COMP 478/6771 (FALL 2020)

Digital Image Processing

Introduction to MATLAB
Part II

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Strings

- Array of Unicode characters.
- Creating Strings

```
>> firstName = 'Thomas'
>> lastName = 'Lee'
```

- Concatenating Strings

```
>> name = [firstName ' ' lastName];
```

- Comparing Strings
  - `strcmp`

Useful Functions

- IO
  - `input` Prompts for user input
  - `disp` Displays objects
- String
  - `sprintf` Writes formatted data to string
  - `num2str` Converts number to string
  - `str2num` Converts string to number
- Math
  - `sort` Sort in ascending or descending order
  - `rem` Remainder after division
  - `round` Rounds towards nearest integer

Program Control Statements

- Conditional Control
  - if, switch
- Loop Control
  - for, while, continue, break
- Function Definition and Termination
  - function, return
- Error Control
  - try, catch

Conditional Statements

1

```
if cond
   expr
end
```

2

```
if cond
   expr1
else
   expr2
end
```

3

```
if cond1
   expr1
elseif cond2
   expr2
elseif cond3
   expr3
 ...
else
   exprn
end
```

Conditional Statements

```
a = 5;
if rem(a,2) == 0
      'a is even'
end
```

```
a = 5;
if rem(a,2) == 0
      'a is even'
else
      'a is odd'
end
```

Loop Statements

```
for index = start:increment:end
    statements
end
```

1

```
while expression
   statements
end
```

2

Loop Statements

```
s = 0;
for i1 = 1:100
    s = s + i1;
end
s
```

```
s = 0;
i1 = 1;
while i1 <= 100
    s = s + i1;
    i1 = i1 + 1;
end

s
```

Loop Statements

```
avg = 0;
count = 0;
n = input('Enter a number: ');
while n >= 0
    count = count + 1;
    avg = avg + n;
    n = input('Enter a number: ');
end
avg = avg / count
```

Continue/Break Statements

- **`continue`**

  Passes control to the next iteration of the for or while loop in which it appears, skipping any remaining statements in the body of the loop.

- **`break`**

  Terminates the execution of a for loop or while loop. When a break statement is encountered, execution continues with the next statement outside of the loop. In nested loops, break exits from the innermost loop only.

Continue/Break Statements

```
for x = -10:.1:10
  if x == 0 || x == 3 || x == 7
    continue;
  end
...
end
```

```
while 1
  str = input('Enter input string: ', 's');
  if strcmp(str, 'exit') || strcmp(str, 'quit')
    break
  end
  disp(['You typed ' str]);
end
```

Functions

```
function y = cube(x)

y = x * x * x;
```

```
function y = fib(n)
% Returns nth number in Fibonacci series

a = 0;
b = 1;
for i1 = 1:n
    tmp = a;
    a = b;
    b = tmp + b;
end
y = b;
```

References

- MATLAB
  The Language of Technical Computing
  Programming *Version 7*
  http://www.mathworks.com/access/helpdesk/help/pdf_doc/matlab/matlab_prog.pdf