SECOND YEAR OF GEOMATICS DEPARTMENT

COMPUTER APPLICATIONS 2018

LECTURE 3

CONTROL FLOW AND OPERATORS
IF STATEMENTS

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LECTURE ELEMENTS

1. “BASIC CONCEPTS”
2. “THE “IF” STATEMENT”
3. “RELATIONAL OPERATORS”
4. “A FEW MORE USEFUL FUNCTIONS”
5. “EXAMPLES”

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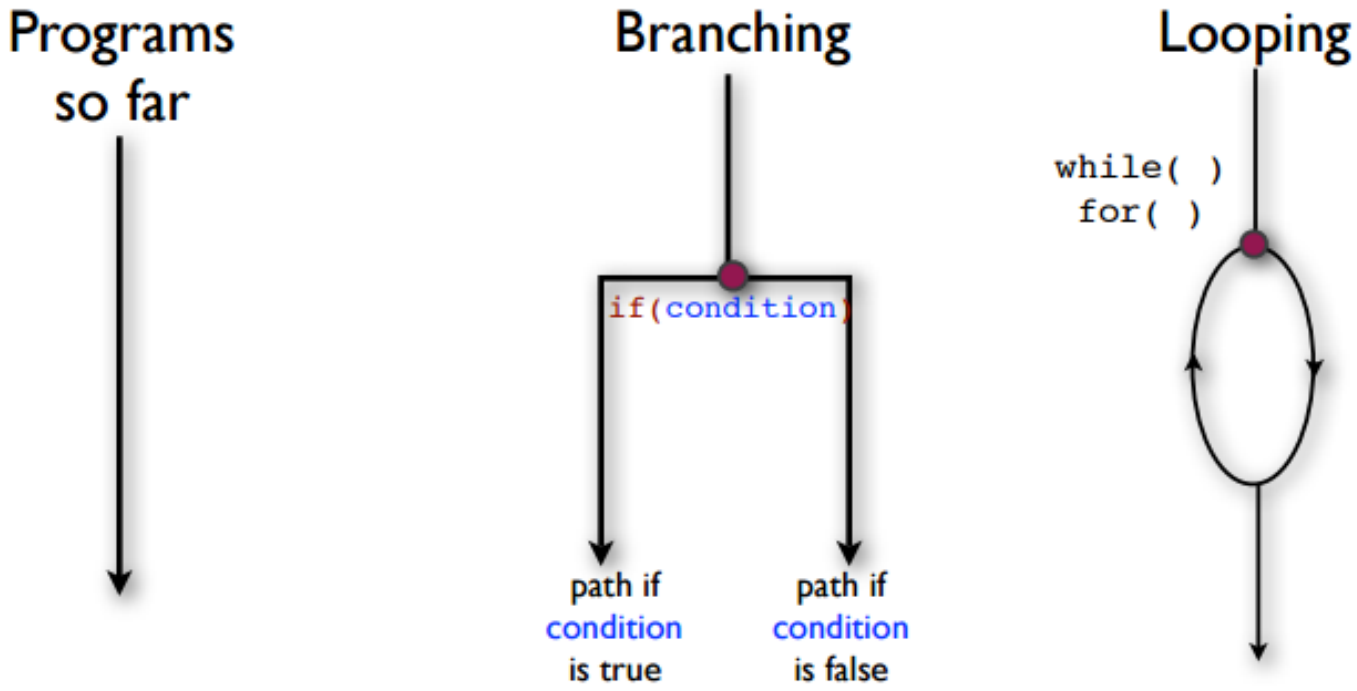
Basic Concepts

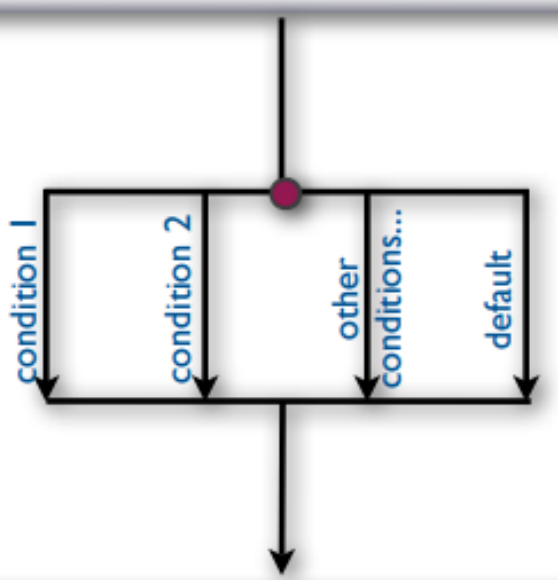


These basic elements can be combined to create complex program logic.

