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# MATLAB programming course for beginners, supported by Wagatsuma Lab@Kyutech

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## Specifications and requirements

1. @Time : 2022-8-10
2. @Author : Hiroaki Wagatsuma
3. @Site : [https://github.com/hirowgit/1A1\\_matlab\\_intermediate\\_course](https://github.com/hirowgit/1A1_matlab_intermediate_course)
4. @IDE : MATLAB R2022a
5. @File : lec0b\_step1.m

## Main program

```
NofD=5;  
maxD=5;  
  
rM=rand(NofD,NofD);  
  
binaryM=(rM>0.5);
```

```
disp('binaryM');
disp(binaryM);
key=find(~binaryM);

doubleM=double(binaryM);
doubleM(key)=3;
disp('doubleM');
disp(doubleM);

intM=floor(rM*maxD)+1;
disp('intM');
disp(intM);

key=find(intM<5);
intM2=intM;
intM2(key)=0;
disp('intM2');
disp(intM2);

s_intM=sort(intM);
disp('s_intM');
disp(s_intM);

dM=diff(s_intM);

[ki kj]=find(dM>0);

mD=max(max(dM));
ti2=[]; tj2=[];
for i=2:mD
    [ti tj]=find(dM==i);
    % sM=sortrows([[ti; ki] [tj; kj]],2);
    if ~isempty(ti)
        sM=sortrows([[ repmat(ti,[i-1,1]);ti2] [ repmat(tj,[i-1,1]);tj2]],2);
        ti2=sM(:,1); tj2=sM(:,2);
        % length(ki)
        % length(ti)
    end

end

if ~isempty(ti2)
    sM=sortrows([[ti2; ki] [tj2; kj]],2);
    ki=sM(:,1); kj=sM(:,2);
    % length(ki)
    % length(ti)
end

sect_id=[0 find(diff(kj)>0)' length(kj)];
sect=[sect_id(1:end-1)+1; sect_id(2:end)];
sect_eg=mat2cell(sect',ones(1,NofD),2);

sect_data=cellfun(@(x) sort(ki(x(1):x(2))),sect_eg,'UniformOutput',false);
NofE_data=cellfun(@(x) diff([0 x' NofD]),sect_data,'UniformOutput',false);
```

```

zeroS=cell(size(NofE_data)); %zeroS(:)={[]};
zeroE=cell(size(NofE_data)); %zeroE(:)={[]};

keyL=find(cell2mat(cellfun(@(x)
    length(x)<maxD,NofE_data,'UniformOutput',false)));
terM=cell2mat(sect_eg(keyL));

terM1=terM(:,1);
trNum=mat2cell(s_intM(1,kj(terM1))',ones(1,length(kj(terM1)))));
% keys=cell2mat(cellfun(@(x) x>1,trNum,'UniformOutput',false));
% zeroS(cell2mat(trNum(keys)))=cellfun(@(x)
    zeros(1,x-1),trNum(keys),'UniformOutput',false);
zeroS(kj(terM1))=cellfun(@(x) zeros(1,x-1),trNum,'UniformOutput',false);
% zeroS(cell2mat(terM1(trNum)))=cellfun(@(x)
    zeros(1,x-1),trNum,'UniformOutput',false);

% terM2=terM(:,2);
trNum=mat2cell(s_intM(NofD,kj(terM1))',ones(1,length(kj(terM1)))));
% keys=cell2mat(cellfun(@(x) x<NofD,trNum,'UniformOutput',false));
% zeroE(cell2mat(trNum(keys)))=cellfun(@(x) zeros(1,NofD-
x),trNum(keys),'UniformOutput',false);
zeroE(kj(terM1))=cellfun(@(x) zeros(1,NofD-x),trNum,'UniformOutput',false);

NofE_data2=cellfun(@(x,y,z) [x, y,
    z],zeroS,NofE_data,zeroE,'UniformOutput',false);
NofE_data_m=cell2mat(NofE_data2);

```

*binaryM*

1	0	1	0	0
1	1	0	0	0
0	0	1	0	1
1	0	0	0	0
1	1	0	0	1

*doubleM*

1	3	1	3	3
1	1	3	3	3
3	3	1	3	1
1	3	3	3	3
1	1	3	3	1

*intM*

4	2	4	1	1
5	4	2	3	2
1	2	3	2	4
4	2	3	2	2
5	4	1	2	4

*intM2*

0	0	0	0	0
5	0	0	0	0
0	0	0	0	0
0	0	0	0	0
5	0	0	0	0

*s\_intM*

1	2	1	1	1
4	2	2	2	2
4	2	3	2	2
5	4	3	2	4
5	4	4	3	4

## Supplementary information to publish

If you want to make a pdf or html file on the code, you can use the code "x\_publish\_each\_codes.m" in the same folder. Please change the file name as " this\_file\_tag='lec\*\_step\*' " (\* will be replaced to the number of the target file).

The code "x\_publish\_all\_codes.m" works for such a publication applying to all codes in the same folder (Note: "x\_publish\_all\_codes\_sub.m" should be located in the same folder).

*Published with MATLAB® R2022a*