

MAE 10 Week 3 Discussion

M/Tu

Logicals:

```
A = ones(3,5); L1 = logical(A); % What is my L array going to be & look like?
A = zeros(3,5); L2 = logical(A); % What about now?
A = 1.5*ones(3,5); L3 = logical(A); % What about now?
Any values that are nonzero are taken to be logical 1
```

```
a = 2; b = 4; c = 6; d = 0;
A = a && b; % Does this work?
%%% One way to better understand logical operators is copy lines 21-22 and
%%% change between the different logical operators (AND, OR, NAND, NOR, XOR,
NXOR, NOT)
%%% along with changing the numeric values of the variables
%%% Can also use multiple logical operators in the same statement such as
%%% A = xor(((a && b) || (b ~ c)),((d < 5) && (~c == a)))
```

If Statements:

```
a = 10;
if a > 5
    % Will this work?
end
```

```
a = 3;
if a > 5
    b = 5; % Would the variable b be created if a =< 5?
end
```

```
a = 2; b = 4; c = 6; d = 0;
if (a > b)
    a = -2*b;
elseif (c > b)
    b = .5*c;
else
    d = 100;
end
```

```
a = 2; b = 4; c = 6; d = 0;
if (a == 2)
    a = 2.1;
    b = 2;
    disp(b);
else
    b = 5;
end
```

```

SportType = input('Enter a sport ', 's');
switch SportType
    case 'Football'
        disp('The S.F. 49ers are the G.B. Packers at Lambeau tonight');
    case 'Basketball'
        disp('76ers @ Celtics is the first game of the new season')
    case 'Formula One'
        disp('Lewis Hamilton will win his 5th WDC this year')
    otherwise
        disp('No other sports matter')
end
%%% You DO NOT use switch case to check logical statements

A = 10; B = 15.5;
fprintf('The value of A is %i and the value of B is %f', A, B)
%%% need to use a line break, \n, with fprintf to denote writing on a new
%%% line

```

% Spot the error(s)

```

a = 5; b = 3; c = 1;
if (a < b)
    disp('Hi')
else
end

```

- No errors

```

a = 5; b = 3; c = 1;
if c < b
    disp('12')
end
if c < a
    disp('11')
end

```

- No errors

- o 12 and 11 displayed in command window

```

a = 5; b = 3; c = 1;
if ((c > b) || (a == b))
    disp(b);
elseif (c == a)
    disp(c);
else
    disp(a);
end
end
end

```

- Errors lines 9 and 10

- Too many ends

```
a = 1; b = 3; c = 1;
if (a > b)
    disp('Hi')
else
    disp('Bye')
elseif (b > c)
    disp('Ok')
end
```

- Error on line 6
 - Can't have an elseif after else

```
fprintf('My score is %i.',17);
fprintf('Your score is %f.', 25.55);
fprintf('His score is %i.',5.75);
```

