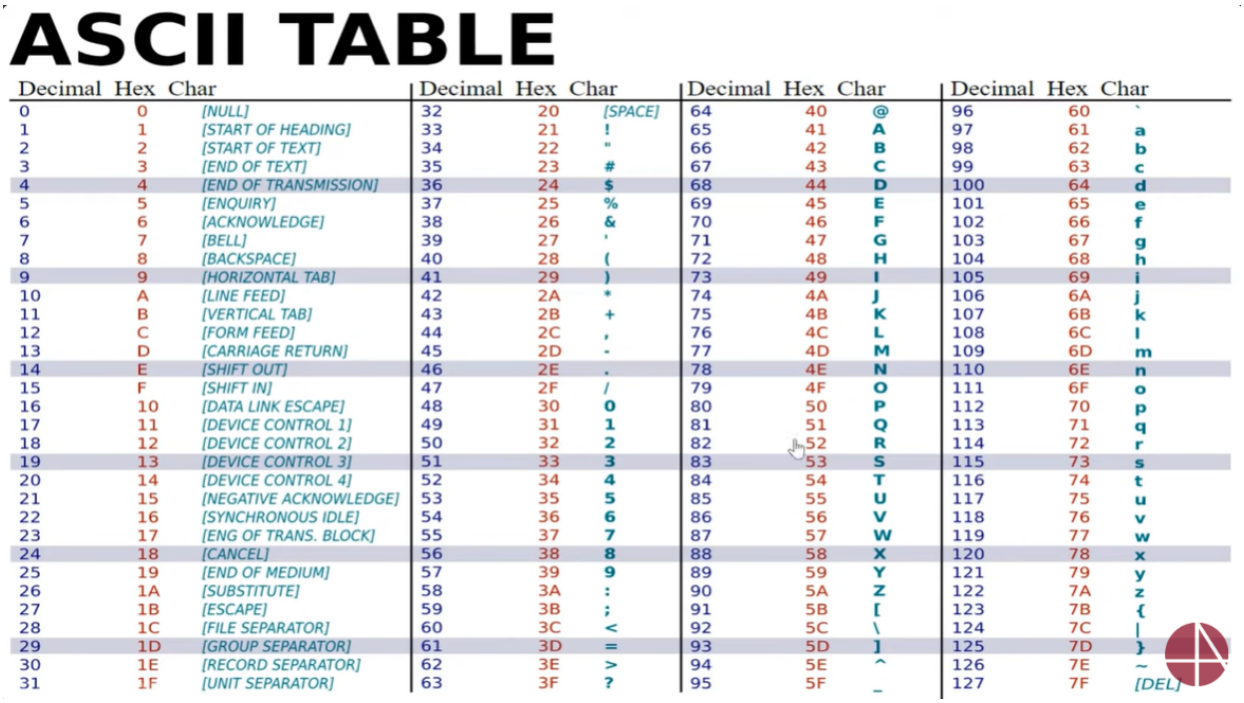
Lesson 9. Fundamental Data Types — Character

