A. Logic Operation

1st. *The simple of the operation*

Simple	operation
<	Small
>	Big
<=	Small or equal
>=	Big or equal
==	Equal
~=	Not equal

The result will appear in the following way

1 for true
0 for false

Example:

```
>> a=1:9

a =

    1    2    3    4    5    6    7    8    9

>> b=9-a

b =

    8    7    6    5    4    3    2    1    0

>> tf=a>4

tf =

    0    0    0    0    1    1    1    1    1
```

```
>> tf1=a>=4

tf1 =

    0    0    0    1    1    1    1    1    1

>> tf1=a~=4

tf1 =

    1    1    1    0    1    1    1    1    1

>> tf1=a==4

tf1 =

    0    0    0    1    0    0    0    0    0
```

****

2nd. *More simples used in logic operation*

And	**&**
Or	**|**
not	**~**

For add more than one logical operation.

Example:

```
>> a

a =

    1    2    3    4    5    6    7    8    9
```

```
>> b

b =

    8    7    6    5    4    3    2    1    0

>> a<=5&a>=2

ans =

    0    1    1    1    1    0    0    0    0

>> a<=5&a==2

ans =

    0    1    0    0    0    0    0    0    0

>> a<=5&a~=2

ans =

    1    0    1    1    1    0    0    0    0

>> a<=5|a~=2

ans =

    1    1    1    1    1    1    1    1    1

>> a<=5|a==2& b==3

ans =

    1    1    1    1    1    0    0    0    0
```

B. Loops and if statement

1st. *Loops*

FOR variable = expr, statement, ..., statement END

Example:

```
FOR I = 1:N,
        FOR J = 1:N,
           A(I,J) = 1/(I+J-1);
        END
     END
```

Example 2:

```
for n=1:10
   x(n)=sin(n*pi/10);
end
x

x =

  Columns 1 through 10

 0.3090    0.5878    0.8090    0.9511    1.0000 0.9511    0.8090    0.5878    0.3090    0.0000

  Columns 11 through 13

  10.0100   11.0100   12.0100
```

ExampleXX:

$$A(i,j)=\begin{cases} 1, \text{if } i=j \\ 0, \text{ if } i>j \text{ ,i ,j=1.....4} \\ i+j, \text{ if } i<j \end{cases}$$

MATLAB wrote as

```
a=0
for i=1:4
for j=1:4
if i==j
a(i,j)=1;
elseif i>j
a(i,j)=i+j;
else
a(i,j)=0;
end
end
 end
 a
```

Result

```
a =

    1    0    0    0
    3    1    0    0
    4    5    1    0
    5    6    7    1
```

1st The other expiration

```
WHILE expression
       statements
      END
```

Example :

```
A=3;
E = 0*A;
F = E + eye(size(E));
N = 1;
while norm(E+F-E,1) > 0,
    E = E + F;
```

```
    F = A*F/N;
    N = N + 1;
end
E
F
```

Result

```
E =

  20.0855


F =

  7.0031e-016
```

2nd Other expiration

Switch-case

Example:

```
method = 'Bilinear';

      switch lower(method)
        case {'linear','bilinear'}
          disp('Method is linear')
        case 'cubic'
          disp('Method is cubic')
        case 'nearest'
          disp('Method is nearest')
        otherwise
          disp('Unknown method.')
      end
      lower(method)
```

result

```
>> Method is linear

ans =

bilinear
```

example 2:

```
x=2.7;
units='m';
switch units
   case { 'inch','in'}
      y=x*2.54;
   case {'meter','m'}
      y=x/100;
   case {'centimeter','cm'}
      y=x;
   otherwise disp(['unknown units:' units])
      y=nan;
end
y
```

result:

```
y =

   0.0270
```

C. M – File.

Definition

It is a file used to store sub-function that you need to used it several times.

Example:

Z=[1 2 3 4 5 6 7 8 9]

Result

>> Z

Z =

1 2 3 4 5 6 7 8 9

Example 2:

```
function y=sqr(x)
% this function will calculate the square of number that you enter
y=x^2;
```

note{ you have to save it under the name before run the function }

result

>> sqr(5)

ans =

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D. Home work for the next week

1st. *Logical problem*

R=0:10
T=20-2:0

Make the following operation

R<=2 | t>9
R<=2 | t~=5
R<=2 &t>=7
R<=2 ~ t==5

This in the command window.

2nd. *For loop and if.*

The program will change the area as the following statement :

$$A(i,j)=\begin{cases} 1, & \text{if } i=j \\ \text{Inf} & \text{f } i>j \text{ ,i ,j=1…..5} \\ i+j, & \text{if } i<j \end{cases}$$

3rd. *Make that all in the M- File*

Same program make them in M-File.