



Recitation Class 04 for VG101

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hwk & lab feedback

- HWK 02
 - Again, usage of semi-colon (;)
 - Understanding of function (will be covered later soon)
- LAB 02
 - Difficult this time
 - But you may find it useful
 - Problem 1 in lab02 V.S. Problem 3 in Fall 2011

Mid-term 01

- Check-list
 - Numerical system
 - Variables (scalar **vector matrix**) and operators
 - **String** and character
 - **for / while / if / switch**
 - **Function and Graphics (The most difficult points)**
 - Some built-in functions (e.g. find / num2str / strcmp)

Mid-term 01

- Before the exam
 - Review the check-list carefully
 - Scan the lecture slides thoroughly (find quickly during exam)
 - Or do you want to print the slides out?
 - Bring a flash disk (make sure no virus in it)
 - Laptop full charged and the power source
 - Download the encrypted rar file from SAKAI

Mid-term 01

- During the exam
 - Don't be late!
 - Check your name of the files.
 - Check the signature.
 - No access to the Internet!
 - Don't be nervous!

Honor Code

- Several possible honor violation found in HWK02

The Honor Code outlines certain standards of ethical conduct for persons associated with the UM-SJTU Joint Institute. The policies of the Honor Code apply to all graduate and undergraduate students of the JI or taking courses at the JI, faculty members, staff members, and administrators.

The Honor Code is based on these tenets:

- Engineers must possess personal integrity as students and as professionals. They must honorably ensure safety, health, fairness, and the proper use of available resources in their undertakings.
- Members of the UM-SJTU Joint Institute are honorable and trustworthy persons.
- The students, faculty members, and staff members of the UM-SJTU Joint Institute trust each other to uphold the principles of the Honor Code. They are jointly responsible for precautions against violations of its policies.
- It is dishonorable for students to receive credit for work that is not the result of their own efforts.

Honor Code

- Several possible honor violation found in HWK02

Matches for [REDACTED] & [REDACTED]) & [REDACTED])

58.9%

| Submission attachment(s)/asc.mko_02 | Submission attachment(s)/asc.mko_02 | 0 |
|---|---|----|
| Submission attachment(s)/tri_geo.m(1-7) | Submission attachment(s)/tri_geo.m(1-7) | 56 |
| Submission attachment(s)/tri_geo.m(7-8) | Submission attachment(s)/tri_geo.m(7-8) | 11 |
| Submission attachment(s)/pasctri.m(1-6) | Submission attachment(s)/pasctri.m(1-6) | 40 |
| Submission attachment(s)/pasctri.m(8-9) | Submission attachment(s)/pasctri.m(8-9) | 16 |
| Submission attachment(s)/pasctri.m(10-11) | Submission attachment(s)/pasctri.m(10-11) | 13 |

```
for k=1:(n+1) %use Binomial law and change t into Pascale triangle
s=k;
for l=1:s
t(s,l)=factorial(s-1)/(factorial(l-1).*factorial(s-l));
end %the end of for l=1:s
end %the end of for k=1:(n+1)
```

Submission attachment(s)/s[REDACTED].hwk2_5.m

```
%Following is the code for problem imread('hwk2img.bmp');
hwk2img=imread('hwk2img.bmp');%import the image
hwk2img=logical(hwk2img~=0); %if the number in hwk2img ~=0 ,it's true, show
1.
num2str(hwk2img) %convert the matrix from number to strings
%This is the end for problem 5
```

Submission attachment(s)/tri_geo.m

```
function [a, B, C] = tri_geo (b, A, c)
%Given a triangle with three sides a, b, and c, as well as three
angles
%A, B, and C.
% Detailed explanation goes here
a=sqrt(b.^2+c.^2-cosd(A).*2*b.*c); %cosine law
B=asind(b.*sind(A)./a); %sine law
C=180-B-A; %the sum of three angles of a triangle is 180
end
```

```
s=r;
for l=1:s
t(s,l)=factorial(s-1)/(factorial(l-1).*factorial(s-l));%According to
the binomial theorem
end %the end of for l=1:s
end %the end of for r=1:(n+1)
```

Submission attachment(s)/s[REDACTED].hwk2_5.m

```
%Following is the code for problem imread('hwk2img.bmp');
hwk2img=imread('hwk2img.bmp');%import the image 'hwk2img.bmp'.
hwk2img(hwk2img~=0)=1; %make every number which doesn't equal to 0 be 1
num2str(hwk2img) %convert the image into a binary image with black area
covered with 0s and white area covered with 1s
%This is the end for problem 5
```

Submission attachment(s)/tri_geo.m

```
function [a, B, C] = tri_geo (b, A, c)
%Given a triangle with three sides a, b, and c, as well as three
angles
%A, B, and C.
% detailed explanation goes here
a=sqrt(b.^2+c.^2-cosd(A)*2*b*c); %cosine law
B=asind(b*sind(A)/a); %sine law
C=180-B-A; %because the sum of three angles of a triangle is 180
end
```

Function (From the previous RC)