Brief overview on character data type

ASCII Table



ASCII TABLE

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	[NULL]	32	20	[SPACE]	64	40	@	96	60	`
1	1	[START OF HEADING]	33	21	!	65	41	A	97	61	a
2	2	[START OF TEXT]	34	22	"	66	42	B	98	62	b
3	3	[END OF TEXT]	35	23	#	67	43	C	99	63	c
4	4	[END OF TRANSMISSION]	36	24	$	68	44	D	100	64	d
5	5	[ENQUIRY]	37	25	%	69	45	E	101	65	e
6	6	[ACKNOWLEDGE]	38	26	&	70	46	F	102	66	f
7	7	[BELL]	39	27	'	71	47	G	103	67	g
8	8	[BACKSPACE]	40	28	(	72	48	H	104	68	h
9	9	[HORIZONTAL TAB]	41	29	)	73	49	I	105	69	i
10	A	[LINE FEED]	42	2A	*	74	4A	J	106	6A	j
11	B	[VERTICAL TAB]	43	2B	+	75	4B	K	107	6B	k
12	C	[FORM FEED]	44	2C	,	76	4C	L	108	6C	l
13	D	[CARRIAGE RETURN]	45	2D	-	77	4D	M	109	6D	m
14	E	[SHIFT OUT]	46	2E	.	78	4E	N	110	6E	n
15	F	[SHIFT IN]	47	2F	/	79	4F	O	111	6F	o
16	10	[DATA LINK ESCAPE]	48	30	0	80	50	P	112	70	p
17	11	[DEVICE CONTROL 1]	49	31	1	81	51	Q	113	71	q
18	12	[DEVICE CONTROL 2]	50	32	2	82	52	R	114	72	r
19	13	[DEVICE CONTROL 3]	51	33	3	83	53	S	115	73	s
20	14	[DEVICE CONTROL 4]	52	34	4	84	54	T	116	74	t
21	15	[NEGATIVE ACKNOWLEDGE]	53	35	5	85	55	U	117	75	u
22	16	[SYNCHRONOUS IDLE]	54	36	6	86	56	V	118	76	v
23	17	[ENG OF TRANS. BLOCK]	55	37	7	87	57	W	119	77	w
24	18	[CANCEL]	56	38	8	88	58	X	120	78	x
25	19	[END OF MEDIUM]	57	39	9	89	59	Y	121	79	y
26	1A	[SUBSTITUTE]	58	3A	:	90	5A	Z	122	7A	z
27	1B	[ESCAPE]	59	3B	;	91	5B	[	123	7B	{
28	1C	[FILE SEPARATOR]	60	3C	<	92	5C	\	124	7C	|
29	1D	[GROUP SEPARATOR]	61	3D	=	93	5D	]	125	7D	}
30	1E	[RECORD SEPARATOR]	62	3E	>	94	5E	^	126	7E	~
31	1F	[UNIT SEPARATOR]	63	3F	?	95	5F	_	127	7F	[DEL]

define and declare a character variable

```
char some_variable_name = 'N';
//注意字符要加上单引号
//字符变量一次只能保存一个字符，因为它的大小是 1 byte，一次不能容纳超过一个字符
```

```
//并不是必须向字符变量提供字符，还可以为他们分配整数值
char some_variable_name = 65;
printf("%c", some_variable_name);
//格式说明符为字符，所以用 %c 而不是 %d，  如果用 %d 打印的就是十进制
```

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = 65;
    printf("%c", var);
    return 0;
}
```