The "if" Statement

Basic syntax:

```
if ( condition1 )
  % do some work
elseif ( condition2 )
  % do different work
:
else
  % do default work
end
```




```
if ( condition )
  % do some work
end
```

```
if ( condition )
  % do some work
else
  % do default work
end
```

Relational Operators

- True condition represented by a nonzero (typically "1").
- False condition represented by zero "0"
- Can be applied to scalars, vectors, or matrices.

Statement	Result	Example
a == b	true if a and b are equal	5==3 false
a ~= b	true if a and b are NOT equal	5~=3 true
a < b	true if a is less than b	5<3 false
a > b	true if a is greater than b	5>3 true
a >= b	true if a is not less than b	5>=3 true
a <= b	true if a is not greater than b	5<=3 false

Comparison Operators

Palm p. 194

Operator	Description
&	Element-wise AND - returns an array of 1 and 0.
|	Element-wise OR - returns an array of 1 and 0
~	Element-wise NOT - returns an array of 1 and 0

Logical Operators

A FEW MORE USEFUL FUNCTIONS

Function	Description
any(var)	returns true if any element of var is true
all(var)	returns true (1) if all elements of var are true.
find(var)	returns the indices where var is true (nonzero).
isequal(var1, var2)	returns true (1) if the two arrays are equal.
strcmp(str1,str2)	Compares two strings and returns true if they are equal.
abs(var)	returns the absolute value of all elements of var.
ceil(var)	rounds all elements of var up.
floor(var)	rounds all elements of var down.
mod(var1,var2)	Remainder of division of var1 by var2.

EXAMPLES

```
dice = 3*rand(1);   % a number between 0 and 3
if( dice<1 )
   name = 'Bob';
elseif (dice<2)
   name = 'Fred';
else
   name = 'Jane';
end

dice = 3*rand(1);   % a number between 0 and 3
if dice<1
   age = 25;
elseif dice<2
   age=19;
else
   age = 40;
end

fprintf('\n%s is %1.0f years old\n\n',name,age);
```

EXAMPLES

```
YOURNUMBER = INPUT('ENTER A NUMBER: ');
IF YOURNUMBER < 0
    DISP('NEGATIVE')
ELSEIF YOURNUMBER > 0
    DISP('POSITIVE')
ELSE
    DISP('ZERO')
END
```

```
A = ONES(2,3);
B = RAND(3,4,5);
IF ISEQUAL(SIZE(A),SIZE(B))
   C = [A; B];
ELSE
   DISP('A AND B ARE NOT THE SAME SIZE.')
   C = [];
END
```

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EXAMPLES

```
a = 100;
%check the boolean condition
   if a == 10
      % if condition is true then print the following
      fprintf('Value of a is 10\n' );
   elseif( a == 20 )
      % if else if condition is true
      fprintf('Value of a is 20\n' );
   elseif a == 30
      % if else if condition is true
      fprintf('Value of a is 30\n' );
   else
      % if none of the conditions is true '
      fprintf('None of the values are matching\n');
   fprintf('Exact value of a is: %d\n', a );
   end
```

EXAMPLES

```
X = 10;
MINVAL = 2;
MAXVAL = 6;
IF (X >= MINVAL) && (X <= MAXVAL)
    DISP('VALUE WITHIN SPECIFIED RANGE.')
ELSEIF (X > MAXVAL)
    DISP('VALUE EXCEEDS MAXIMUM VALUE.')
ELSE
    DISP('VALUE IS BELOW MINIMUM VALUE.')
END
```

```
A = RAND(100, 1);
IF A < 30
    DISP('SMALL')
ELSEIF A < 80
    DISP('MEDIUM')
ELSE
    DISP('LARGE')
END
```

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TEST EXAMPLE

- GENERATE A MATLAB PROGRAM IN A SCRIPT FILE TO CONVERT THE STUDENTS DEGREES TO CERTAIN GRADES

1. LOAD THE STUDENTS DEGREES FROM TEXT FILE
2. USE THE IF STATEMENT TO CATEGORIZE THE STUDENT DEGREES AS FOLLOWS:

<50 POOR , 50 TO 65 PASS , 65 TO 75 GOOD , 75 TO 85 V.GOOD, >85 EXCELLENT

3. SAVE THE OUTPUTS TO A TXT FILE

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SUPPLEMENTARY FILES

1. PLEASE VISIT THE LINK "HTTPS://WWW.YOUTUBE.COM/WATCH?V=3EFMZS3OIXI"
2. PLEASE VISIT THE LINK "HTTPS://WWW.YOUTUBE.COM/WATCH?V=ZZT1JI1KWFS"
3. PLEASE SEE THE ADDED PDF. FILES **OPERATORS AND FLOW & CONTROL STRUCTURES**

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