Introduktion til Programmering og Problemløsning (PoP)

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

Type	syntax	Examples	Value
int, int32	<int | hex>	3, 0x3	3
	<int | hex>l	3l, 0x3l	
uint32	<int | hex>u	3u	3
	<int | hex>ul	3ul	
byte, uint8	<int | hex>uy	97uy	97
	'<char>'B	'a'B	
byte[]	"<string>"B	"a\n"B	[|97uy; 10uy|]
	@"<string>"B	@"a\n"B	[|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	3UL	3
	<int | hex>uL	3uL	
float, double	<float>	3.0	3.0
	<hex>LF	0x013fLF	9.387247271e-323
single, float32	<float>F	3.0F	3.0
	<float>f	3.0f	3.0
	<hex>lf	0x013flf	4.4701421e-43f
decimal	<float | int>M	3.0M,3M	3.0
	<float | int>m	3.0m,3m	
string	"<string>"	"\"quote\".\n"	"quote".<newline>
	@"<string>"	@"""quote"".\n"	"quote".\n.
	"""<string>"""	""""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			¬	¼	Ì	Ü	ì	ü
0d			SHY	½	Í	Ý	í	ý
0e			®	¾	Î	Þ	î	þ
0f			¯	¿	Ï	ß	ï	ÿ

Tegn og Strenge

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	Præcendens og association
3 + 4	(2.0 + 3.0)+ 4.0
3.0 + 4.0	(2.0 / 3.0)/ 4.0
3 + 4.0	2.0 **(3.0 ** 4.0)
5 / 2	(exp 0.0)+ 1.0
5 % 2	
2 * (5 / 2) + 5 % 2	
2.0 ** 3.0	
pown 2 3	
"hej " + "med " + "dig"	

Operator	Associativity	Description
+<expr>, -<expr>, ~~~<expr>	Left	Unary identity, negation, and bitwise negation operator
f <expr>	Left	Function application
<expr> ** <expr>	Right	Exponent
<expr> * <expr>, <expr> / <expr>, <expr> % <expr>	Left	Multiplication, division and remainder
<expr> + <expr>, <expr> - <expr>	Left	Addition and subtraction binary operators
<expr> ^^^ <expr>	Right	bitwise exclusive or
<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'.
<expr> && <expr>	Left	Boolean and
<expr> || <expr>	Left	Boolean or

String slicing, boolske værdier og sammenligning

Slicing

"abcdefghijkl".[1] = 'b'

"abcdefghijkl".[1..4] = "bcde"

"abcdefghijkl".[..4] = "abcde"

"abcdefghijkl".[4..] = "efghijkl"

"abcdefghijkl".Length = 12

"abcdefghijkl".[0..11] = "abcdefghijkl"

Boolske værdier og operatorer

true = 1

false = 0

a && b

a || b

not a

Sammenligninger

3 < 4

3 > 4

3 <> 4

3 = 4

~~not 3 = 4~~

not (3 = 4)

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