```
"E:\C Programming & Data St
A
Process returned 0 (0x0)   execution time : 0.628 s
Press any key to continue.
```

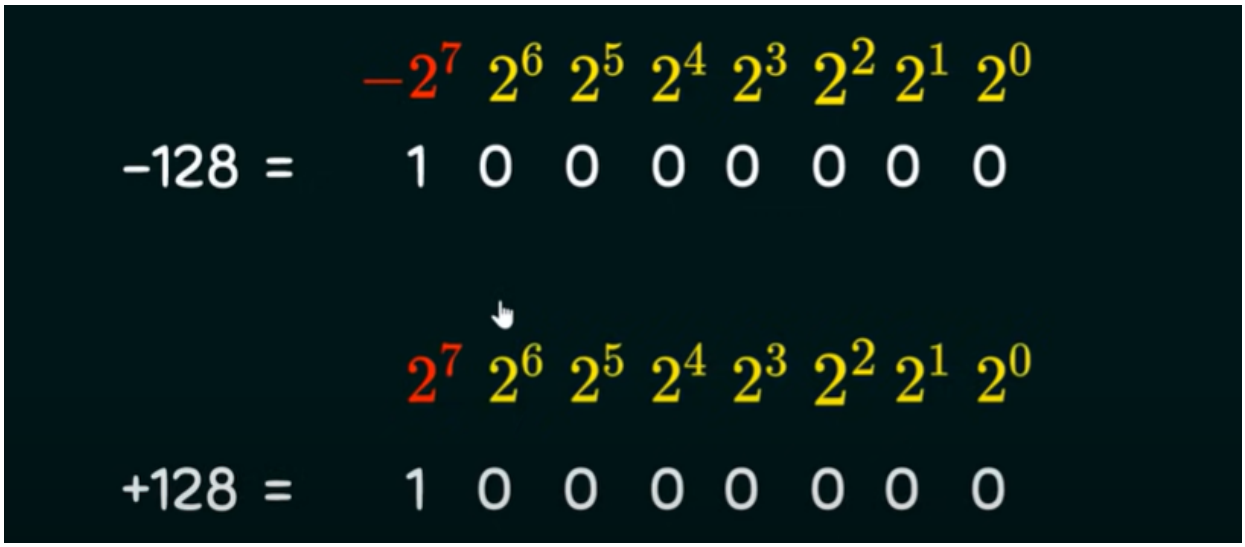
```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = 65;
    printf("%d", var);
    return 0;
}
```

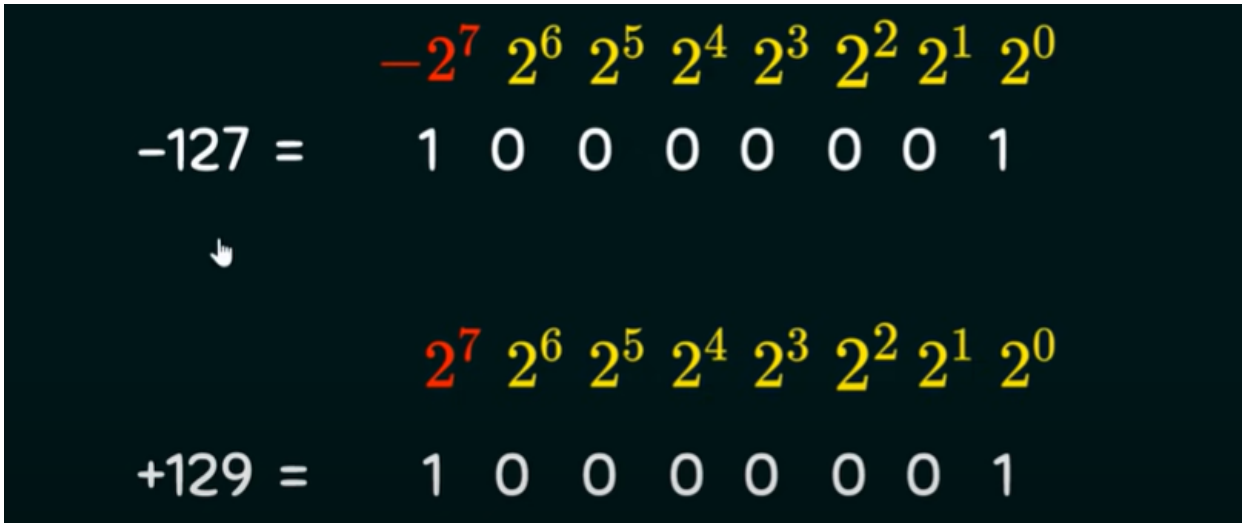
```
"E:\C Programming & Data St
65
Process returned 0 (0x0)   execution time : 0.357 s
Press any key to continue.
```

Size/Range of characters

Difference between signed and unsigned characters

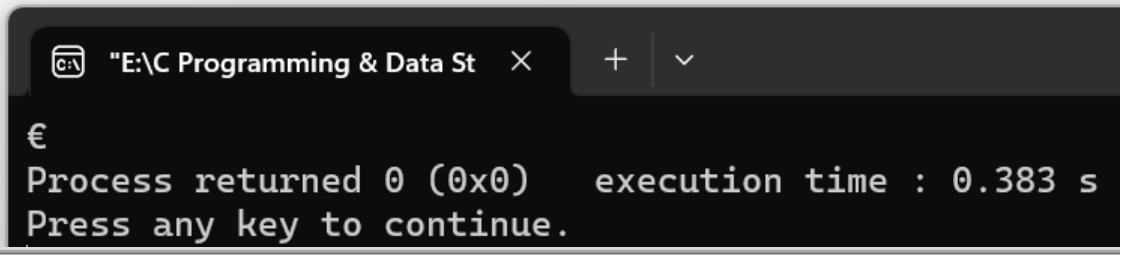
二进制补码



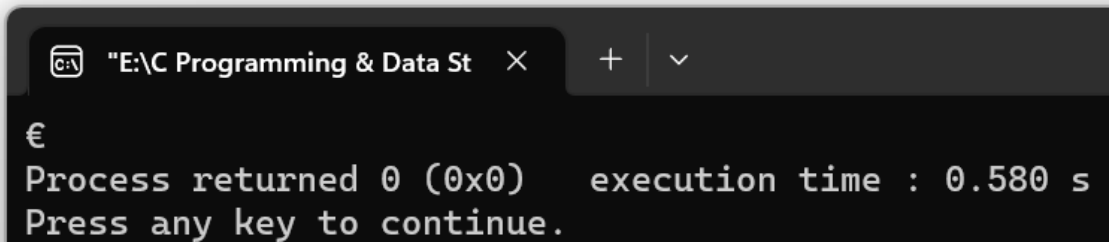


Note: -128 和 +128 , -127 和 +129 的二进制相同，类似的 -126 和 +130 的二进制补码相同.... -1 和 +255 的二进制表示也相同，所以它们打印出来的效果相同