- No errors, but the way the lines are being displayed is ugly and the numeric values are not displayed exactly

```
%%% Question %%%
```

```
% Take the following two arrays:
```

```
%%% Score = [10 81 65 73 96 101];
```

```
%%% Name = [Bill John Dean Alan Arthur David];
```

```
% Hint: Need to denote character strings (names) as separate elements in  
% the character array
```

```
%%% The scores correspond to the names, i.e. Bill's score is 10, David's  
%%% score is 101
```

```
% Write a program that rearranges both arrays so that the scores/names go  
%%% from best (elem 1) to worst (elem 6) and determines what letter grades  
each
```

```
%%% person recieved (A+ (100+), A (90-100), B (80-90), C (70-80), D (60-70),  
F (<60)
```

```

clear;clc;
Score = [10 81 65 73 96 101];
Name = ["Bill" "John" "Dean" "Alan" "Arthur" "David"];

%Sorting arrays descending order
[SortScore,I] = sort(Score,'descend'); % look into sort()
SortName = [Name(I(1)) Name(I(2)) Name(I(3)) Name(I(4)) Name(I(5))
Name(I(6))];

% Determining letter grades
if ~isempty((SortScore > 100)) == 1 % look into isempty()
    a = (SortScore > 100);
    b = find(a); % look into find()
    disp('People who recieved an A+')
    disp(SortName(b))
end
if ~isempty((SortScore <= 100) & (SortScore >= 90)) == 1
    a = ((SortScore <= 100) & (SortScore >= 90));
    b = find(a);
    disp('People who recieved an A')
    disp(SortName(b))
end
if ~isempty((SortScore < 90) & (SortScore >= 80)) == 1
    a = ((SortScore < 90) & (SortScore >= 80));
    b = find(a);
    disp('People who recieved a B')
    disp(SortName(b))
end
if ~isempty((SortScore < 80) & (SortScore >= 70)) == 1
    a = ((SortScore < 80) & (SortScore >= 70));
    b = find(a);
    disp('People who recieved a C')
    disp(SortName(b))
end
if ~isempty((SortScore < 70) & (SortScore >= 60)) == 1
    a = ((SortScore < 70) & (SortScore >= 60));
    b = find(a);
    disp('People who recieved a D')
    disp(SortName(b))
end
if ~isempty((SortScore < 60)) == 1
    a = ((SortScore < 60));
    b = find(a);
    disp('People who recieved an F')
    disp(SortName(b))
end

%%% Can I figure out a way to use elseif and else statements or can I only
%%% use if?
%%% Can I use switch case instead of if statements or switch case to sort
%%% the name and score arrays?

```

Friday Discussion

1. Switch command example 1:

```
clear;clc;
x=80;
switch x
    case 80
        disp('x=80')
    case {80, 78}
        disp('x=80 or x=78')
end
Output: x=80
```

note that even though both cases are true, MATLAB does not see the second case because our first case was true.

2. Write a program that takes an input from a user for the month and then based on the input displays to the user how many days are in that specific month.

Answer:

```
Month=input('Please input a number for month');
switch Month
    case{1,3,5,7,8,10,12}
        disp('There are 31 days in this month')
    case{4,6,9,11}
        disp('There are 30 days in this month')
    case{2}
        disp('There are 28 days in this month')
    otherwise
        disp('Number not valid. please enter a value between 1-12')
end
```

3. Check for the size of the matrices A and B if the sizes are equal make a new matrix with stacking the two matrices together and display the size of the new matrix by fprintf command.

Answer:

```
clear;clc;
;%Here I have predefined matrices, Alternatively you could have ask the user
to enter matrices A and B;

A=ones(2,3);
B=rand(2,3);

if isequal(size(A),size(B))
    C = [A; B]
    x=size(C);
    fprintf('C is a %d by %d Matrix\n',x);
else
    C = []
    disp('A and B are not the same size.')
end
```

4. Write a program that takes an input from a user for the month and then based on the input displays to the user how many days are in that specific month and tell the user which season it is.

```
Month=input('Please input an integer for month');
if Month>12|Month<1
    disp('The number is not valid. please enter an integer between 1-12')
else
switch Month
    case{1,3,5,7,8,10,12}
        if Month==1 | Month==3
            disp('It is winter')
            disp('There are 31 days in this month')
        elseif Month==7|Month==8
            disp('It is Summer')
            disp('There are 31 days in this month')
        elseif Month==10|Month==12
            disp('It is Fall')
            disp('There are 31 days in this month')
        else
            disp('It is spring')
            disp('There are 31 days in this month')
        end
    case{4,6,9,11}
        if Month==4| Month==6
            disp('It is Spring')
            disp('There are 30 days in this month')
        elseif Month==9
            disp('It is Summer')
            disp('There are 30 days in this month')
        else
            disp('It is Fall')
            disp('There are 31 days in this month')
        end
    case{2}
        disp('It is winter')
        disp('There are 28 days in this month')
end
end
```