TECHNISCHE UNIVERSITÄT DRESDEN

Introduction to Matlab

Conditionals and loops

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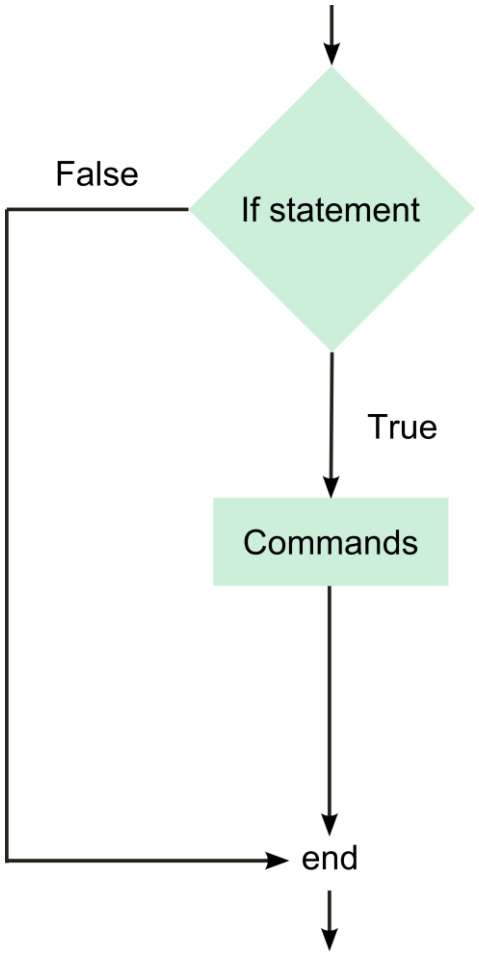
DRESDEN concept
Exzellenz aus Wissenschaft und Kultur