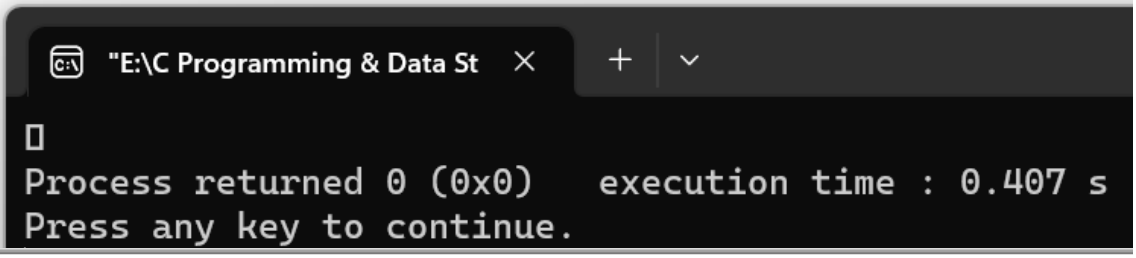
```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = 128;
    printf("%c", var);
    return 0;
}
```



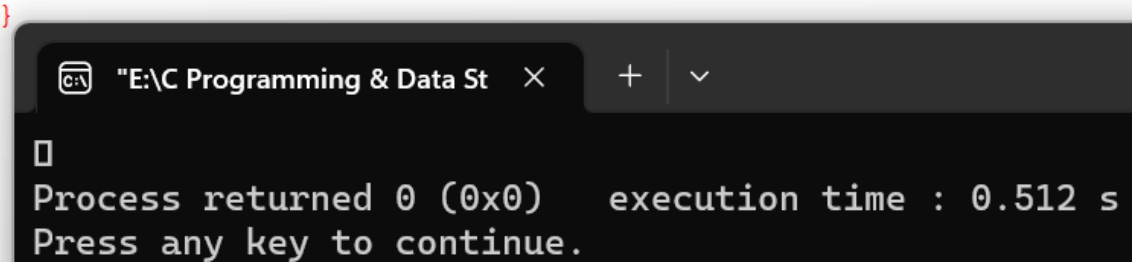

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = -128;
    printf("%c", var);
    return 0;
}
```



```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = -1;
    printf("%c", var);
    return 0;
}
```




```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    char var = 255;
    printf("%c", var);
    return 0;
}
```



conclusion

在字符变量的情况下，负值不会带来任何额外作用，每个负值都相当于 Extended ASCII characters 中的某个正值

Summary