Strings

• Strings are not a built-in data type.
• C provides almost no special means of defining or working with strings.
• A string is an array of characters terminated with a “null character” (\0)
String literals

char *name = "csc209h";
printf("This is a string literal\n");

• String literals are stored as character arrays, but you can't change them.

name[1] = 'c'; /* Error */

• The compiler reserves space for the number of characters in the string plus one to store the null character.
String Variables

• arrays are used to store strings
• strings are terminated by the null character ('\0') (That's how we know a string's length.)
• Initializing strings:
  - `char course[8] = "csc209h";`
  - `course` is an array of characters
  - `char *s = "csc209h";`
  - `s` is a pointer to a string literal
String functions

• The library provides a bunch of string functions which you should use (most of the time).

• man string

• int strlen(char *str)
  – returns the length of the string. Remember that the storage needed for a string is one plus its length
Copying a string

char *strncpy(char *dest, char *src, int size)

– copy up to size bytes of the string pointed to by src in to dest. Returns a pointer to dest.
– Do not use strcpy (buffer overflow problem)

char str1[3];
char str2[5] = "abcd";
/*common error*/
strncpy(str1, str2, strlen(str2));
Concatenating strings

```c
char *strncat(char *s1, const char *s2, size_t n);
```

- appends the contents of string `s2` to the end of `s1`, and returns `s1`.
- only appends up to `n` bytes to `s1`

**Watch out!** It is easy to forget how much space is left.
- `char str1[6] = "abc";`
- `strncat(str1, "def", 6); /*wrong*/`
Comparing strings

int strcmp(const char *s1, const char *s2)
• compares s1 and s2, returning a value less than, equal to, or greater than 0 depending on whether s1 is less than, equal to, or greater than s2.

if( strcmp(str1, str2) <= 0 )
    /* is str1 <= str2 */
NAME
strchr, strrchr - locate character in string

SYNOPSIS
#include <string.h>

char *strchr(const char *s, int c);
char *strrchr(const char *s, int c);

DESCRIPTION
The strchr() function returns a pointer to the first occurrence of the character c in the string s.

The strrchr() function returns a pointer to the last occurrence of the character c in the string s.

RETURN VALUE
The strchr() and strrchr() functions return a pointer to the matched character or NULL if the character is not found.