

Introduktion til Programmering og Problemløsning (PoP)

Simple typer og operatorer

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Typer definerer formen på klodsen

Type:	int	float	char	string	float	float
Værdi:	3	3.0	'3'	"3"	3e0	3.0e0

Metatype	Type name	Description
Boolean	<u>bool</u>	Boolean values true or false
Integer	<u>int</u>	Integer values from -2,147,483,648 to 2,147,483,647
	<u>byte</u>	Integer values from 0 to 255
	<u>sbyte</u>	Integer values from -128 to 127
	<u>int8</u>	Synonymous with sbyte
	<u>uint8</u>	Synonymous with byte
	<u>int16</u>	Integer values from -32768 to 32767
	<u>uint16</u>	Integer values from 0 to 65535
	<u>int32</u>	Synonymous with int
	<u>uint32</u>	Integer values from 0 to 4,294,967,295
	<u>int64</u>	Integer values from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807
	<u>uint64</u>	Integer values from 0 to 18,446,744,073,709,551,615
Real	<u>float</u>	64-bit IEEE 754 floating point value from $-\infty$ to ∞
	<u>double</u>	Synonymous with float
	<u>single</u>	A 32-bit floating point type
	<u>float32</u>	Synonymous with single
Character	<u>decimal</u>	A floating point data type that has at least 28 significant digits
	<u>char</u>	Unicode character
None	<u>string</u>	Unicode sequence of characters
	<u>unit</u>	The value ()
Object	<u>obj</u>	An object
Exception	<u>exn</u>	An exception

Type	syntax	Examples	Value
int, int32	<int | hex> <int | hex>1	3, 0x3 31, 0x31	3
uint32	<int | hex>u <int | hex>ul	3u 3ul	3
byte, uint8	<int | hex>uy '<char>'B	97uy 'a'B	97
byte[]	"<string>"B @"<string>"B	"a\n"B @"a\n"B	[[97uy; 10uy]] [[97uy; 92uy; 110uy]]
sbyte, int8	<int | hex>y	3y	3
int16	<int | hex>s	3s	3
uint16	<int | hex>us	3us	3
int64	<int | hex>L	3L	3
uint64	<int | hex>UL <int | hex>uL	3UL 3uL	3
float, double	<float> <hex>LF	3.0 0x013fLF	3.0 9.387247271e-323
single, float32	<float>F <float>f <hex>lf	3.0F 3.0f 0x013f1f	3.0 3.0 4.4701421e-43f
decimal	<float | int>M <float | int>m	3.0M,3M 3.0m,3m	3.0
string	"<string>" @"<string>" ""<string>""	"\"quote\".\".\n" @""\"quote\".\".\n" ""\"quote\".\".\n""	"quote\".<newline> "quote\".\".\n "quote\".\".\n

ASCII, Latin1, UTF8 og Kodesider

x0+0x	00	10	20	30	40	50	60	70
00	NUL	DLE	SP	0	@	P	'	p
01	SOH	DC1	!	1	A	Q	a	q
02	STX	DC2	"	2	B	R	b	r
03	ETX	DC3	#	3	C	S	c	s
04	EOT	DC4	\$	4	D	T	d	t
05	ENQ	NAK	%	5	E	U	e	u
06	ACK	SYN	&	6	F	V	f	v
07	BEL	ETB	'	7	G	W	g	w
08	BS	CAN	(	8	H	X	h	x
09	HT	EM	)	9	I	Y	i	y
0A	LF	SUB	*	:	J	Z	j	z
0B	VT	ESC	+	;	K	[	k	{
0C	FF	FS	,	<	L	\	l	|
0D	CR	GS	-	=	M	]	m	}
0E	SO	RS	.	>	N	^	n	~
0F	SI	US	/	?	O	_	o	DEL

x0+0x	80	90	A0	B0	C0	D0	E0	F0
00			NBSP	°	À	Ð	à	ð
01			¡	±	Á	Ñ	á	ñ
02			¢	²	Â	Ò	â	ò
03			£	³	Ã	Ó	ã	ó
04			¤	´	Ä	Ô	ä	ô
05			¥	µ	Å	Õ	å	õ
06			¦	¶	Æ	Ö	æ	ö
07			§	·	Ç	×	ç	÷
08			¨	¸	È	Ø	è	ø
09			©	¹	É	Ù	é	ù
0a			ª	º	Ê	Ú	ê	ú
0b			«	»	Ë	Û	ë	û
0c			¬	$\frac{1}{4}$	Ì	Ü	ì	ü
0d			SHY	$\frac{1}{2}$	Í	Ý	í	ý
0e			®	$\frac{3}{4}$	Î	Þ	î	þ
0f			¯	¸	Ï	ß	ï	ÿ

