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Discrete Mathematics
LabSheet 03
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Conditional Statements

if Statements

Conditional statements or decision statements are a key part of most programming languages. This allows the programmer to selectively execute commands depending on a specified *condition*. OCTAVE provides the "if" statement for this purpose. There are 3 basic variants of this if statement.

- **if ... end**
- **if ... else ... end**
- **if ... elseif ... else ... end**

The simplest form of the if the statement is,

```
if condition
      statements
end
```

Example:

12.m *hh.m

```
1  x=12
2  if(x==12)
3  printf('true')
4  else
5  printf('False')
6  endif
7
8
```

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The second form of an if statement looks like this:

```
if (condition)
    then-body
elseif (condition)
    elseif-body
else (condition)
endif
```

Example :

```
1  x=12;
2  y=23;
3  if(x==y)
4    disp('both are equal')
5  elseif (x>y)
6    disp('x value is greater than y')
7  else
8    disp('x value is less than y')
9  endif
```

What should be the output?

The following operators can be used in the condition.

Operator	Description
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
==	Equal to
~=	Not equal to
&	AND operator
|	OR operator
~	NOT operator

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Nested if Statements

There come to some situations where multiple conditions have to be satisfied to execute a block of code then we use nested if statements.

Syntax :

```
if <expression 1>
   % Executes when the boolean expression 1 is true
   if <expression 2>
      % Executes when the boolean expression 2 is true
   end
end
```

Example :

```
number = 3;

if number < 10
        fprintf('The number is less than 10\n');
        if number < 5
                fprintf('Also The number is less than 5');
        end
end
```

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switch statement

The switch statement conditionally executes a set of statements that are selected from several options, each of which covers a case statement.

Syntax :

```
switch <switch_expression>
  case <case_expression>
    <statements>
  case <case_expression>
    <statements>
  ...
  ...
  otherwise
    <statements>
end
```

Example :

```
name = 'Octave';

switch (name)

 case 'Matlab'

  fprintf('My name is Matlab.\n');

 case 'Octave'

  fprintf('My name is Octave.\n');

  otherwise

  fprintf('Invalid Name.\n');

end
```

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Exercise

1. If **x = 4** finds the number **"x"** is **less than 10 or not.**
2. Find out the maximum of the given two numbers **(u = 3, v = 7).**
3. Using Logical Operators check the given number is within range or not
   (a = 8, min = 1, max = 10).
4. Use the `if` condition to check whether there are real roots in the quadratic function.
5. Use `disp` function to display an error message if the **roots are not rea**l.
6. Check whether there are **2 roots or just one**.
7. Use **Nested if** Statements to find the maximum of three numbers, let us consider three numbers are x, y, and z. **x = 4, y = 8, and z = 12**.
8. Use the **switch** statement to find the number you have given **is either 5 or 8** if not display an error message. **(n = 8)**.