

# C Cheat Sheet

Compiling	
gcc	GNU C Compiler (ex. gcc file.c)
-c	Generate object files (.o files)
-o	Specify name for output executable

Preprocessor Macros	
<i>General</i>	C Preprocessor Directives are directives processed at compile time that change the text of a program
#define	Create a symbolic constant or expression
<i>Examples</i>	#define NOR(A,B) !(A    B) #define TRUE 1

Storage and Linkage Classes	
Static Var, outside function	Storage: static Linkage: internal
Static Var, inside function	Storage: static Linkage: none
Non-static Var, outside function	Storage: static Linkage: external
Non-static Var, inside function	Storage: automatic Linkage: none
Static function	Storage: none Linkage: internal
Non-static function	Storage: none Linkage: external

Strings	
Strings are character arrays that are terminated with the NULL character (literal 0).	
Strings must be declared large enough to hold the string plus NULL termination (A string to hold "Hello" would need to be 6 characters long)	
Double quotes include NULL character ("Hi" -> Hi plus NULL termination.)	

String functions and manipulation	
snprintf	Formatted print to string, protecting against buffer overflow
sscanf	Formatted read from string
strlen	Returns length of string without null termination
<i>Examples</i>	snprintf(d,10,"%s",s); -Copies no more than 10 chars from s to d.

Standard and File I/O	
printf	Formatted print to stdout
fprintf	Formatted print to file
scanf	Formatted read from stdin
fscanf	Formatted read from file
<i>Examples</i>	printf("%s\n", buffer); -prints buffer with newline scanf("%d %d", i, j); -Read two ints from stdin into i and j

Opening File(s)	
fopen	Opens a file
fclose	Closes a file
r	Opens for reading (if the file exists)
w	Creates a new file with the specified file name (overwriting existing files of the same name)
a	Opens for appending If the file does not exist, creates the file.
r+	Opens for reading and
w+	appending (if the file exists)
a+	Otherwise, creates file
<i>Examples</i>	fp = fopen("f.txt", "w+"); -Opens f.txt for reading and appending close(fp); -Closes the file fp

String Format Specifiers	
%s	String of characters (null terminated)
%[n]s	String of n characters
%c	Single character
%d or %i	Signed integer
%u	Signed integer
%f	Floating point
%x	Unsigned hexadecimal integer
%p	Pointer address

Data Types	
char	Character (1 byte)
short	Signed short integer (2 bytes)
int	Signed integer (4 bytes)
long	Signed long integer (8 bytes)
float	Single-precision float
double	Double-precision float
stdint.h	Contains definitions for fixed size integers (int8_t, int16_t, int32_t, uint8_t, uint16_t, uint32_t)
signed	Modifier that makes a
unsigned	variable signed or unsigned

Dynamic Memory	
<i>General</i>	Dynamic memory is that must be explicitly allocated at runtime and freed when it is no longer needed.
malloc	Allocates dynamic memory returning a pointer to the allocated memory.
free	Function for freeing allocated dynamic memory.
<i>Examples</i>	Arr = malloc(5); -Allocates an array of 5 bytes free(Arr); -Frees allocated memory