CS 241
Data Organization
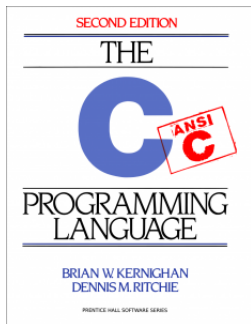# Character Arrays

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Read Kernighan & Richie

3 Control Flow

4 Functions and Program Structure

C Strings: a char Array

- In the C programming Language, there does not exist a String type.

- In C, a string is a *null terminated* `char` array:

a	b	c	\0

```c
char str[40];
str[0] = 'a';
str[1] = 'b';
str[2] = 'c';
str[3] = '\0'; /* null terminated */
printf("%c\n",str[0]); /* a */
printf("%c\n",str[1]); /* b */
printf("%s\n",str); /* abc */
printf("%lu\n", sizeof(str)); /* 40 */
```

C Strings: a char Array

When a char array is declared with double quotes, C will null terminate the array.

```c
char str[] = "abc";
printf("%c\n",str[0]); /* a */
printf("%s\n",str); /* abc */

printf("%lu\n", strlen(str)); /* 3 */
printf("%lu\n", sizeof(str)); /* 4 */
printf("%d\n", str[0]); /* 97 */
printf("%d\n", str[1]); /* 98 */
printf("%d\n", str[2]); /* 99 */
printf("%d\n", str[3]); /* 0 */
printf("%d\n", str[4]); /* ??? seg fault? */
```

strlen is a library function in <string.h>

While Character at str[i] is Not Null

```c
char str[15];
str[0] = getchar();
str[1] = getchar();
str[2] = getchar();
str[3] = '\0';
int i=0;
while (str[i])
{
  printf("%c\n",str[i]);
  i++;
}
```

String Length: (Section 2.3)

```c
#include <stdio.h>
int strLength(char s[])
{
  int n=0;
  while (s[n]) n++;
  return n;
}

int main(void)
{
  char str[] = "Euler";
  printf("%s: %d\n", str, strLength(str));
}
```