

# Formatting Data in MATLAB: The `fprintf` Function

a MATLAB Cheat Sheet by SPARTAN PROFESSOR



## INPUT ARGUMENTS

**Description:** The `fprintf` function is used to format data to text.

**Input Arguments:** The function has three input arguments: `fprintf(fileID, formatSpec, A1, ..., An)`

- `fileID` is the **file identifier**
- `formatSpec` specifies the format of the output fields using **formatting operators**
- `A1, ..., An` are one or more **numeric or character arrays** (scalars, vectors, matrices,...)

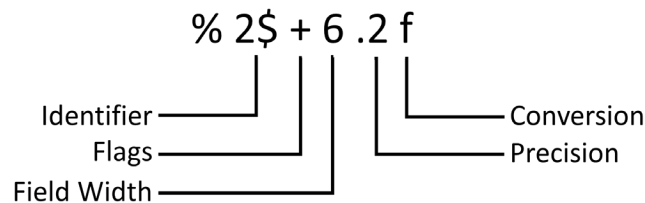
## fileID

**Description:** The **file identifier** is specified as one of the following

- 1 for standard output to the screen (DEFAULT)
- 2 for standard error
- A file identifier obtained from the function `fopen`

## formatSpec

**Description:** `formatSpec` specifies the format of the output fields using **formatting operators**.



## CONVERSION CHARACTER

**Description:** The **conversion character** formats numeric and character data as text.

Value Type	Conversion	Details
Integer, signed	<code>%d</code> or <code>%i</code>	Base 10
Integer, unsigned	<code>%u</code>	Base 10
	<code>%o</code>	Base 8 (octal)
	<code>%x</code>	Base 16 (hexadecimal), lowercase letters a-f
	<code>%X</code>	Base 16 (hexadecimal), uppercase letters A-F
Floating-point number	<code>%f</code>	Fixed-point notation
	<code>%e</code>	Exponential notation, lowercase e
	<code>%E</code>	Exponential notation, uppercase E
	<code>%g</code>	The more compact of <code>%e</code> or <code>%f</code> with no trailing zeros
	<code>%G</code>	The more compact of <code>%E</code> or <code>%f</code> with no trailing zeros
Character or strings	<code>%c</code>	Single character
	<code>%s</code>	Character vector or string array.

## SUBTYPE

**Description:** The **subtype operator** prints a floating-point value as its octal, decimal, or hexadecimal value. The subtype operator **immediately precedes** the conversion character.

**Note:** Not all conversion characters have subtypes.

Subtype Conversion Character	Output Value Type
<code>%bx</code>	Double-precision hexadecimal value, lowercase a-f
<code>%bX</code>	Double-precision hexadecimal value, uppercase A-F
<code>%bo</code>	Double-precision octal value
<code>%bu</code>	Double-precision decimal value
<code>%tx</code>	Single-precision hexadecimal, lowercase a-f
<code>%tX</code>	Single-precision hexadecimal, uppercase A-F
<code>%to</code>	Single-precision octal value
<code>%tu</code>	Single-precision decimal value

## IDENTIFIER

**Description:** The **identifier** specifies the order for processing the function input arguments. Syntax: `n$`, where `n` represents the positions of the other input arguments in the function call.

**Note:** If an identifier is not specified, then the function input arguments will be processed in the order that they were specified in the function call.

## FLAGS

Flags	Description
'-'	Left-justify
'+'	Always print a sign character (+ or -)
' '	Insert a space
'0'	Pad to field width with zeros before the value
'#'	Modify selected numeric conversions
	• For <code>%o</code> , <code>%x</code> , or <code>%X</code> , print <code>0</code> , <code>0x</code> , or <code>0X</code> prefix.
	• For <code>%f</code> , <code>%e</code> , or <code>%E</code> , print decimal point even when precision is <code>0</code> .
	• For <code>%g</code> or <code>%G</code> , do not remove trailing zeros or decimal point.

## FIELD WIDTH

**Description:** The **field width** specifies the minimum number of characters to print.

**Note:** The function pads to field width with spaces before the value unless otherwise specified by flags.

## PRECISION

**Description:** The **precision** specifies either the number of digits to the right of the decimal point or the number of significant digits pending the conversion character specified.

Conversion Character	Description
%f	Number of digits to the right of the decimal place
%e	Number of digits to the right of the decimal place
%E	Number of digits to the right of the decimal place
%g	Number of significant digits
%G	Number of significant digits

## ADDITIONAL TEXT

**Description:** **formatSpec** can include additional text before a percent sign, %, or after a conversion character.

**Note:** The additional text can be:

- ordinary text to print
- special characters

Special Character	Representation
Single quotation mark	' '
Percent character	%%
Backslash	\\
Alarm	\a
Backspace	\b
Form feed	\f
New line	\n
Carriage return	\r
Horizontal tab	\t
Vertical tab	\v

## A1,...,An

**Description:** The input arguments in the function call that are to be formatted.

**Note:** The input arguments can be specified as scalars, vectors, matrices, or multidimensional arrays.