If conditionals

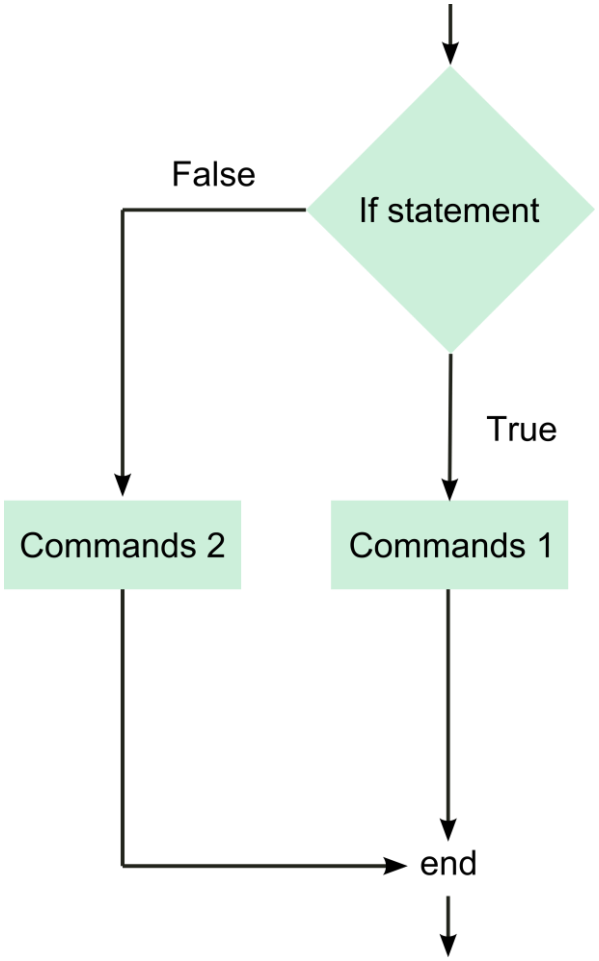



```
if conditional
commands
end
```

Example:

```
if a<5
  fprintf('a is smaller than 5');
end
```

If else

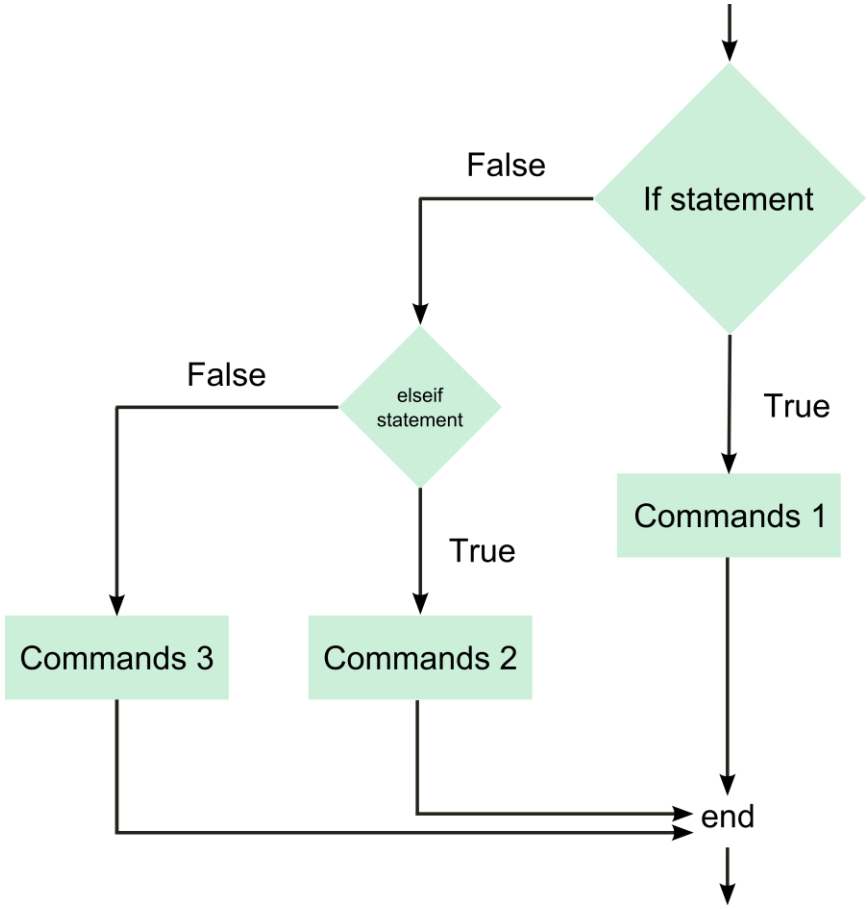



```
if conditional
commands
else
commands
end
```

Example:

```
if a<5
fprintf('a is smaller than 5');
else
fprintf('a is bigger or equal
than 5');
end
```

If elseif



if conditional
commands
elseif
commands
end

Example:

```
if a<5
fprintf('a is smaller than 5');
elseif a>5
fprintf('a is bigger than 5');
else
fprintf('a is 5');
end
```

Conditionals

There are many conditionals you can use with the if statement:

- <
- >
- ==
- <=
- >=
- ~=
- 0
- 1

There are combination operators:

- && (and)
- || (or)
- ~ (negation)

If it is True, it will return 1. If it is False, it returns 0. For example:

1<3 → 1
8>9 → 0
5 ==5 → 1
~(1>2) → 1
~6 → 0

1 && 1 → 1
1 && 0 → 0
0 && 1 → 0
0 && 0 → 0

1 || 1 → 1
1 || 0 → 1
0 || 1 → 1
0 || 0 → 0

Switch and case

```
switch x
  case value1
    commands
  case value2
    commands
…
  otherwise
    commands
end
```

Example:

```
switch x
   case 1
     y = 2;
     x = 2;
   case 2
     y = -2;
   case {3,4}
     y = 9;
   otherwise
     y = 0;
end
```

for loop

To repeat a block of commands many times, use a for loop.

```
for index = values
  commands
end
```

For example:

```
for k = 1:3
   display(k)
end
```

Example:

```
for k = [1,5,-1]
    display(k)
end
```

Examples

```
for x = 1:10
   if x==5 || x== 7
      display(x);
   end
end
```

```
for k = 1:10
   y(k) = exp(k);
   if y(k)>30
      y(k) = 30;
   end
end
```

```
gamma = 1;
x = 5;
for i = 1:x
   gamma = gamma*i;
end
```

Exercises

1. Using for loops, calculate the volumes of cilinders whose radii are r = {1,1.2,1.3} and whose height is h = 5. That is, calculate three volumes (one for each cilinder). Write these volumes to a vector VolumesCilinder. The volume of a cilinder is given by $V = \pi r^2 h$.
2. Repeat the previous exercise, but now with r = {1, 1.2, 1.3} and h = {5, 10, 12}. Write the results to a 3x3 matrix. Hint: use two nested for loops.
3. Write a function with two inputs, a vector VecX and a number Y. The function should search VecX and find those elements that equal X. The output of the function is a vector Z with those indices. The function must work with any size of vector VecX.