1  
% LiXin  
% 2022/2/28  
% -----  
close all; clear all; clc;
```

Input for Problem 1~4

```
% Problem 1  
M = [1 2; 3 4];  
even_index(M)  
  
% Problem 2  
v = [1 2 3 4];  
flip_it(v)  
  
% Problem 3  
N = magic(5);  
n = 2;  
top_right(N, n);  
  
% Problem 4  
A = magic(5);  
peri_sum(A)
```

Problem 6

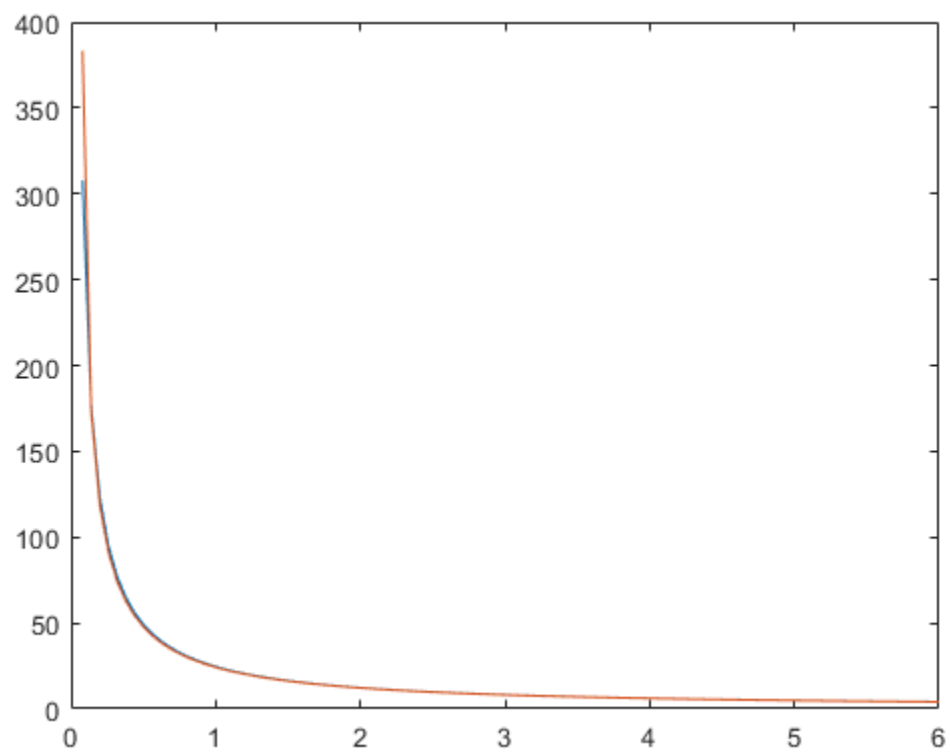
```
h = 2;  
v = sqrt(2 * 9.8 * h);  
for i = 1:8 % rebound 8 times  
    v = 0.85 * v;  
end  
h = v*v/(2*9.8)
```

$h =$

0.1485

Problem 7

```
n=1;  
T=300;  
R=0.08206;  
a=1.39;  
b=0.039;  
V=linspace(0.08,6,100);  
P1=n*R*T./V;  
P2=n*R*T./(V-n*b)-n*a./V.^2;  
plot(V,P1)  
hold on  
plot(V,P2)
```



Problem 8

```
% a  
x = 10 * rand(ceil(10*rand)+2,1)  
% b  
mysum=0;
```

```

for i = 1:size(x,1)
    mysum = mysum + x(i,1);
end
mysum
% c
if mysum == sum(x)
    disp('Congratulations!! you did it right')
    load handel;
    sound(y, Fs)
else
    fprintf('Sorry, %.2f ~= %.2f. Please try again.\n', mysum, sum(x))
end
% d
x = 10 * rand(ceil(10*rand)+2,1);
mysum=0;
i = 1;
while i <= size(x,1)
    mysum = mysum + x(i,1);
    i = i + 1;
end
mysum
if mysum == sum(x)
    disp('Congratulations!! you did it right')
    load handel;
    sound(y, Fs)
else
    fprintf('Sorry, %.2f ~= %.2f. Please try again.\n', mysum, sum(x))
end

```

x =

```

9.0579
1.2699
9.1338
6.3236
0.9754
2.7850
5.4688
9.5751
9.6489
1.5761
9.7059

```

mysum =

```
65.5204
```

Congratulations!! you did it right

mysum =

```
76.7005
```

Congratulations!! you did it right

Problem 1

returns a matrix that contains only those elements of M that are in even rows and columns

```
function res = even_index(M) % M as a matrix
    res = M(2:2:end, 2:2:end);
end
```

ans =

4

Problem 2

returns the opposite order of v

```
function w = flip_it(v) % row vector v, row vector w
    for i = size(v,2) : -1 : 1
        w(1,size(v,2) - i + 1) = v(1,i);
    end
end
```

ans =

4 3 2 1

Problem 3

returns the n -by- n square subarray of N located at the top right corner of N

```
function M = top_right(N, n) % a matrix N, a scalar non-negative
    integer n
    M = N(1:n, end-n+1:end)
end
```

M =

8 15
14 16

Problem 4

add together the elements that are in the first and last rows and columns

```
function my_sum = peri_sum(A)
    my_sum = 0;
    my_sum = my_sum + sum(A(:,1)) + sum(A(:,end)) + sum(A(1,:)) +
    sum(A(end,:));
    my_sum = my_sum - A(1,1) - A(1,end) - A(end, end) - A(end,1);
end
```

ans =

208

Problem 5

power series for $\sin(x)$, 5 terms are needed, when i exceeds 20, the loop terminates

```
function sin_x = cal(x)
sin_x = 0;
    for i = [1:2:20]
        sin_x = sin_x + (-1)^floor(i/2)*x^i/factorial(i);
    end
end
```

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