Goals for today

- Everything you wanted to know about C-strings
  (but were afraid to ask)
- Char/ascii
- String constants, string as “abstraction”
  (albeit a leaky one)
- C library functions <string.h>
- Under the hood: C-string as pointer/array of char
- Array indexing vs pointer arithmetic
- Ask questions today (and every day!)

Character data

- **char is 1 byte**
  - (by definition in standard, never need to compute sizeof(char)
- **char may be signed or unsigned by default**
  - Of consequence when promoting to larger type but not much else
- **Standard ASCII maps 0x00 - 0x7f to letters, digits, punct**
  - man ascii to display table
  - 8th bit used as parity/error check in some situations
  - No consensus for characters mapped to 0x80-0xff
- **Unicode**
  - more robust/flexible but more complex, larger storage needs
- **char operations**
  - single byte integer, man isdigit

	2	3	4	5	6	7
0:		0	@	P	`	p
1:	!	1	A	Q	a	q
2:	"	2	B	R	b	r
3:	#	3	C	S	c	s
4:	$	4	D	T	d	t
5:	%	5	E	U	e	u
6:	&	6	F	V	f	v
7:	'	7	G	W	g	w
8:	(	8	H	X	h	x
9:	)	9	I	Y	i	y
A:	*	:	J	Z	j	z
B:	+	;	K	[	k	{
C:	,	<	L	\	l	|
D:	-	=	M	]	m	}
E:	.	>	N	^	n	~
F:	/	?	O	_	o	

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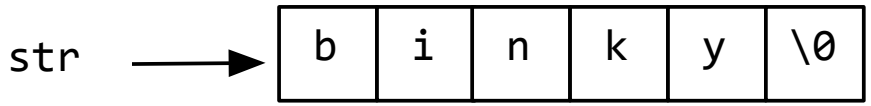
```
int my_isdigit(int ch)
{
    return ch >= '0' && ch <= '9';
}


int my_isxdigit(int ch)                    // from musl
{
   return my_isdigit(ch) || ((unsigned)ch|32)-'a' < 6;
}
```

Representing a sequence of chars

- **How to represent sequence of chars?**
  - Stuff into a 4-byte or 8-byte word?
  - Array/vector/list of char?
- **C language features generally map straight to machine structures**
  - We saw this with behavior/operations of integers
  - How does underlying system support sequence of anything?
- **C-string is a simply a pointer!**
  - characters stored in sequential memory locations
  - Null char used for termination

```
char *str = "binky";
```



- **What can you do with a C-string?**
  - read/write individual chars, e.g. str[index]
  - man string for library functions

/afs/ir/class/cs107/samples/lect4

```
size_t my_strlen(const char *s)
{
    size_t count = 0;
    while (s[count] != '\0')
        count++;
    return count;
}

char *my_strcpy(char *dst, const char *src)
{
    char *result = dst;
    while ((*dst++ = *src++)) ;
    return result;
}

char *my_strncpy(char *dest, const char *src, size_t n)
{                                                    // from man page
    size_t i;

    for (i = 0; i < n && src[i] != '\0'; i++)
         dest[i] = src[i];
    for ( ; i < n; i++)
        dest[i] = '\0';
    return dest;
}
```

Let's code!

`/afs/ir/class/cs107/samples/lect4/pig.c`

Pig latin: be => ebay
trash => ashtray
one => oneway

Helpful string.h functions to consider:

- strcspn
- strcat, strncat