Principles of Computer Science II

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Lecture Slides 12 - Character Processing

The char Data Type

- Used to represent variables
- Stored in one byte on the machine
  - Commonly, 1 byte = 8 bits = 256 values
  - Usual range is from -128 to 127
- The integer code stored in a `char` variable is interpreted according to a character encoding
  - ASCII
  - EBCDIC

Character Literals, etc.

```
printf("%c\n", 'a');      /* a is printed */

printf("%c%c%c\n", 'A', 'B', 'C'); /* ABC is printed */

printf("%d\n", 'a');      /* 97 is printed (ASCII) */

printf("%c\n", 97);       /* a is printed */

printf("\"ABC\"\n");      /* "ABC" is printed */

printf("'%c%c\n", '"', '\'');    /* ... */


         /* see control characters on page 176 */
```


getchar() - putchar() Macros

Contains line:
`#define EOF (-1)`

```
#include <stdio.h>

int main(void) {
    int c;

    while ((c = getchar()) != EOF) {
        putchar(c);
        putchar(c);
    }
    return 0;
}
```

An `int` holds all possible character values as well as special values like `EOF`

Recursive dbl_out

```
#include <stdio.h>

void dbl_out() {
    int c;
    if ((c = getchar()) != EOF) {
        putchar(c);
        putchar(c);
        dbl_out();
    }
}

int main(void) {
    dbl_out();
    return 0;
}
```


Character Macros/Functions in ctype.h

- `isalpha(c)` `isdigit(c)`
- `isupper(c)` `islower(c)`
- `isalnum(c)` `isxdigit(c)`
- `isspace(c)` `ispunct(c)`
- `isprint(c)` `isgraph(c)`
- `iscntrl(c)` `isascii(c)`

- `toupper(c)` `tolower(c)` `toascii(c)`
  - (pg. 185)