- **Return Values \neq Printed Values**
- `function [return values] = name(arguments)`
expression
return
- Lifespan of variables
- e.g.
 - `flag = prime_check(n);`
 - `n = encrypt('Hello! VG101!');`
 - `x = gcd(a,b);`
 - `[x,y] = gcd_lcm(a,b);`

Debug (From the previous RC)

- Run: F5
- Halt: shift + F5
- Break point: F12
- Step over: F10
- Step into: F11
- Step out: shift + F11
- Show the variables on the command window
- Also use “%” instead of deleting the commands

Debug (From the previous RC)

- The following is only my habit of debug.
 1. Static debug
 2. Compile the code
 3. Check some easy test cases
 4. Make use of the debugger (if mistakes found in step 3)
 5. Check some special test cases
 6. Make use of the debugger (if mistakes found in step 5)
 7. Delete the temporary variables and command for debug

Sample test

- Fall 2009 Problem 1
 - Usage of length()?
 - What is the difference between size()?
 - Usage of mod()?
 - Use vector instead of loop statement?

```
ABCD = 0; testV = [ 3 -5 6 -8 9 11];  
for i=1:length(testV)  
    if testV(i) > 0  
        ABCD = ABCD - mod(testV(i),2);  
    else  
        ABCD = ABCD - testV(i);  
    end  
end  
ABCD
```

```
testV = [ 3 -5 6 -8 9 11];  
i = testV > 0;  
testV(i) = mod(testV(i),2);  
ABCD = sum(-testV)
```

Revision

- What about this one?

```
ABCD = 0; testV = [ 3 -5 6 -8 9 11];  
for i=1:length(testV)  
    if testV(i) > 0  
        ABCD = ABCD - mod(testV(i),2);  
    elseif testV(i) < -7  
        ABCD = ABCD - testV(i) * 2;  
    else  
        ABCD = ABCD + testV(i);  
    end  
end  
ABCD
```

```
testV = [ 3 -5 6 -8 9 11];  
i = testV > 0  
testV(i) = -mod(testV(i),2)  
i = testV < -7;  
testV(i) = -testV(i) * 2;  
ABCD = sum(testV)
```

- Do you want to use it as a template?

Sample test

- Fall 2009 Problem 2
 - Matrix operation (' .* ./ .^)
 - Built-in functions (**min max sum prod length size zeros ones**)
 - Lecture 2 (p.11 & p.12)
- Dimension mismatch
 - Try “B(1:2,1:2)=A(2:end,3:end);” ?
 - Why “B(1:2,1:2)=A(3:end,3:end);” works?

Sample test

- Fall 2009 Problem 3
 - Still about matrix
- Always be careful during the exam!
 - `beta(mickey, minnie) = beta(minnie, mickey)*2;`

Sample test

- Fall 2009 Problem 5
- Try to solve it in two different ways!
 - Compare with problem 2 in HWK02.
- Which is wrong among the following codes?

```
function str = decode(str)
str(str == '%') = 's';
str(str == 's') = ' ';
str(str == 'z') = [];
```

```
function str = decode(str)
str(str == 's') = ' ';
str(str == '%') = 's';
str(str == 'z') = [];
```

- View a string as a vector of characters.

Sample test

- Fall 2011 Problem 1
- Comments will be helpful for both students and TAs!
- Rewrite the for loop. Which one is correct?

```
f = sin(x) ./ x;  
f(x == 0) = 1;  
f(f > 0.5) = 0;
```

```
f(x == 0) = 1;  
f = sin(x) ./ x;  
f(f > 0.5) = 0;
```

```
f = sin(x) ./ x;  
f(f > 0.5) = 0;  
f(x == 0) = 1;
```

- Still not perfect! (Comparison of real numbers)
 - You should set a variable.
 - zero = 1e-8; (small enough)

```
>> x = linspace(-5*pi,5*pi,51); x(26)
```

```
ans =
```

```
-1.7764e-15
```

```
>> x = linspace(-5*pi,5*pi,61); x(31)
```

```
ans =
```

```
0
```

Sample test

- Fall 2011 Problem 2
 - The usage of function
 - How to deal with the return value and input arguments?
 - How to build a help information for a function?
- Rewrite it as usual
 - You may want to review the usage of `find()` to get the index.

```
best = Inf;
for i = 1: length(arr)
    if (abs(arr(i) - x) < best)
        best = abs(arr(i) - x);
        ans = arr(i);
        idx = i;
    end
end
```

```
brr = abs(arr - x);
idx = find(brr == min(brr));
ans = arr(idx);
```

Sample

- Fall 2011 Problem 3
- Compare with Problem 1 in LAB 02
- Rewrite it without using for loop

```
[n,m] = size(A);  
B = zeros(m,n);  
for i = 1:m  
    for j = 1:n  
        B(i,j) = A(j,m + 1 - i);  
    end  
end
```

```
[n,m] = size(A);  
A = A';  
B = zeros(m,n);  
i = 1:m;  
j = 1:n;  
B = A(m+1-i,j);
```

Graphics

- About the graphics, please listen carefully in the lecture on Wednesday.
- Zhang Huajun will lead a recitation class about graphics on Wednesday, too.