Tegn og Streng

Character	Escape sequence	Description
BS	\b	Backspace
LF	\n	Line feed
CR	\r	Carriage return
HT	\t	Horizontal tabulation
\	\\	Backslash
"	\"	Quotation mark
'	\'	Apostrophe
BEL	\a	Bell
FF	\f	Form feed
VT	\v	Vertical tabulation
	\uXXXX, \UXXXXXXXX, \DDD	Unicode character

x0+0x	00	10	20	30	40	50	60	70
00	NUL	DLE	SP	0	@	P	'	p
01	SOH	DC1	!	1	A	Q	a	q
02	STX	DC2	"	2	B	R	b	r
03	ETX	DC3	#	3	C	S	c	s
04	EOT	DC4	\$	4	D	T	d	t
05	ENQ	NAK	%	5	E	U	e	u
06	ACK	SYN	&	6	F	V	f	v
07	BEL	ETB	'	7	G	W	g	w
08	BS	CAN	(	8	H	X	h	x
09	HT	EM	)	9	I	Y	i	y
0A	LF	SUB	*	:	J	Z	j	z
0B	VT	ESC	+	;	K	[	k	{
0C	FF	FS	,	<	L	\	l	|
0D	CR	GS	-	=	M	]	m	}
0E	SO	RS	.	>	N	^	n	~
0F	SI	US	/	?	O	_	o	DEL

En char-type som repreræsenterer en ny linje: '\n'

Eller som Unicode '\u000a'

En streng: "Hello World"

En streng med:

- Ny linje: "Hello World\n"
- Gåseøjne: "\"Hello World\""
- Verbatim: "\"\"Hello World\"\""

Operatorer, præcedens og association

Operatorer og typer

`3 + 4`

`3.0 + 4.0`

~~`3 + 4.0`~~

`5 / 2`

`5 % 2`

`2 * (5 / 2) + 5 % 2`

`2.0 ** 3.0`

`pown 2 3`

`"hej " + "med " + "dig"`

Operatorer, præcedens og association

Operatorer og typer	Præcedens og association	Operator	Associativity	Description
3 + 4	(2.0 + 3.0) + 4.0	+<expr>, -<expr>, ~~~<expr>	Left	Unary identity, negation, and bitwise negation operator
3.0 + 4.0	(2.0 / 3.0) / 4.0	f <expr>	Left	Function application
3 + 4.0	2.0 ** (3.0 ** 4.0)	<expr> ** <expr>	Right	Exponent
5 / 2	(exp 0.0) + 1.0	<expr> * <expr>, <expr> / <expr>, <expr> % <expr>	Left	Multiplication, division and remainder
5 % 2		<expr> + <expr>, <expr> - <expr>	Left	Addition and subtraction binary operators
2 * (5 / 2) + 5 % 2		<expr> ^^^ <expr>	Right	bitwise exclusive or
2.0 ** 3.0		<expr> < <expr>, <expr> <= <expr>, <expr> > <expr>, <expr> >= <expr>, <expr> = <expr>, <expr> <> <expr>, <expr> <<< <expr>, <expr> >>> <expr>, <expr> &&& <expr>, <expr> ||| <expr> ,	Left	Comparison operators, bitwise shift, and bitwise 'and' and 'or'.
pown 2 3		<expr> && <expr>	Left	Boolean and
"hej " + "med " + "dig"		<expr> || <expr>	Left	Boolean or

String slicing, boolske værdier og sammenligning

Slicing	Boolske værdier og operatorer	Sammenligninger
<code>"abcdefghijkl".[1]</code> = <code>'b'</code>	<code>true = 1</code>	<code>3 < 4</code>
<code>"abcdefghijkl".[1..4]</code> = <code>"bcde"</code>	<code>false = 0</code>	<code>3 > 4</code>
<code>"abcdefghijkl".[..4]</code> = <code>"abcde"</code>	<code>a && b</code>	<code>3 <> 4</code>
<code>"abcdefghijkl".[4..]</code> = <code>"efghijkl"</code>	<code>a || b</code>	<code>3 = 4</code>
<code>"abcdefghijkl".Length</code> = <code>12</code>	<code>not a</code>	<code>not 3 = 4</code>
<code>"abcdefghijkl".[0..11]</code> = <code>"abcdefghijkl"</code>		<code>not (3 = 4)</code>

a	b	a && b	a || b	not a
false	false	false	false	true
false	true	false	true	true
true	false	false	true	false
true	true	true	true	false

Resumé

I denne video har du hørt om:

- Simple typer
- ASCII og UTF-8 tegnsæt
- Operatorer, association og præcedens
- Slicing af strenge